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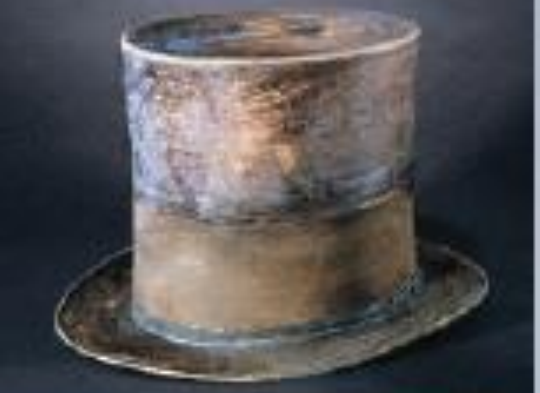
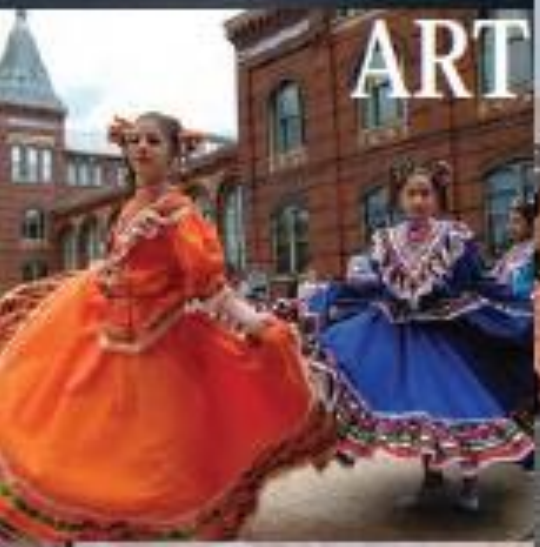
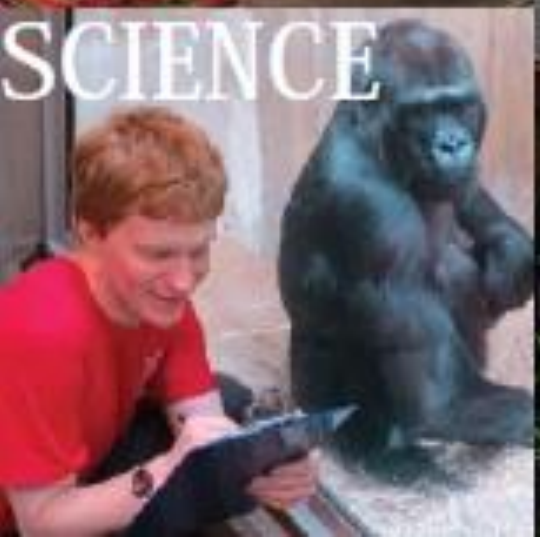
HISTORY





SCIENCE



2013 - 2014 SORS

Smithsonian Opportunities for Research and Study

SMITHSONIAN OPPORTUNITIES

FOR RESEARCH AND STUDY
IN HISTORY ● ART ● SCIENCE

2013-2014

Office of Fellowships and Internships
Smithsonian Institution
Washington, DC

CONTENTS

RESEARCH AND STUDY OPPORTUNITIES

INTRODUCTION

Eric Woodard, Director, Office of Fellowships and Internships

The Office of Fellowships and Internships has the central management and administrative responsibility for the Institution's programs of research fellowships, internships, and other academic appointments. One of its primary objectives is the facilitation of the Smithsonian's scholarly interactions with students and scholars at universities, museums, and other research institutions around the world. The Office administers Institution-wide research support programs, and encourages and assists other Smithsonian museums, research institutes and research offices in the development of additional fellowships, internships, and visiting appointments.

This book is published to provide information about the Smithsonian Institution's fellowships, internships, and research resources. The Smithsonian Institution encourages access to its research staff, collections, and reference materials by visiting scholars, scientists, and students. The Institution offers in-residence appointments for research and study using its facilities, with the advice and guidance of its staff members. These appointments enable qualified persons to make use of Smithsonian resources in pursuing studies related to research interests of the Institution and its staff. Appointments vary in duration, and many carry financial support.

Sections of *Smithsonian Opportunities for Research and Study*

- Details about the purpose, research fields, eligibility requirements, duration of appointment, and application procedures and deadlines for each type of opportunity offered throughout the Institution are described in the first section. The online version of this publication provides some links to more detailed information for some of the programs listed.
- The second section of the book is devoted to descriptions of the Museums, Research Institutes, and Research Offices of the Smithsonian and to the research interests of the professional staff. The online version of this publication provides some links to more detailed information for some of the staff members listed.
- The third section provides information about the Institution's research support units available for consultation and use by visiting scholars, scientists and students.

Further information about the programs described in the book may be obtained by contacting this office (unless otherwise noted):

Contact: Office of Fellowships and Internships
Smithsonian Institution
MRC 902 P.O. Box 37012
470 L'Enfant Plaza, Suite 7102
Washington, D.C. 20013-7012

Phone: (202) 633-7070

E-mail: siofi@si.edu

WWW: www.si.edu/ofi

INFORMATION FOR APPLYING TO THE SMITHSONIAN INSTITUTION FELLOWSHIP PROGRAM

Applicants to the Smithsonian Institution Fellowship Program must propose to conduct research in a discipline pursued at the Smithsonian and must submit a specific and detailed research proposal indicating why the Smithsonian is an appropriate place to carry out the study. Projects that broaden and diversify the research conducted within these disciplines are encouraged. Fellowships are offered to support research at Smithsonian facilities or field stations. Fellows are expected to spend most of their tenure in residence at the Smithsonian, except when arrangements are made for periods of field work or research travel.

For all fellowships, appropriate members of the Smithsonian professional staff must be willing and able to serve in the capacity of principal advisor or host, and space and facilities must be available to accommodate the proposed research.

Applicants are evaluated on the scholarly merit of their proposals; their ability to carry out the proposed research and study; the likelihood that the research can be completed during the requested appointment period; extent to which the Smithsonian, through its research staff members or resources, can contribute to the proposed research project; and the inclusion of diverse perspectives. Included in the proposal evaluation will be its relevance in terms of the Smithsonian's Strategic Plan and how the research reflects one or more of the Four Grand Challenges.

Four Grand Challenges of the Smithsonian Strategic Plan
(http://si.edu/about/documents/SI_Strategic_Plan_2010-2015.pdf):

Unlocking the Mysteries of the Universe

- Better understand the early epoch of inflation of the universe, the nature and role of dark matter in the evolution of the universe, and the properties of the dark energy that is speeding up the expansion of the universe.
- Comprehend extreme explosive phenomena in the universe, with foci on gamma-ray bursts and the birth of neutron stars and black holes in supernovae, whose huge explosions create the basic elements from which life is formed.
- Discover how galaxies form, cluster, and interact; how supermassive black holes grow, and how galaxies evolve with cosmic time.
- Understand how stellar processes change clouds of gas and dust into stars and planets, including the Earth, and how life emerged here and perhaps elsewhere.
- Explore how diverse peoples throughout history have interpreted the cosmos and its role in their lives.
- Understand the formation, geological diversity, and dynamics of the Earth, the Moon, and other rocky bodies in our solar system.

Understanding and Sustaining a Biodiverse Planet

- Improve understanding of and access to the biology and natural history of species – information that is lacking for the vast majority of species on the planet.
- Increase knowledge of the evolutionary and ecological history of species and ecosystems, and the processes responsible for population declines and extinction.
- Develop concepts, theories, tools, and models that contribute directly to halting biodiversity loss, managing species and their habitats, restoring ecosystems, and mitigating threats to the environment.

- Understand how species interactions, climate change, habitat fragmentation, diseases, environmental contaminants, and invasions of exotic species affect the survival of species and the functioning of ecosystems.
- Improve knowledge of the relationships between cultures and biological diversity over time in order to better sustain both.

Valuing World Cultures

- Add to knowledge of migrations, diasporas, and interactions of cultural groups.
- Study historic and contemporary cultural and artistic heritage, with particular emphasis on the arts of Asia and Africa, the heritage of the Americas, indigenous knowledge and expressive systems, and modern and contemporary art and design.
- Shed light on the interconnections among world cultures.
- Augment knowledge about the processes leading to the loss of cultural diversity – tangible and intangible heritage.

Understanding the American Experience

- Use material culture and documentary collections to research and interpret national milestones and achievements; American life and national identity, cultural expression, the environment and changing landscape, and achievements in science and technology; political and military struggles; economic, scientific, technological, and cultural innovations; and artists and leaders that have defined the United States and the character of its people.
- Interpretation of the diverse communities of the United States, particularly African American, Latino, Asian Pacific American, and Native American, as well as the cultural interrelationships among these communities.
- Conduct research on contemporary American life and creativity.
- Conduct research on historical migrations and diasporas to and within America and on the contemporary movements of people, art, artifacts, and cultural expressions that connect various world cultures to the American experience.
- Use biography and stories of individuals such as leaders, inventors, artists, and cultural exemplars to help understand the evolving nature of the American character.

FELLOWSHIP CATEGORIES

Postdoctoral Fellowships are offered to scholars who have held a Ph.D. or equivalent for less than seven years.

Senior Fellowships are offered to scholars who have held a Ph.D. or equivalent for seven years or more. The term is 3 to 12 months.* Both fellowships offer a stipend of $45,000 per year plus allowances. Earth and Planetary Studies - Senior and Postdoctoral - offer a stipend of $50,000 per year plus allowances.

Predoctoral Fellowships are offered to doctoral candidates who have completed preliminary course work and examinations, and have been advanced to candidacy. Candidates must have the approval of their universities to conduct doctoral research at the Smithsonian Institution. The term is 3 to 12 months. The stipend is $30,000 per year plus allowances.

Graduate Student Fellowships are offered to students formally enrolled in a graduate program, who have completed at least one semester and not yet been advanced to candidacy if in a Ph.D. Program. Applicants must submit a proposal for research in a discipline which is pursued at the Smithsonian. The term is 10 weeks; the stipend is $6,500.

These fellowships support research in residence at all Smithsonian facilities except the Smithsonian Astrophysical Observatory (see separate listing in Fellowships and Internships section). **Applications are available in September, and the deadline for submission is January 15th.** Stipends are prorated for periods of less than twelve months.

*Postdoctoral applicants in science may apply for up to 24 months.

FIELDS OF RESEARCH AND STUDY

The following information is offered as a general guide to the reader in suggesting the Smithsonian museums, research facilities, archives, and other reference resources which may be pertinent to the individual's field of interest.

American History, American Material and Folk Culture, and the History of Music and Musical Instruments, consult the following entries: National Museum of the American Indian; National Museum of American History; National Portrait Gallery; National Air and Space Museum; Cooper-Hewitt, National Design Museum; Anacostia Community Museum; National Museum of African American History and Culture; National Postal Museum; Center for Folklife and Cultural Heritage; and the Smithsonian Institution Archives.

History of Science and Technology, consult the following entries: National Museum of American History; National Air and Space Museum; Smithsonian Institution Archives; and Dibner Library of the History of Science and Technology under Smithsonian Institution Libraries.

History of Art, Design, Crafts, and the Decorative Arts, consult the following entries: Smithsonian American Art Museum; Archives of American Art; Hirshhorn Museum and Sculpture Garden; Freer Gallery of Art/Arthur M. Sackler Gallery; Cooper-Hewitt, National Design Museum; National Museum of African Art; National Museum of the American Indian; National Museum of American History; National Portrait Gallery; and National Postal Museum.

Anthropology, Archaeology, Linguistics, and Ethnic Studies, consult the following entries: National Museum of Natural History; National Museum of African Art; National Museum of the American Indian; National Museum of American History; Anacostia Community Museum; Center for Folklife and Cultural Heritage; Smithsonian Tropical Research Institute; and the Museum Conservation Institute.

Evolutionary, Systematic, Behavioral, Environmental, and Conservation Biology, consult the following entries: National Museum of Natural History; National Zoological Park; Smithsonian Environmental Research Center and Smithsonian
Tropical Research Institute.

Earth, Mineral, and Planetary Science, consult the following entries: the Departments of Mineral Sciences and Paleobiology of the National Museum of Natural History; and Center for Earth and Planetary Studies of the National Air and Space Museum.

Materials Characterization and Conservation, consult the Museum Conservation Institute; Freer Gallery of Art/Arthur M. Sackler Gallery; and the National Museum of the American Indian.

Principal Advisors, Co-Advisors, and Consultants

Individuals listed in this publication are divided into three categories; research staff, affiliated research staff, and program staff. Each listing contains information regarding the individual's educational background and their research specialties. **Applicants are strongly encouraged to contact potential advisors and co-advisors to determine the feasibility of the proposed research being conducted at the Smithsonian Institution, and the availability of relevant resources, including collections, archives, and library materials during the proposed tenure dates.**

Research staff may be named by applicants to serve as principal advisors, co-advisors or consultants.

Affiliated research staff who are in residence during most of the tenure period proposed may be named as a co- advisor or as a consultant by an applicant.

Program staff and their respective offices, are available for specialized assistance and advice to visiting investigators and are described and named in the section entitled "Research Assistance Programs."

Obtaining Application Materials

Potential applicants should visit www.si.edu/ofi for application instructions. Application instructions should be reviewed well in advance of the deadline to allow for your consultation with proposed advisor(s)/host(s), preparation of the proposal and accompanying materials for consideration.

Deadline: January 15th is the deadline for fellowships to begin on or after June 1st

FELLOWSHIP AND INTERNSHIP PROGRAMS

The following section includes descriptions of fellowships, internships and other programs available at the Institution. Please take note of specialized fellowships and their respective places of contact.

As part of its mandate for "the increase and diffusion of knowledge," including the diverse ideas, skills, and cultures of our nation, the Smithsonian Institution pursues policies of equal opportunity and cultural diversity. Smithsonian fellowships and internships are awarded on the basis of these policies. Applicants are evaluated on their academic standing, scholarly qualifications, experiences, the quality of the research project or study proposed and its suitability to Smithsonian collections, facilities, and programs.

Scholars and students with outside sources of funding are also encouraged to utilize the Institution's resources and facilities. The Office of Fellowships and Internships can facilitate visiting appointments in such cases provided that the investigator obtains approval from the staff member with whom he/she would consult.

FELLOWSHIPS

Fellowships at the Smithsonian Institution provide students and scholars with opportunities to pursue independent research projects in association with members of the Smithsonian's professional research staff.

OFFICE OF FELLOWSHIPS AND INTERNSHIPS (OFI)

Smithsonian Institution Fellowship Program

***Please note** - Persons interested in conducting research at the Smithsonian Astrophysical Observatory (see separate listing) should apply to that unit directly.

Graduate Student Fellowships - These fellowships allow students to conduct research for ten-week periods in association with Smithsonian research staff members. Applicants must be formally enrolled in a graduate program of study, must have completed at least one semester, and must not yet have been advanced to candidacy in a doctoral program.

Predoctoral Fellowships - These fellowships allow students to conduct research for periods of three to twelve months.
Applicants must have completed coursework and preliminary examinations for the doctoral degree, and must be engaged in dissertation research. In addition, candidates must have the approval of their universities to conduct their doctoral research at the Smithsonian.

Postdoctoral and Senior Fellowships - Postdoctoral Fellowships of three to twelve months are available for scholars who have held the doctoral degree or equivalent for fewer than seven years as of the application deadline. Senior Fellowships of three to twelve months are available for scholars who have held the doctoral degree or equivalent for more than seven years as of the application deadline. Applications for senior fellowships may be made up to eighteen months in advance. Stipends for senior fellowships are the same as for the postdoctoral program, but the Smithsonian's stipend may be matched by other sources of funding such as a sabbatical salary.

Stipend Senior and Postdoctoral - $45,000 per year
Earth and Planetary Sciences Senior and Postdoctoral - $50,000 per year
Predoctoral - $30,000 per year
Graduate Students - $6,500

Deadline January 15th for awards to begin on or after June 1st

For more information see the previous section 'Information for Applying to the Smithsonian Institution Fellowship Program'

Smithsonian Postgraduate Fellowships in Conservation of Museum Collections Program

These fellowships are offered to recent graduates of masters programs in art conservation or the equivalent or conservation scientists, including those at the postdoctoral level, who wish to conduct research and gain further training in Smithsonian conservation laboratories for a period of one year. Additional facilities may be available to museum or archives fellows for analytical work at the Museum Conservation Institute (MCI).

Term Fellowships are available for 3 to 12 months
Stipend A stipend of $35,000 is being offered plus allowances
Deadline January 15
WWW http://www.smithsonianofi.com/fellowship-opportunities/

Minority Visiting Students

Through the Minority Student Awards Program the Office of Fellowships and Internships offers internships and visiting student awards to increase participation of U.S. minority groups who are underrepresented in Smithsonian scholarly programs, in the disciplines of research conducted at the Institution, and in the museum field. Visiting Student Awards are available for currently enrolled advanced graduate students. Visiting Students pursue independently designed research projects in association with Smithsonian staff. Students should contact the Office of Fellowships and internships for application information.

Term 10 weeks
Stipend $600 per week
Deadline Summer (to begin after June 1) – February 1
Fall (to begin after October 1) – February 1
Spring (to begin after January 1) - October 1

Molecular Evolution Fellowships

Postdoctoral Fellowships in Molecular Evolution are available to support research that uses the resources and research opportunities offered at the National Zoological Park (Washington, DC), the National Museum of Natural History (Washington, DC) or the Smithsonian Tropical Research Institute (Panama).

Stipend $45,000 for one year (12 months) to $90,000 for two years (24 months)
Deadline January 15th for awards to begin on or after June 1st

Native American Community Scholars Awards

The Office of Fellowships and Internships offers awards to Native Americans who are formally or informally related to a Native American community to undertake individually designed research projects related to Native American topics and using Native American resources at the Smithsonian.

Stipend $150 per day for up to 21 days, a travel allowance and a small research allowance
Deadline Summer (to start after June 1st) – February 1
Fall (to start after October 1st) – June 1
Spring (to start after January 1st) – October 1

Native American Visiting Student Awards

Appointments are available for currently enrolled advanced Native American graduate students who are formally or informally related to a Native American community. Visiting Students pursue independent research in association with Smithsonian staff.

Stipend	$150 per day for up to 21 days and $600 per week for 3 to 10 weeks, a travel allowance and a small research allowance
Deadline	Summer (to start after June 1st) – February 1 Fall (to start after October 1st) – June 1 Spring (to start after January 1st) – October 1

For more information and/or applications for the above programs contact:

Office of Fellowships and Internships, Smithsonian Institution, MRC 902 P.O. Box 37012, 470 L'Enfant Plaza, Suite 7102, Washington, DC 20013-7012

E-mail	siofi@si.edu
Phone	(202) 633-7070
WWW	www.si.edu/ofi

OTHER FELLOWSHIPS

FREER GALLERY OF ART AND ARTHUR M. SACKLER GALLERY

Anne Van Biema Fellowship

The Anne van Biema Fellowship was established by bequest to promote excellence in research and publication on the Japanese visual arts. Fellowships support research at the Freer Gallery of Art and Arthur M. Sackler Gallery of the Smithsonian Institution in Washington, DC. Research proposals are evaluated in terms of merit, originality, methodology, and potential for significant publication that will advance scholarly and public understanding of the Japanese visual arts. Interdisciplinary proposals with a primary focus on Japanese visual arts are considered.

Term	2 to 9 months
Deadline	December 15
Contact	Zeynep Simavi, Program Specialist, Scholarly Programs and Publications, Anne van Biema Fellowship, Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution, MRC 707, P.O. Box 37012, Washington, DC 20013-7012
Email	avbfellowship@si.edu; SimaviZ@si.edu
Phone	202-633-0410
Fax	202-633-0067
WWW	http://www.asia.si.edu/research/vanBiemaFellowship.asp

J.S. Lee Memorial Fellowship

In honor of the late Dr. J. S. Lee, a distinguished Hong Kong philanthropist and lifelong supporter of the study of Chinese art, this fellowship facilitates the international exchange of curatorial expertise and contributes to the professional development of Chinese art curators and academics. Fellows may choose to be based at the Freer and Sackler or at a number of other museums worldwide.

Contact	Nancy Micklewright, Head of Scholarly Programs and Publications, Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution, MRC 707, P.O. Box 37012, Washington, DC 20013-7012
Email	MicklewrightN@si.edu
Phone	202-633-0401
Fax	202-633-0067
WWW	http://www.jsleefellowship.org/

Lunder Fellowship

This fellowship provides opportunities to conduct research and work with the Lunder Consortium for Whistler Studies on programs and publications focusing on James McNeill Whistler and art of the Aesthetic Movement. Both emerging and established scholars are invited to apply. The fellowship is offered through the generosity of the Lunder Foundation and administered through the Lunder Consortium for Whistler Studies (comprising the Freer Gallery, the Colby College Museum of Art, the University of Glasgow, and the Art Institute of Chicago). Fellowships are awarded for twelve- to eighteen-month terms.

Term	12 to 18 months
Contact	Lee Glazer, Associate Curator of American Art, Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution, MRC 707, P.O. Box 37012, Washington, DC 20013-7012
Email	Email: glazerl@si.edu
Phone	202-633-0339
Fax	202-633-0067

MUSEUM CONSERVATION INSTITUTE (MCI)

Museum Conservation Institute Postdoctoral Fellowship in Mass Spectrometry

Applications are invited for a postdoctoral position to work with Dr. Mehdi Moini at a recently established mass spectrometry and proteomics laboratory at the Smithsonian Museum Conservation Institute. The aim of the laboratory is to develop mass spectrometry and proteomics technologies relevant to museums' specimens. Projects include but are not limited to: species (fungus, etc.) and proteinaceous objects identification using metabolomics and proteomics techniques; biological dating using various MS techniques such as amino acid racemization; analysis of insoluble proteinaceous or polymeric materials; analysis of paints, inks, etc. using surface ionization techniques; as well as development of portable separation-mass spectrometry devices for onsite chemical/biological analysis.

The successful applicant will have a Ph.D. in the area of separation, micro- and nanofabrication, mass spectrometry, and proteomics and an outstanding academic track record demonstrated by publications in refereed journals. Working experience with Thermo LTQ Orbitrap Veloes, ABI Qstar and 4700 TOF/TOF, as well as with capillary electrophoresis and 2D nano-LC is essential. Experience with DART and microfabrication of fluidic networks would be an advantage, but is not essential.

The position is for one year, with a possibility of an extension for the second year. The stipend for this position is $45,000, with approx. $5000 allowance for health insurance.

Qualified applicants should contact Dr. Mehdi Moini (moinim@si.edu).

Applications must be made online at https://solaa.si.edu

NATIONAL AIR AND SPACE MUSEUM (NASM)

Guggenheim Fellowship

The Guggenheim Fellowship is a competitive three- to twelve-month in-residence fellowship for pre-or postdoctoral research in aviation and space history. Predoctoral applicants should have completed preliminary course work and examinations and be engaged in dissertation research. Postdoctoral applicants should have received their Ph.D. within the past seven years. A stipend of $30,000 for predoctoral candidates and $45,000 for postdoctoral candidates will be awarded, with limited additional funds for travel and miscellaneous expenses.

Verville Fellowship

The Verville Fellowship is a competitive nine- to twelve-month in-residence fellowship intended for the analysis of major trends, developments, and accomplishments in the history of aviation or space studies. The fellowship is open to all interested candidates with demonstrated skills in research and writing. An advanced degree in history, engineering, or related fields is not a requirement. A stipend of $55,000 will be awarded for a 12-month fellowship, with limited additional funds for travel and miscellaneous expenses.

Application packages are available on the Museum website at:
http://www.nasm.edu/nasm/joinnasm/fellow/fellow.htm.

The Charles A. Lindbergh Chair in Aerospace History

The Charles A. Lindbergh Chair in Aerospace History is a competitive twelve-month fellowship open to senior scholars with distinguished records of publication who are working on, or anticipate working on, books in aerospace history. Support is available for replacement of salary and benefits up to a maximum of $100,000 a year.

Postdoctoral Earth and Planetary Sciences Fellowship

The National Air and Space Museum has established the Postdoctoral Earth and Planetary Sciences Fellowship to support scientific research in this area. Scientists in the Center for Earth and Planetary Studies concentrate on geologic and geo-physical research of the Earth and other terrestrial planets, using remote sensing data obtained from Earth-orbiting and interplanetary spacecraft. Appointments can be made for one or more years. Stipends are compatible with NRC postdoctoral fellowships in the applicant's field. In years that the fellowship is offered, announcements will be made in the American Geophysical Union's professional publication EOS.

NATIONAL MUSEUM OF AMERICAN HISTORY (NMAH)

Lemelson Center Fellowships

The Lemelson Center Fellowship Program supports projects that present creative approaches to the study of invention and innovation in American society. These include, but are not limited to, historical research and documentation projects resulting in publications, exhibitions, educational initiatives, documentary films, or other multimedia products.

The program provides access to the expertise of the Institution's research staff and the vast invention and technology collections of the National Museum of American History (NMAH). The NMAH Archives Center documents both individuals and firms across a range of time periods and subject areas. Representative collections include the Western Union Telegraph Company Records, ca. 1840-1994 and the Earl S. Tupper Papers, documenting Tupper, and his invention, Tupperware. In addition, the NMAH Library offers long runs of historical technology serials like Scientific American and American Machinist, and the American Trade Literature collection, which includes 300,000 catalogs, technical manuals, and advertising brochures for some 30,000 firms, primarily from 1880-1945. For a comprehensive catalog of objects, manuscripts, images and research materials available at the NMAH (and other Smithsonian units), see http://www.collections.si.edu/.

The Lemelson Center invites applications covering a broad spectrum of research topics that resonate with its mission to foster a greater understanding of invention and innovation, broadly defined. However, the Center especially encourages project proposals that will illuminate the role of women inventors; inventors with disabilities; inventors from diverse backgrounds; or any inventions and technologies associated with groups that are traditionally under-represented in the historical record. Pertinent NMAH collections include the papers of Victor L. Ochoa, a Mexican-American aeronautical inventor; the papers of Dr. Patricia Bath, an African-American inventor of a patented cataracts treatment; the Safko International papers, documenting assistive technologies built for the physically disabled; and the HIV/AIDS and LGBT Reference Collections, which document innovative public health programs and associated technologies.

The Lemelson Center Fellowship Program annually awards 2 to 3 fellowships to pre-doctoral graduate students, post-doctoral scholars, and other professionals who have completed advanced training. Fellows are expected to reside in the Washington, D.C. area, to participate in the Center's activities, and to make a presentation of their work to colleagues at the museum. Fellowship tenure is based upon the applicants' stated needs (and available funding) up to a maximum of ten weeks. Stipends for 2014-2015 will be $575/week for pre-doctoral fel-

lows and $870/week for post-doctoral and professional fellows. Applications are due 15 January 2014. For application procedures and additional information, see http://invention.smithsonian.org/ resources/research_fellowships.aspx. Researchers should consult with the fellowship coordinator prior to submitting a proposal – please contact historian Eric S. Hintz, Ph.D. at +1 202-633-3734 or hintze@si.edu.

Term	Up to ten weeks
Stipend	Pre-doctoral: $575/week; postdoctoral and professional: $870/week
Deadline	January 15
Contact	Eric Hintz, Historian, Lemelson Center, Smithsonian Institution, MRC 604 P.O. Box 37012 National Museum of American History, Washington, DC 20013-7012
Email	hintze@si.edu
Phone	(202) 633-3734
Fax	(202) 357-4517
WWW	www.invention.smithsonian.org/resources/research_fellowships.aspx

Lemelson Center Travel to Collections Award

The Travel to Collections Awards Program supports research on the history of invention and innovation based on the holdings of the Museum's Archives Center and curatorial divisions. The Archives Center holds more than 20,000 feet of archival materials. The collections are particularly strong in personal papers and business records documenting the history of American enterprise and technology.

Since 1995 the Lemelson Center has supported oral and video documentation of contemporary inventors and inventions such as the SmartLevel, a high-tech electronic level, the Gerber Cutter, a computer controlled fabric cutter invented by H. Joseph Gerber, the Sendzimir "Z" Mill for cold rolling steel invented by Tadeusz Sendzimir, and the windsurfer invented by S. Newman Darby.

To encourage use of its invention-related collections, the Lemelson Center offers awards up to $150 a day for a maxi-mum of 10 days. Awards are $150 per day for 10 business days (Monday-Friday) maximum. No additional funds will be granted for travel. The travel award may be used to cover transportation and living expenses, and copying pertinent archival resources. All funds awarded are subject to tax and non-U.S. applicants should inquire about visa status and tax implications. Scholars, graduate students, and independent researchers not residing or attending school within commuting distance of the National Museum of American History may apply for this program. Recipients must commence their research at the National Museum of American History within one year of being notified of the award. Awards may not be used to extend other Smithsonian appointments. Only one award can be offered to a visitor within a twelve-month period.

Decisions are made on the basis of recommendation and review by the Smithsonian staff.

Requirements:

- Recipients must commence their research at the National Museum of American History within one year of being notified of the award.
- Recipients are requested to submit a short report on their research at the National Museum of American History. Edited versions of or excerpts from these reports may be used in the Lemelson Center's publications.
- Recipients are asked to provide the Center with a copy of any publication resulting from research conducted as a result of the award.
- Recipients are requested to participate in an informal brown bag lunch discussion at the Lemelson Center.

The Application Process - Applicants must apply using the Smithsonian online application system - https://solaa.si.edu.

Please be aware that complete applications must include the following:

- application form;

- current curriculum vitae or resume;
- bibliography of relevant secondary sources;
- statement of purpose summarizing their project and detailing why the Archives Center's collections are essential to their research;
- list of specific collections or resources to be consulted (visit the main archives page to search online finding aids for invention-related collections at the Archives Center).

Applicants must consult with the Travel Award Coordinator prior to submitting a proposal.

Term	Maximum of 10 days
Stipend	Up to $150 a day
Deadline	January 15th. Awards announced by mid-April.
Contact	Alison Oswald, Archivist
Address	Lemelson Center for the Study of Invention and Innovation, National Museum of American History, Room 1219, MRC 604, Smithsonian Institution, P.O. Box 37012 Washington, DC 20013-7012
Email	oswalda@si.edu
Phone	202-633-3726
Fax	202-786-2453
WWW	http://invention.smithsonian.org/resources/default_research.aspx

NATIONAL MUSEUM OF THE AMERICAN INDIAN (NMAI)

Conservation Department Program

The Conservation Department of the National Museum of the American Indian offers 1-2 year Fellowships funded by the Andrew W. Mellon Foundation. Experience gained in the internship is relevant to the care, preservation, and conservation of the museum's collection.

Areas of study	Organic and inorganic materials, archaeology and ethnographic collections, objects and textiles.
Location	The fellowship is located at the Cultural Resources Center in Suitland, Maryland.
Education level	Currently enrolled in a conservation training program or recent graduate
Positions	2
Term	1-2 years
Stipend	Yes
Deadline	March 15th for Fellowship to commence the following Fall
Contact	Marian Kaminitz, Head of the Conservation Department, NMAI Cultural Resource Center, 4220 Silver Hill Road, Suitland, MD 20746
Email	kaminitzm@si.edu
Phone	(301) 238-1415
Fax	(301) 238-3201

For more information and instructions on how to apply, please visit:
http://americanindian.si.edu/subpage.cfm?subpage=collections&second=conserv&third=training#andrew

NATIONAL MUSEUM OF NATURAL HISTORY (NMNH)

Cuatrecasas Fellowship

These fellowships are to support work in the spirit of the research of the late Dr. José Cuatrecasas, a long time associate of the US National Herbarium. Priority is given to scientists from Latin America or from elsewhere who work on tropical plants and seek to study specimens housed in the US National Herbarium.

Term	3-12 months
Stipend	$3,000
Deadline	March 31
Contact	Vicki Funk
Email	funkv@si.edu
WWW	http://botany.si.edu/cuatrecasas/cuatrecasas_fund.htm

Global Volcanism Program for Visiting Scientist/Postdoctoral Fellowship

As part of Natural History's Department of Mineral Sciences, the Global Volcanism Fellowship Program supports research to address problems in volcanology, important on a global scale and/or volcanic systematics on regional/global scales from geochemical, petrological and/or physical volcanological perspectives. The Department is home to the National Rock and Ore Collections as well as extensive preparatory and analytical equipment including experimental petrology labs, EMPA, FEG SEM, FTIR, XRD, cathodoluminescence, and wet chemistry. Award includes a stipend of $50,000 annually plus $5,000 for expenses including, but not limited to, health insurance, family health insurance, dependent care, and relocation. A research budget should be included are part of the proposal and may be granted on a case by case basis. To apply, e-mail a project proposal (5 page maximum), CV, and names of at least two refereneces familiar with your work to Dr. Elizabeth Cottrell (cottrellE@si.edu).

Term	One year; term may be extended based upon progress and availability of funds.
Stipend	Postdoctoral research fellows: $50,000/year Visiting senior scientists: Negotiated on a case by case basis, but will not exceed $50,000/year
Deadline	Applications are accepted on a rolling basis.
Contact	Elizabeth Cottrell (cottrellE@si.edu) or Benjamin Andrews (andrewsB@si.edu) NHB-119, Mineral Sciences, 10th and Constitution Ave, Washington, DC, 20002
WWW	http://mineralsciences.si.edu/research/fellowship/htm

Peter Buck Fellowship

The Peter Buck Fellowship Program offers postdoctoral, predoctoral and graduate student level fellowships. Postdoctoral Fellowships are 2-3 years in duration, and awarded to scientists who have received their Ph.D. or equivalent degree in the last five years. Graduate Fellowships are 1-2 years in duration, and awarded to any student enrolled in or admitted to a Ph.D. program, as long as her or his advisor/coadvisor is on the staff of NMNH and the project involves full-time residency at the Museum and/or its permanent facilities during the fellowship period. Peter Buck Fellowships are open to citizens of any country. Apply through the Smithsonian Fellowship Program.

Term	1-3 years
Stipend	$45,000/year plus allowances
Deadline	January 15
Contact	Scott Wing

Email WingS@si.edu

SMITHSONIAN AMERICAN ART MUSEUM AND ITS RENWICK GALLERY

Email americanartfellowships@si.edu
Phone 202-633-8353
WWW http://www.americanart.si.edu/fellowships

The Douglass Foundation Fellowship

The Douglass Foundation Fellowship in American Art is awarded annually to a predoctoral scholar conducting research in American art. This twelve-month residential fellowship carries a stipend of $30,000, with limited additional funds for relocation to Washington, D.C. Application guidelines and deadlines are the same as for the Smithsonian Institution Fellowship Program.

The Patricia and Phillip Frost Fellowship

The Patricia and Phillip Frost Fellowship is offered to support research in American art and visual culture. The terms of the fellowship as well as the application guidelines and deadlines are the same as for the Smithsonian Institution Fellowship Program.

The James Renwick Fellowship

The James Renwick Fellowship in American Craft is available for research in American studio crafts or decorative arts from the nineteenth century to the present. The terms of the fellowship as well as the application guidelines and deadlines are the same as for the Smithsonian Institution Fellowship Program.

The Sara Roby Fellowship

The Sara Roby Fellowship is awarded to a scholar whose research topic is in the area of twentieth-century American realism. The terms of the fellowship as well as the application guidelines and deadlines are the same as for the Smithsonian Institution Fellowship Program.

The Joshua C. Taylor Fellowship

The Joshua C. Taylor Fellowship is supported by alumni and friends of the fellowship program. The terms of the fellowship as well as the application guidelines and deadlines are the same as for the Smithsonian Institution Fellowship Program.

The Terra Foundation Fellowships in American Art

The Terra Foundation Fellowships in American Art seek to foster a cross-cultural dialogue about the history of art of the United States up to 1980. They support work by scholars from abroad who are researching American art or by U.S. scholars who are investigating international contexts for American art. The application guidelines and deadlines are the same as for the Smithsonian Institution Fellowship Program.

The Wyeth Foundation Predoctoral Fellowship

The Wyeth Foundation Predoctoral Fellowship is awarded for the advancement and completion of a doctoral dissertation that concerns the traditions of American art. This twelve-month residential fellowship carries a stipend of $30,000, with additional funds for research travel and relocation to Washington, D.C. The Wyeth Foundation

also offers a publication subvention of up to $5,000 to help former Wyeth Fellows publish their first substantial scholarly book on American art. Application guidelines and deadlines are the same as for the Smithsonian Institution Fellowship Program.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY (SAO)

SAO Predoctoral Fellowships

The 2013 Smithsonian Astrophysical Observatory (SAO) Predoctoral Program invites applications from current graduate students pursuing thesis research in astrophysics or related fields. Applicants in theory, observation, instrument development, or laboratory experiements at a university or college are strongly encouraged to apply. Online applications are accepted on a rolling adminssion basis. For application instructions and a login to the application, please see the Admissions page (www.cfa.harvard.edu/opportunities/fellowships/predoc/).

Started in 1985, the Program has welcomed graduate studenta from universities aroud the world interested in carrying out all or part of their research under the guidance of SAO scientists.

The Harvard-Smithsonian Center for Astrophysics creates a rich environment for collaborations among the future colleagues by bringing together 300 SAO scientists across a broad spectrum of scientific endeavors in nearly all areas related to astronomy, including: atomic and molecular physics, geophysics and atmospheric physics, the solar system, solar physics, planetary systems, the interstellar medium, stars and star formation, supernovae, compact objects, galaxies, extragalactic astronomy and cosmology.

Facilities include the MMT Observatory, Magellan, and other optical and infrared telescopes; radio telescopes, especially the Submillimeter Array on Mauna Kea, Hawaii; a large Beowulf cluster and network of workstations; a number of specialized laboratories; an outstanding library system; and access to data from a wide range of space missions, especially the Chandra X-ray Observatory and the Spitzer Space Telescope.

WWW www.cfa.harvard.edu/opportunities/fellowships/predoc/).

Clay Postdoctoral Fellowship

The Smithsonian Astrophyscial Observatory (SAO) invites applications for the Clay Postdoctoral Fellowship 2014, which will be awarded to an outstanding researcher—or researchers—displaying significant promise in theory, observation, instrumentation, and/or laboratory experiments. The CFA combines the resources and research facilities of the Harvard College Observatory and the Smithsonian Astrophysical Observatory under a single director. Now organized in six research divisions—Atomis and Molecular Physics; High Energy Astrophysics; Optical and Infrared Astronomy; Radio and Geoatstronomy; Solar, Stellar, and Plantery Scinces; and Theoretical Astrophyics—nearly 350 Smithsonian and Harvard scientists work cooperatively in an environment that welcomes the ideas and contributions of young scientists.

The facilities include MMT (Fred Lawrence Whipple Observatory, Arizona), Magellan (Las Campanasa Observatory, Chile), and other optical and infrared telescopes; raio telescopes, especially the Submillimeter Array on Mauna Kea, Hawaii; a large Beowulf library system; and access to data from a wide range of space missions, especially the Chandra X-ray Observatory and the Spitzer Space Telescope.

Term Approximately 4 years
Deadline October 30, 2013
Stipend Approximately $67,500 with research budget of $16,000

WWW http://www.cfa.harvard.edu/opportunities/fellowships/clay/

Visiting Student and Scholar Prgrams

The Smithsonian Astrophysical Observatory has a Visiting Scientist and Visiting Student Program to expand scholarly exchange in atompic and molecular physics; infrared, optical, radio, and X-ray astronomy; planetary sciences; geophysics; solar and stellar physics; and theoretical astrophysics. Visits can vary from several weeks or months and, in some cases, last up to a year or more. This program annually attracts many international and national visitors.

Stipend Varies with length of visit and amount of support being provided by visitor's home insititution
WWW http://www.cfa.harvard.edu/opportunities/visitingsci.html

SMITHSONIAN CENTER FOR LEARNING AND DIGITAL ACCESS (SCLDA)

Fellowships in Museum Practice

The Smithsonian's Fellowships in Museum Practice (FMP) program is an opportunity for mid- and senior-level museum personnel, researchers and training providers to spend time at the Smithsonian researching a particular topic of interest that is relevant to their work and the museum profession. The program, unique in the museum profession worldwide, supports research about issues of theory and practice in education, curation, exhibition, administration, and other museum functions and disciplines. The purpose of the program is to serve as a catalyst for helping expand the intellectual resources and networking capacities of museums and their personnel – conditions necessary for fostering inspiration, innovation, and ultimately, the production of new scholarship. It is not a training program or a collection survey tool. The goal of the program is foster innovative scholarship and expand the availability of information that has the potential to contribute to improvements in museum operations.

Fellowships are awarded annually for a period of up to 6 months. An award consists of a stipend of $3,500 per month plus round-trip travel expenses between the recipient's home and Washington, D.C.

Deadline February 15, annually
Contact Program Manager, Fellowships in Museum Practice, SCLDA Smithsonian Institution, Washington, D.C. 20560-0427
Fax (202) 633-5489
Email fmp@si.edu
WWW http://museumstudies.si.edu/fmp.htm

SMITHSONIAN GARDENS (SG)

The Enid A. Haupt Fellowship in Horticulture

The Enid A. Haupt Fellowship in Horticulture, made possible by a generous endowment from philanthropist Enid A. Haupt, aims to advance the knowledge and understanding of the roles and significance of horticulture in society and to contribute to the ongoing dialog in the field. Applicants must be enrolled in a graduate program seeking (or have received) their Master's or Ph.D. in horticulture, landscape architecture, cultural studies, or a related discipline with a concentration in garden history or landscape studies. This fellowship is full-time, in-residence, and available for up to 6 months or 12 months, contingent upon available funding. The candidate is

eligible for stipend and research allowances. For additional information on the Enid A. Haupt Fellowship in Horticulture, visit: http://www.gardens.si.edu/

Deadline May 15th
Contact Enid A. Haupt Fellowship, Smithsonian Gardens, PO Box 37012, Capital Gallery Suite 3300, MRC 506, Washington, DC 20013-7012
Phone (202) 633-2220
Fax (202) 633-5697
Email gardens@si.edu

SMITHSONIAN LATINO CENTER (SLC)

Latino Museum Studies Program (LMSP)

The Latino Museum Studies Program (LMSP), organized by the Smithsonian Latino Center (SLC), is dedicated to fostering the development of scholars and emerging leaders in the fields of Latino history, art and culture. This program is offered in two components. The first is a two-week seminar designed to enhance leadership, research and creative skills through a series of panel discussions, hands-on workshops, interactive discussions and behind-the-scenes tours of Smithsonian museums and collections and other important cultural institutions in the nation's capital. The second component is a four-week practicum at a Smithsonian museum or research center created to advance a Smithsonian project of program initiative. Practicums are assigned based on the skills, interests, experience and area of study of the applicants. The SLC will partner this year with the National Trust for Historic Preservation in Washington, D.C. to offer two additional practicums. Participants are required to complete all six weeks of the program. Fifteen graduate students are selected from a nationwide pool of applicants. Participation is free and includes the cost of round-trip travel to Washington, D.C., housing accommodations for the duration of the six-week program, and a stipend for the practicum.

The Smithsonian Latino Center is a division of the Smithsonian Institution that ensures Latino contributions to art, science and the humanities are highlighted, understood and advanced through the development and support of public programs, scholarly research, museum collections an educational opportunities at the Smithsonian and its affiliated organizations across the U.S. and internationally.

Email lopezd@si.edu
Phone (202) 633-1240
WWW Latino.si.edu

SMITHSONIAN INSTITUTION LIBRARIES (SIL)

Smithsonian Institution Libraries Resident Scholar Programs

The Smithsonian Institution Libraries (SIL)'s Dibner Library Resident Scholar Program and Baird Society Resident Scholar Program provide support for scholarly research in the Special Collections of the Smithsonian Libraries in Washington, DC and New York, NY, in an extensive range of subject areas. Each program awards stipends of $3,500 per month for up to six months. Doctoral students and post-doctoral scholars are welcome to apply. Scholars must be in residence at the Smithsonian during the award period.

The Dibner Library Resident Scholar Program supports research on topics relating to the history of science and technology collections in the Dibner Library. The Dibner Library has manuscripts and rare books dating primarily from the fifteenth to the nineteenth centuries. Collection strengths are in the fields of mathematics, astronomy,

classical natural philosophy, theoretical physics (up to the early twentieth century), experimental physics (especially electricity and magnetism), engineering technology (from the Renaissance to the late nineteenth century), and scientific apparatus and instruments. Detailed information about the Dibner Library's collections can be found on its website: http://library.si.edu/libraries/dibner/collections. This award is supported by the family of Frances K. Dibner. For additional information on the Smithsonian Institution Libraries Resident Scholar Programs, visit: http://library.si.edu/fellowships/dibner-library-resident-scholar-program

Baird Society Resident Scholars

Baird Society Resident Scholars conduct research in SIL's other Special Collections located in Washington, DC and New York City. These include printed materials on world's fairs (19th and early 20th centuries); manufacturer's commercial trade catalogs in the National Museum of American History Library (285,000 pieces representing 30,000 companies dating from the 19th and 20th centuries); natural history rare books in the Cullman Library (pre-1840 works on topics such as botany, zoology, travel & exploration, museums & collecting, geology, and anthropology); air and space history in the National Air and Space Museum Library's Ramsey Room (ballooning, rocketry, and aviation, late 18th to early 20th centuries); James Smithson's library in the Cullman Library; rare materials on European and American decorative arts, architecture, and design in the Cooper-Hewitt National Design Library (18th to 20th centuries); and history of art and artists (exhibition catalogs, catalogues raisonnés, serials, dissertations and artists' ephemera) at the Smithsonian American Art Museum/ National Portrait Gallery Library. This award is supported by the many annual donors to the Smithsonian Libraries. For additional information on Baird Society Resident Scholars, visit: http://library.si.edu/fellowships/baird-society-resident-scholar-program

The Margaret Henry Dabney Penick Resident Scholar Program

The Margaret Henry Dabney Penick Resident Scholar Program supports scholarly research into the legacy of Patrick Henry and his political circle, the early political history of Virginia, the history of the American Revolution, founding era ideas and policy-making, as well as science, technology, and culture in colonial America and the Early National Period. The stipend for this long-term fellowship is $45,000 for nine consecutive months. The fellowship is open to post-doctoral scholars. Senior scholars are particularly encouraged to apply. The Smithsonian Institution Libraries offers its fellows the rich holdings of its research collections, especially at the National Museum American History Library, the Dibner Library of the History of Science and Technology, American Art / Portrait Gallery Library, and the American Civilization Collection at the National Museum of the American Indian. This program is supported by a bequest from Margaret P. Nuttle. For additional information on the The Margaret Henry Dabney Penick Resident Scholar Program, visit: http://library.si.edu/fellowships/penick-resident-scholar-program

WWW http://library.si.edu/about/internships-and-fellowshipsSmithsonian Institution Libraries Resident Scholar Programs

Deadline	March 15
Contact	Smithsonian Institution Libraries, Resident Scholar Programs, The Dibner Library of the History of Science and Technology, NMAH 1041 MRC 672, P.O. Box 37012, Washington, D.C. 20013-7012
Email	SILResidentScholars@si.edu
Phone	(202) 633-3872
WWW	http://library.si.edu/about/internships-and-fellowshipsSmithsonian Institution Libraries Resident Scholar Programs

SMITHSONIAN TROPICAL RESEARCH INSTITUTE (STRI)

The Smithsonian Tropical Research Institute (STRI), is a division of the Smithsonian Institution in Washington DC and maintains research facilities for marine and terrestrial research at various locations on the Isthmus of Panama. STRI offers fellowships for undergraduate, predoctoral and postdoctoral research in the areas represented by its scientific staff. Disciplines include ecology, anthropology, paleontology, paleoecology, evolutionary biology, molecular phylogenetics, biogeography, animal behavior, neurobiology, soils sciences, and physiology of tropical plants and animals.

A. Stanley Rand Fellowship Program

Support is provided for short-term research in the tropics focused on animal behavior, natural history, evolutionary biology, plant and animal ecology and environmental monitoring. (Deadlines: March 15, May 15, August 15 and November 15).

Applications to STRI may be submitted in either English or Spanish. They should consist of one printed copy, plus one electronic copy of all requested materials. The electronic copy should be submitted on a CD or by e-mail (to fellows@si.edu), as a single file in Word or preferably PDF, including application form, proposal with budget and CV. Send hard copy of the application to STRI/Office of Academic Programs, MRC 0580-12, Unit 9100 Box 0948, DPO AA 34002-9998 (from the US); or Apartado 0843-03092, Balboa, Panama from elsewhere.

For more information and instructions about STRI fellowships visit www.stri.org or contact fellows@si.edu

CFS Research Grants Program

The Research Grants Program of the Center for Tropical Forest Science (CTFS) of the Smithsonian Tropical Research Institute is intended to provide opportunities for senior researchers, postdoctoral fellows, and graduate students to support research associated with the CTFS network of Forest Dynamics Plots. Anyone working directly in a Forest Dynamics Plot (FDP), analyzing data from a plot, or generating complementary data that strengthens FDP research programs is eligible to apply. Projects can be field-oriented, laboratory-based, or analytical, and scientifically, basic or applied in nature. Grants range from $3,000-$15,000, though a small number of postdoctoral grants (up to $40,000) may be given. The CTFS Grants Program will make awards for projects three months to three years in length.

Grant proposals should include a Research Proposal (not to exceed 1500 words), a list of collaborators, curriculum vitae, proposed referees, and a detailed budget.

Contact	Smithsonian Tropical Research Institute, Office of Academic Programs, MRC 0580-12, Unit 9100 BOX 0948, DPO AA 34002-9998
E-mail	fellows@si.edu
Phone	(507) 212-8031
Fax	(507) 212-8150
WWW	http://www.stri.org/english/education_fellowships/index.php

Short-Term Fellowships

Primarily for graduate students but awards are made occasionally to undergraduate and postdoctoral candidates. These fellowships enable selected candidates to work in the tropics and explore research possibilities at STRI. The Ernst Mayr Fellowship is awarded to an outstanding short term fellowship candidate on an annual basis. (Deadlines: March 15, May 15, August 15 and November 15).

Short-Term Fellowships for Students in Latin America, especially Central America and Panama

Support is provided for short-term projects and internships. Candidates must be from universities in Latin America, particularly Central America and Panama. (Deadlines: March 15, May 15, August 15 and November 15).

Three-year Postdoctoral Fellowships in Tropical Biology

Research should be based at one of STRI's facilities, but proposals that include comparative research on other tropical countries will be considered. (Deadline - January 15).

OFFICE OF THE UNDER SECRETARY FOR SCIENCE (OUSS)

Smithsonian Marine Science Network Postdoctoral Fellowship - MarineGEO:

The Smithsonian Institution is undertaking the design and implementation of a new global-scale network of marine ecological observatories – MarineGEO -- dedicated to understanding change in the structure and function of marine ecosystems. MarineGEO will focus on understanding patterns of biodiversity and ecosystem function associated with natural and anthropogenic changes that occur at local, regional and global scales. MarineGEO will address critical knowledge gaps that currently limit the capacity of the science community to forecast change, and the policy community to plan for change. These needs will be met through standardized, long-term measurements and experiments at spatial and temporal scales appropriate for ocean and coastal ecosystems. MarineGEO will begin with a set of core sites, including the Marine Science Network Laboratories, and expand over time. The vision is that the fully deployed network, including partnerships with other institutions and networks, will capture the physical and biological gradients that govern ocean ecosystems and serve as a catalyst for intellectual exchange. These goals will be accomplished through SI Marine Science expertise and infrastructure combined with a diverse consortium of partner institutions and collaborators worldwide.

This program seeks applications for research projects that address at least one of these fundamental questions posed by MarineGEO about marine ecosystems, their biodiversity, function and sustainability through comparative experiments, measurements, and/or applications of modern analytical tools across the Marine Science Network sites. Proposals must focus on comparative research involving at least two of the Network facilities and Smithsonian units (NMNH, SERC, STRI, NZP). Postdoctoral scientists must collaborate directly with identified Smithsonian scientists as named sponsors/advisors of the fellowship (see Marine Research Staff information at http://www.si.edu/marinescience/staff.htm). Fellows should select co-Advisors from more than one SI unit (NMNH including SMSFP, SERC, STRI, NZP). Joint proposals among two or more fellowship applicants will also be considered.

Term	Maximum of two years, pending review of the first-year progress report.
Stipend	Stipends are $45,000 per year with additional funds available for group health insurance, travel from place of origin to the Smithsonian host facility, research travel and research supplies, up to a combined $55,000 maximum per year.
Deadline	2013 – To be determined
WWW	http://si.edu/marinescience/msn_cfps.htm

INTERNSHIPS

An internship at the Smithsonian Institution is a prearranged, structured learning experience scheduled within a specific time frame. The experience must be relevant to the intern's academic and professional goals, and to research and museum activities of the Institution. An internship is performed under the direct supervision of Smithsonian staff.

Internships, for the most part, are arranged individually. Information and applications may be obtained by contacting the appropriate internship coordinator or by contacting the Office of Fellowships and Internships, the central referral service for internships. Refer to the listings below for deadlines, addresses and other specific information regarding various internship programs. Please note: all Smithsonian interns must be at least 16 years old.

OFFICE OF FELLOWSHIPS AND INTERNSHIPS' (OFI) INTERNSHIP PROGRAMS

Minority Internships

The Office of Fellowships and Internships offers a number of opportunities to increase participation of minority groups who are underrepresented in Smithsonian scholarly programs, in the disciplines of research conducted at the Institution, and in the museum field. Stipend awards are available for interns through the Minority Student Awards Program to participate in supervised on-going research, or museum-related activities for periods of ten weeks. Minority undergraduate and beginning graduate students are encouraged to apply. Students should contact the Office of Fellowships and Internships for application information.

Term	10 weeks
Stipend	$550 per week
Deadlines	Summer (starting June 1) - February 1
	Fall (starting October 1) – February 1
	Spring (starting February 1) – October 1

Native American Internships

Appointments are offered to Native American students, who are formally or informally related to a Native American community, to pursue internship projects related to Native American topics and using Native American resources at the Smithsonian.

Appointments are spent in residence at the Institution's facilities under the supervision of Smithsonian research and professional staff members. Appointments of 10 weeks are available to undergraduate or graduate students, and provide stipends and a travel allowance. Students should contact the Office of Fellowships and Internships for application information.

Term	10 weeks
Stipend	$600 per week
Deadlines	Summer (to begin after June 1) – February 1

Fall (to begin after October 1) – February 1
Spring (to begin after January 1) - October 1

James E. Webb Internship for Minority Undergraduate Juniors, Seniors and Graduate Students in Business and Public Administration

This program was established in honor of the late James. E. Webb, Regent Emeritus and former Administrator of the National Air and Space Administration (NASA), to promote excellence in the management of not-for-profit organizations. Internships are offered to US minority undergraduate junior, seniors and graduate students majoring in areas of business or public administration. These opportunities are intended to increase participation of minority groups who are underrepresented in the management of not-for-profit scientific and cultural organizations. Interns are placed in offices, museums, and research institutes throughout the Smithsonian Institution.

Term 10 weeks
Stipend $600 per week
Deadlines Summer (to begin after June 1) – February 1
Fall (to begin after October 1) – February 1
Spring (to begin after January 1) – October 1

Katzenberger Art History Internship Program

The Katzenberger Foundation Art History Internship Program is a need-based program supporting internships for undergraduates in research and collections projects at the Smithsonian Institution in Washington, DC. The program is generously funded by the Katzenberger Foundation and administered by the Office of Fellowships and Internships. Six internships are offered each summer and located in Washington, DC, at the Smithsonian's art museums and archives. Applicants must meet these eligibility requirements: open only to US citizens; must be enrolled as undergraduate juniors, seniors, or equivalent, in a degree granting program at an accredited institution; must be declared as an art history major, concentration, or related discipline; must qualify for federal student aid. A final summary report is required upon completion of the internship.

Term 10 weeks, full-time, summer only
Stipend $550 per week
Deadline February 1
Contact Office of Fellowships and Internships, Smithsonian Institution, 470 L'Enfant Plaza, Suite 7102, MRC 902, P.O. Box 37012, Washington, D.C. 20013-7012
E-mail siofi@si.edu
Phone (202) 633-7070
WWW www.si.edu/ofi

OTHER INTERNSHIPS

ACCESSIBILITY PROGRAM (AP)

Access to Opportunities – Smithsonian Internship Program for People with Disabilities

This program provides paid internship opportunities annually at the Smithsonian for people with disabilities. Applications should be made online using the Smithsonian Online Application System: https://solaa.si.edu

Application Materials – Application – Resume – Academic essay: 2 pages describing how academic goals, qualifications, and career aspirations relate to the internship at the Smithsonian Institution. – Unofficial academic transcripts from all colleges/universities attended – 2 Letters of recommendation from professors or teachers; if preferred, a reference can e-mail the letter directly to floresk@si.edu.

Additional Eligibility Requirements: Applicants who are in college or graduate school, or who have graduated within the last 6 months are invited to apply. – The program is open to United States citizens (or permanent residents); recruitment is mainly from the Washington, DC Metropolitan area. – Declared academic major, concentration, or discipline related to the internship (i.e. someone applying for a history internship, must be a history major, etc.) – Enrolled as an undergraduate Junior, Senior, or equivalent in a degree granting program, at an accredited institution (*Just-graduated seniors are eligible to apply, provided their undergraduate graduation date was 6 months before the program start date.) Graduate students will be considered on a case-by-case basis.

Phone	(202) 633-4340
Email	floresk@si.edu
Apply	SOLAA
Term	Internship appointment tenure dates will vary based upon student availability and supervisor need. General cycles are summer (mid-May through mid-August) and fall (mid-September through mid-December).
WWW	http://museumstudies.si.edu/Intern/AccessInternship.html

ANACOSTIA COMMUNITY MUSEUM (ACM)

The Smithsonian's Anacostia Community Museum documents and interprets the effect of historical and contemporary social and cultural issues on communities. Established in 1967 as the Anacostia Neighborhood Museum, it served first as a Smithsonian outreach museum situated in one of the District of Columbia's largely African American neighborhoods and later evolved into a museum documenting, preserving and interpreting African American history from local and community history perspectives.

In 2006, the name of the institution was changed to the Anacostia Community Museum to reflect the expansion from ethnic themes and issues to broader cultural issues that resonate within communities worldwide. The mission of the Anacostia Community Museum is to challenge perceptions, broaden perspectives, generate new knowledge, and deepen understanding about the ever-changing concepts and realities of "community."

To this end, the museum works with community organizations, neighborhood groups, civic organizations and other groups around the country to identify, document and preserve materials of historical importance and to develop community self-studies; with churches, mosques, and other religious institutions to preserve and document their histories.

The museum's programmatic objectives are flexible enough to encourage the creation of projects tailored to students' interests and needs, while also allowing for a challenging experience and effective results that may be measured by standards of traditional scholarship. Included are opportunities to develop and engage in oral history

projects, regional history, community history, and art and cultural history. Under the supervision of the museum's education staff, there is also the opportunity to engage in curriculum development projects.

The museum's permanent collection and archives offer scholars interested in African American material culture excellent opportunities for research and professional development. Internships are also available in the fields of Special Events, Public Relations, and Graphic Arts.

Applications will be considered and accepted based on staff availability and museum schedules. The Museum internship coordinator must be consulted prior to application submission.

Stipend No
Contact Sharon Reinckens, Internship Coordinator
Email Reinckenss@si.edu
Phone (202) 633-4838
Fax (202) 287-3183
WWW http://anacostia.si.edu/exhibits/Get_Involved/Interns_Fellows.htm

ARCHIVES OF AMERICAN ART (AAA)

The Archives of American Art collects the personal papers of American artists, art dealers, critics, and others concerned with American art. Internships are available to undergraduates and graduate students who have a background in art history, American studies, or American history and are looking for the opportunity to conduct research in primary sources, process archival collections, prepare written descriptions of collection contents, and assist with registrarial duties.

General Internship (undergraduate and graduate)

Term Variable, ten weeks or more
Stipend No
Deadline October 1 (spring), February 25 (summer), June 1 (fall)
Contact Marisa Bourgoin, Archives of American Art, PO Box 37012, Victor Bldg., Suite 2200, MRC 937, Washington, DC 20013-7012
Email bourgoinm@si.edu
WWW http://www.aaa.si.edu/aboutus/opportunities

Horowitz/Fraad Minority Internship

Term Variable, ten weeks or more
Stipend $5,000, based on a full–time, ten week schedule. Applicants who will receive course credit for the internship are not eligible for stipends.
Deadline October 1 (spring), February 25 (summer), June 1 (fall)
Contact Marisa Bourgoin, Archives of American Art, PO Box 37012, Victor Bldg., Suite 2200, MRC 937, Washington, DC 20013-7012
Email bourgoinm@si.edu
WWW http://www.aaa.si.edu/aboutus/opportunities

Graduate Internship in Archival Studies

Graduate internships are offered on a limited basis to graduate students in advanced archival tracks and programs. A professional and focused experience in archival work may be structured around processing and

preservation of archival collections, cataloging and archival descriptive practices and standards including EAD (Encoded Archival Description), and digital collections access projects. Course credit can be earned with the approval of the intern's academic institution. Graduate interns work under the supervision and guidance of senior archivists in either Collections Processing or Digital Initiatives.

Term Variable, ten weeks or more
Stipend No
Deadline October 1 (spring), February 25 (summer), June 1 (fall)
Contact Erin Kinhart, Archives of American Art, PO Box 37012, Victor Bldg., Suite 2200, MRC 937, Washington, DC 20013-7012
Email kinharte@si.edu
WWW http://www.aaa.si.edu/aboutus/opportunities

CENTER FOR FOLKLIFE AND CULTURAL HERITAGE (CFCH)

Internships are offered year-round in the fields of folklore, cultural anthropology, and ethnomusicology. Internships are open to all interested persons looking to further their academic and/or career goals in these or related areas. Intern projects often center on Smithsonian Folkways Recordings, archives and collections, educational outreach projects, Web production and Web content creation, video projects, and planning and production of the Smithsonian Folklife Festival. The internship experience is an opportunity to learn – through hands-on training and one-on-one engagement with knowledgeable staff and professionals in the field – about planning, organizing, and producing large public programs and events; marketing and production aspects of a record label; collections management; research and documentation; and working with information to create multi-media educational products that allow for greater visibility by large audiences.

Term 6 weeks to 1 year, full- or part-time
Stipend No
Deadline Considered year-round; deadline for summer internships is March 15th
Contact Arlene Reiniger, Smithsonian Institution, Center for Folklife and Cultural Heritage, PO Box 37012, MRC 520, 600 Maryland Ave., SW, Suite 2001, Washington, DC 20013-7012
Email reinigera@si.edu
Phone (202) 633-6443
Fax (202) 633-6476
WWW http://www.folklife.si.edu/join_us/internships.aspx

COOPER-HEWITT, NATIONAL DESIGN MUSEUM (CHNDM)

While Cooper-Hewitt is undergoing a major expansion and renovation of its campus and buildings, we regret that we will not be able to accept interns from 2009-2012. Please check our website for updates and new application dates.

Internships offer hands-on learning opportunities for students from around the globe to experience the museum work environment. Interns are teamed with staff mentors and work on projects like Summer Design Institute, exhibition research, grant writing, and collections cataloguing. The internship program encourages promising students of art history, architectural history, museum studies, museum education, and design to explore museum careers.

This program acquaints participants with the programs, policies, procedures, and operations of Cooper-Hewitt, National Design Museum and of museums in general. Interns are assigned to specific curatorial, educational, or administrative departments where they assist on special research or exhibition projects and participate in daily museum activities.

WWW: http://cooperhewitt.org/EDU/internships.asp

FREER GALLERY OF ART AND ARTHUR M. SACKLER GALLERY (FGA/AMSG)

The Richard Louie Memorial Internship for High School Students of Asian Descent

This summer internship honors Richard Louie, former Associate Director of the Freer Gallery of Art and Arthur M. Sackler Gallery. The program is intended as an opportunity for high school students of Asian descent to gain practical experience in a museum setting.

Eligibility

Applicants must: Be enrolled in high school (Including recently graduated seniors for the term immediately following their graduation, i.e. students graduating in spring 2014 may apply for the summer 2014 term). Be sixteen years or older. Be of Asian descent.

Stipend Yes
Deadline For each internship term, applications must be submitted electronically by the following dates: Winter/Spring term: November 15; Summer: March 15; Fall: July 15
Contact Please submit all application materials via the SOLAA system.
Phone (202) 633-0466
E-mail asiainternship@si.edu
WWW http://www.asia.si.edu/research/richardlouie.asp

Freer Gallery of Art and Arthur M. Sackler Gallery Unpaid Internships

The Freer Gallery of Art, along with its sister museum, the Arthur M. Sackler Gallery, are the national museums of Asian art at the Smithsonian Institution and are jointly administered. The Freer Gallery of Art and Arthur M. Sackler Gallery house one of the most distinguished collections of Asian art in the world today, as well as the largest collection of work by James McNeill Whistler. The Galleries support advanced research and disseminates the results through exhibitions and publications.

Internships provide an educational experience guided by a mentor. Internships are available to high school, undergraduate, and graduate students for special projects and general departmental work in the following departments: Administration/Finance/Human Resources; Archives; Conservation and Scientific Research; Collections Management (Registrar); Curatorial; Education and Public Programs; Exhibition Management; Information Technology; Publications; Design and Production; Library; Membership and Development; Photography; Public Affairs and Marketing; Rights and Reproductions; and Museum Shops.

Stipend No
Deadline For each internship term, applications must be submitted electronically by the following dates:
Winter/Spring term: November 15; Summer: March 15; Fall: July 15
Contact Please submit all application materials via the SOLAA system.
E-mail asiainternship@si.edu

Phone (202) 633-0466
WWW http://www.asia.si.edu/research/internships.asp

HIRSHHORN MUSEUM AND SCULPTURE GARDEN (HMSG)

Each year a number of undergraduate and graduate internships are available at the Hirshhorn Museum and Sculpture Garden. Internships are offered during the summer, spring, and fall/winter semesters, and academic credit may be arranged through the intern's school. International students are encouraged to apply. While internships are unpaid appointments, they provide an excellent foundation for future museum work or art-related careers, driven by mentor-based educational experiences. Departments that offer internships include: Curatorial Division, Education Department, Exhibition and Design Department, Conservation Department, Communications and Marketing, Development.

Additional Eligibility Requirements: Applicants should have 15 semester hours of art history or equivalent academic preparation, with a grade point average of 3.25 for undergraduates and 3.5 for graduate students. A specialization in modern and contemporary art history is helpful.

Term 1 - 2 semesters
Stipend No
Deadline Fall - June 1st, Spring - November 1st, Summer - February 1st
Contact Intern Coordinator, Smithsonian Institution, PO Box 37012 MRC 350, Hirshhorn Museum and Sculpture Garden, Washington, DC 20013-7012
E-mail hmsgeducation@si.edu
Phone (202) 633-4674, M-F
WWW http://hirshhorn.si.edu/info/columns.asp?key=91

INTERNATIONAL CENTER (IC)

The International Center serves as a home for several independent units that foster the Smithsonian's international activities, and organize various types of international programs that are not ordinarily undertaken elsewhere within the Institution. Internships are created as the need arises, in connection with the development of specific projects by the various units.

International Center units include the Office of International Relations, the International Gallery, the Smithsonian Institution Monitoring and Assessment of Biodiversity Program, and the Washington office of the Smithsonian Tropical Research Institute. Some of these units occasionally have projects suitable for interns to work on; others rarely do. Thus, internship opportunities in the Center do not exist year-round or necessarily during the summer, but occur at random and sporadic intervals.

Applications will be considered from graduate students and undergraduates in their junior or senior years of college. Guided by a mentor, interns will be able to gain experience in an educational setting: duties might include research, writing, editing, scheduling, archiving, database management and light office work.

Term Minimum of two months
Applications Considered year-round
Stipend No
Contact Francine Berkowitz
Email fcb@si.edu

MUSEUM CONSERVATION INSTITUTE (MCI)

Conservation Internships

Conservation internships are mentor-guided learning experiences that are offered for advanced students enrolled in graduate conservation training programs that require a year of conservation experience.

Term 1 academic year
Stipend Yes
Deadline February 1st
Contact (301)-238-1236
WWW http://www.si.edu/mci/english/professional_development/fellowships_internships.html

Research Internships

The Smithsonian's Museum Conservation Institute (MCI) is offering short-term learning opportunities to work on research and conservation projects with staff members as mentors. These internships are offered to undergraduate and graduate students in appropriate disciplines.

Term Generally 10 weeks, June to mid-August, but other arrangements may be possible
Deadline February 25
Contact (301) 238-1236
WWW http://www.si.edu/mci/english/professional_development/2013ResearchInternships.html

NATIONAL AIR AND SPACE MUSEUM (NASM)

The National Air and Space Museum offers an exciting work experience to college and university students through its Summer Internship Program. Interns have a firsthand, mentor-guided opportunity to learn about the historic artifacts and archival materials housed in the Museum and to study the scientific and technological advances they represent.

Each year positions are available in a variety of Museum areas such as Aircraft Restoration, Aviation or Space History, Planetary Science, Collections Management, Web & New Media, Exhibit & Graphic Design, Public Relations, Budget & Finance, Architecture & Engineering, and Education. Students from all fields of study are encouraged to apply.

Areas of Study: advancement, architecture and engineering, archives, aviation, budget and finance, collections, collections processing, earth and planetary studies, education, exhibits, exhibits production, exhibits technology, finance, graphic design, history, journalism, photography, public affairs, safety and health, science and library disciplines, space science, visitor services, web and new media.

Term Minimum 10 weeks
Stipend Yes
Deadline February 15th
Contact Myra Banks-Scott, Educational Outreach and Student Services Manager, Education Department
Phone (202) 633-2542
WWW http://www.nasm.si.edu/getinvolved/intern/index.cfm

NATIONAL MUSEUM OF AFRICAN ART (NMAfA)

Internships are mentor-based experiential learning opportunities offered to students enrolled in undergraduate and graduate programs and to individuals interested in exploring museum professions. Internship opportunities are available in the following departments: administration, conservation, curatorial, development, education, exhibits, photographic archives, public affairs, and registration. Candidates must have a background in art history, anthropology, museum studies, or a related discipline. Specific training in African art or other aspects of African culture is desirable, particularly in the Education and Curatorial Departments. Under the supervision of a staff member, an intern works for a minimum of 10 weeks, 20 hours per week.

Stipend No
Deadline Fall/Spring: 1-2 months before start date
Summer: March 1st
Contact (202) 633-4652 M-F
Email MonstedK@si.edu
WWW http://africa.si.edu/about/internships.html

NATIONAL MUSEUM OF AMERICAN HISTORY (NMAH)

Internship Program

The National Museum of American History internship program allows a diverse group of people with innumerable interests, strengths, and goals to encounter an educational environment where they can work with and learn from professionals and scholars in related areas of concentration. The Museum offers interns of different backgrounds incredible opportunities in a variety of fields, from public relations to exhibition research to project design. Learning from knowledgeable mentors in the dynamic atmosphere of the Museum and Washington, D.C. area, interns enjoy an intensive experience as multifaceted as the Museum itself.

Designed around specific Museum projects, internships are available in the following areas: archival science; curatorial research and collections; design and graphics; jazz history and public programming; public relations and communications; museum management; music history and programming; education and public programs production; textile and paper conservation.

Term Part time (20 hour/week minimum required) or full time; minimum of 2 months
Stipend No
Deadline Fall (October - December) July 1
Spring (January - May) October 15
Summer (June - September) February 1
Contact (202) 633-3556
Email nmahintern@si.edu
WWW http://americanhistory.si.edu/getinvolved/internship

NATIONAL MUSEUM OF THE AMERICAN INDIAN (NMAI)

Internship Program

The Internship Program provides educational opportunities for students interested in the museum profession and related programming. Interns complete projects using the resources of the NMAI and other Smithsonian offices. Internships are an opportunity to learn about the museum's collections, exhibitions, and programs and meet professionals in the museum field.

Term	Minimum 6 weeks, maximum 15 weeks
Deadlines	November 20th for Spring starting third full week of March
	February 6th for Summer starting first full week of June
	July 12th for Fall starting last full week of September
Contact	Jill Norwood
Email	NMAIinterns@si.edu
Phone	(202) 633-6645
WWW	http://nmai.si.edu/connect/internships/

Conservation Internship Program

The Conservation Department of the National Museum of the American Indian offers 10-week summer internships funded by the Andrew W. Mellon Foundation. Experience gained in the internship is relevant to the care, preservation, and conservation of the museum's collection.

Term	Summer only **-** 10 weeks
Deadline	February 1
Contact	kaminitzm@si.edu
Phone	(301) 238-1415
Fax	(301) 238-3201

Conservation Department Program

The Conservation Department of the National Museum of the American Indian offers a six-month preprogram internship to individuals committed to pursuing a graduate level degree in a conservation program. Experience gained in the internship is relevant to the care, preservation, and conservation of the museum's collection. The intern has an opportunity to include treatments and projects worked on during the year in a portfolio for application to a graduate conservation training program.

Term	6 months
Stipend	Yes
Deadline	February 15th
Contact	Marian Kaminitz, Head of the Conservation Department, NMAI Cultural Resources Center, 4220 Silver Hill Road, Suitland, MD 20746.
Email	kaminitzm@si.edu
Phone	(301) 238-1415
Fax	(301) 238-3201

NATIONAL MUSEUM OF NATURAL HISTORY (NMNH)

Natural History Internship Program

The National Museum of Natural History offers internships in each of its research departments, offices, and specialized units with emphasis on current activities of the staff. Each year more than 500 students engage in internships at NMNH with appointments varying from one week to one year. Project focus and intensity varies greatly. Positions range from short-term, part-time appointments to full-time year-long commitments. Interns are placed throughout the Museum including administration, information technologies, business ventures, and public affairs, as well within the scientific units. Students interested in placement through the general internship program are encouraged to contact the project sponsor directly using the contact information (phone and e-mail) provided in the project listing to discuss details, availability, and potential placement. For an up-to-date listing of available projects visit: http://www.mnh.si.edu/academics/internship_projects.cfm.

Term: Open
Stipend: None
Deadline: Accepted year around. There is no formal application, review or notification date.
Contact: Mary Sangrey, Head, Office of Academic Services, NHB MRC 106, Room 61, PO Box 37102, Smithsonian Institution, Washington, D.C. 20013-7012
Phone: (202) 633-4548
Fax: (202) 633-0153
Email: arc@si.edu

Spring Break Internship Program

The Alternative Spring Break Program (ASB) provides college-level undergraduate and graduate students an opportunity to join week-long internship projects in a wide variety of professional settings throughout the NMNH community. The goal is to place interested and motivated undergraduate and graduate students, during the week of their spring break, in a professional work environment at the National Museum of Natural History where they can:

- Gain practical experience by working in a professional museum setting
- Develop new skills by learning from NMNH professionals
- Provide a service to the organization by contributing their time and talents
- Create professional partnerships
- Pursue their fields of interest related, or not, to their current profession

Project focus and intensity varies greatly. Participants are expected to be in-residence at the Smithsonian's National Museum of Natural History in Washington, DC during their participation in the program. No financial assistance, housing, or travel allowance is provided as part of the program.

Term 1 week
Stipend None
Deadline Two weeks prior to the anticipated start date
Contact: Mary Sangrey, Head, Office of Academic Services, NHB MRC 106, Room 61, PO Box 37102, Smithsonian Institution, Washington, D.C. 20013-7012
Phone: (202) 633-4548
Fax: (202) 633-0153
Email: arc@si.edu
WWW: http://www.mnh.si.edu/academics/internship_projects.cfm?listing=spring

Winter Break Internship Program

The Alternative Winter Break Program provides an opportunity for college-level undergraduate and graduate students located in the DC area during the winter break (generally January) to spend time at the Museum contributing to the on-going activities of the NMNH community. Project focus and intensity varies greatly. Participants are expected to be in-residence at the Smithsonian's National Museum of Natural History in Washington, DC during their participation in the program.

Term 1-5 weeks
Stipend None
Deadline Two weeks prior to the anticipated start date

Contact Mary Sangrey, Head, Office of Academic Services, NHB MRC 106, Room 61, PO Box 37102, Smithsonian Institution, Washington, D.C. 20013-7012
Phone (202) 633-4548
Fax (202) 633-0153
Email arc@si.edu
WWW http://www.mnh.si.edu/academics/internship_projects.cfm?listing=winter

Natural History Research Experiences

Natural History Research Experiences (NHRE) summer internships pair undergraduates with members of the Natural History research and collections staff, providing a hands-on introduction to scientific research. NHRE internships offer the opportunity for students to engage in an original research project with a scientific mentor from one or more of the scholarly disciplines at the National Museum of Natural History: Anthropology, Botany, Entomology, Invertebrate Zoology, Mineral Science, Paleobiology, Vertebrate Zoology, and Museum Education. Additional activities include behind-the-scenes tours and lectures at the museum. As part of the application procedure, students must identify a field of interest and/or specific individuals with whom they are interested in working. Information about research areas and staff directories can be found at department websites. Students can also browse project archives from previous years for inspiration. Students selected for placement in the NHRE program will be given full details about the specific research mentor, department, and project(s) available to them, at which point they can accept or reject the internship offer.

The National Museum of Natural History (NMNH) is located on the National Mall in the heart of Washington, DC. Students selected will receive a stipend and housing at a local university. A relocation allowance may also be available.

Previous research experience is not required and we encourage applications from ethnic minorities and members of other underrepresented groups.

Term 10 weeks (May – August)
Stipend $5,000
Deadline Early February
Contact Virginia Power, Program Administrator
Email powerv@si.edu
Phone (202) 633-1055
WWW http://www.mnh.si.edu/NHRE/

Arctic Studies Center Internship Program - Anchorage, Alaska

The Alaska Office of the Arctic Studies Center, National Museum of Natural History, accepts applications for archaeology and anthropology internship positions at the Anchorage Museum in Anchorage, Alaska. At the Arctic Studies Center, Native peoples, scholars and museum associates work together on a broad range of collaborative

research, exhibitions and education programs. Applications should be sent to the contact below and include a CV and cover letter, stating the position and dates you are applying for.

Term	Varies (see above)
Stipend	None
Deadline	Accepted year around
Contact	Dawn Biddison, Assistant Curator, Address: Smithsonian Arctic Studies Center, Alaska Office, 625 C Street, Anchorage, AK 99501
Email	biddisond@si.edu
WWW	http://www.mnh.si.edu/arctic/html/about_internship.html

Smithsonian Marine Station Internship Program – Fort Pierce, Florida

The Smithsonian Marine Station (SMS) is a research center specializing in marine biodiversity and ecosystems of Florida. Research focuses on the Indian River Lagoon and the offshore waters of Florida's east central coast, with comparative studies throughout coastal Florida. Internship opportunities are available to students seeking to contribute their time and energy toward the activities of the Station. Internship appointments vary from one month to one year. Project focus and intensity varies greatly. Positions range from short-term, part-time appointments to full-time year-long commitments.

Term	Open
Stipend	None
Deadline	Accepted year around
Contact	Joan Kaminski, 701 Seaway Drive, Fort Pierce, FL 34949
Email	kaminski@si.edu
Phone	(772) 462-0977
Fax	(772) 461-8154

Youth Engagement through Science (YES) Program

The Youth Engagement though Science (YES!) program engages rising high school sophomores and juniors from the Washington DC area in exciting internships at the National Museum of Natural History. During 6 weeks in the summer, interns work on meaningful research projects and venture behind-the-scenes into the Museum's vast research collections. Participants acquired valuable technological skills and enhanced their written and verbal communication skills through guided workshops. At the end of the summer session, YES! interns are challenged to create educational activities for museum visitors, combining their research and science education skills. In the fall, participants continue with their educational and career development by participating in college preparatory activities.

Term	May - November
Stipend	Yes
Deadline	April
Contact	Elio Cruz, P.O. Box 37012, Education & Outreach, MRC 158, Washington, DC 20013-7012
Email	yesprogram@si.edu
Phone	202-633-0815
WWW	http://www.mnh.si.edu/education/yes/index.html

NATIONAL PORTRAIT GALLERY (NPG)

Generations of remarkable Americans are kept in the company of their fellow citizens at the National Portrait Gallery. The Gallery presents the wonderful diversity of individuals who have left—and are leaving—their mark on our country and our culture. Through the visual and performing arts, we celebrate American leaders, artists, activists, and icons of pop culture. They all link us to our past, our present, and our future.

The National Portrait Gallery, as part of the Smithsonian Institution, offers formal internships to qualified applicants. A Smithsonian internship is a prearranged, structured learning experience that should be relevant both to the intern's academic and professional goals and to the professional disciplines represented at the Smithsonian. Various departments at the National Portrait Gallery sponsor interns throughout the year. The availability of internships is dependent upon departmental projects and staff needs, as well as the background, skills, and interest of the applicant; a full listing of opportunities may be found on our website.

Projects are based on needs of the department and are agreed upon by the mutual consent of the intern candidate and his or her supervisor. Please see our website to explore the National Portrait Gallery's departments and how to apply.

Stipend None
Deadline Considered year-round; summer application deadline: March 3
Contact (202) 633-8508
Email NPGInterns@si.edu
WWW http://npg.si.edu/education/internships.html

NATIONAL POSTAL MUSEUM (NPM)

Museum-wide Internship Program

The National Postal Museum showcases one of the largest and most comprehensive collections of stamps and philatelic materials in the world. The museum houses six major galleries that highlight a range of topics, from the earliest history of the mail and its rapid growth as a modern enterprise, to the art of letter writing and the beauty and lore of stamps. Internships are available in the following areas: American studies, postal history, transportation history, philately, education, exhibits, collections management, public affairs available to undergraduate and graduate students.

Term Determined for each position
Stipend None
Deadline Accepted year round
Contact Motoko Hioti, Intern Coordinator, National Postal Museum, Education Department, Smithsonian Institution, PO Box 37012 MRC 570, Washington, D.C. 20013-7012,
Email hiokim@si.edu
Phone (202) 633-5535
Fax (202) 633-9393
WWW http://www.postalmuseum.si.edu/involved/7c_internships.html

NATIONAL ZOOLOGICAL PARK (NZP)

National Zoological Park Internship

The Smithsonian's National Zoological Park is one of the world's leading institutions in animal management and conservation biology research. Within the NZP, the Smithsonian Conservation Biology Institute (SCBI) acts as an umbrella research organization for the Smithsonian's global effort to conserve species and train future generations of conservationists. The Institute consists of six centers: The Center for Animal Care Science, the Conservation Ecology Center, the Center for Conservation Education and Sustainability, the Center for Conservation and Evolutionary Genetics, the Migratory Bird Center, and the Center for Species Survival. This research encompasses a broad array of subjects including ecology and biodiversity monitoring, reproduction and animal health, genetic diversity and systematics, and nutrition and geographic information systems. NZP staff members are involved in groundbreaking research contributing to the conservation of endangered species and ecosystems locally, nationally, and around the world. The objective of our research programs is to develop long-term, collaborative conservation initiatives that utilize the diverse array of scientific, cultural, and political tools to understand and protect species and their ecosystems. Its efforts support one of the four main goals of the Smithsonian's new strategic plan, which advances "understanding and sustaining a biodiverse planet".

The Center for Animal Care Sciences encompasses daily animal management, animal behavioral studies, nutritional research, commissary operations, and park management (including horticultural operations).

The Zoo also has a full-service exhibit design and production organization, administrative services that include information management (including web and help desk activities), public affairs, advancement (fundraising), and safety.

Internship opportunities at the NZP were established with the understanding that gaining practical, professional experience in the various fields of zoo operations and research is an ongoing process, and is necessary for advancement in studies and career development. Internship positions are designed for undergraduate or beginning graduate students, but are not limited to individuals in a degree program. A few animal management and educational outreach opportunities are available for high school students interested in biology.

Additionally, the NZP is supported by its dedicated non-profit partner 'Friends of the National Zoo' (FONZ). FONZ supports the Zoo in fulfilling its goal of excellence in animal care, science, sustainability, and education. One way that FONZ does this is by offering internships to undergraduate and recent college graduates in communications, marketing, and education.

The NZP (including SCBI) and FONZ offer internship in each of their major program areas:

- Conservation Biology
- Exhibit design, interpretation and evaluation
- Information Technology and Web Management
- Communications and Marketing
- Public Affairs
- Planning and Strategic Initiatives
- Reproductive Sciences
- Science Training and Education
- Animal Management
- Animal Nutrition
- Veterinary Medicine

Under the guidance of a staff mentor, each intern will carry out practical activities and/or research in their focus area with the goal of completing a specific project. Interns are placed at all three NZP facilities: The Washington DC National Zoo (a public park), in the Quadrangle on the Smithsonian Mall, and the SCBI academic and breeding center in Front Royal, Virginia.

For more information about our internship opportunities and to view a list of current projects and their availability, visit our website at http://nationalzoo.si.edu/UndergradInternships/.

OFFICE OF ADVANCEMENT (OA)

The Smithsonian Office of Advancement offers internship opportunities that can provide you with an outstanding, real-world foundation for your future career. As an intern, you will work within a specific department, and have the chance to interact with professionals across the Institution.

Undergraduate and graduate internships are offered throughout the year. Academic credit may be arranged through your school.

Internship opportunities are filled as-needed in the following areas:

- Membership
- Campaign Volunteer Management
- Communications
- Donor Stewardship & Programming
- Corporate/Foundation Relations
- Prospect Management
- Prospect Development
- Planned Giving
- Regional Major Gifts

Term Internships are available in the Winter/Spring, Summer, and Fall
Contact Katie McGoldrick
Email McGoldrickK@si.edu
WWW http://www.si.edu/giving/giv_internships.html

OFFICE OF THE CHIEF INFORMATION OFFICER (OCIO)

The Office of the Chief Information Officer (OCIO) provides the Smithsonian's central computing and telecommunications services; provides leadership in information technology throughout the Institution in support of systems planning and development, communications, and computer-related training; and provides policy and guidance to ensure the integrity and security of Institutional automated data. Internship Programs & Requirements Internships with this office provide practical experience leading to the eventual achievement of personal goals of the interns. Specific interest in computer help desk, electronic mail, programming disciplines, network design and operations. Applicants should have a definite interest in and some knowledge of computers. Information Technology Services Division Interns participate and assist staff with products and services to include technical training, computer help desk, electronic mail and technical support for the Institution's World Wide Web Site, www.si.edu. This division also operates facilities for hands-on training, document and image scanning, and multi-media product development. Infrastructure Technologies Division Interns in the division have the opportunity to provide foundation computing capabilities, technical support to several mainframe computer systems, network servers operated by OCIO on behalf of offices within the Institution. System Engineering Division Interns will provide central support for the applications systems at the Institution which include acquiring and or developing, deploying and maintaining application systems, providing leadership and guidance in data administration both Institution-wide and in the International Museum Community. Applicants are reviewed by the OCIO Intern Coordinator and division managers. Selected intern(s) are notified by the coordinator. There are no deadlines; the office accepts applications throughout the year.

Contact (202) 633-8486
Email cattaneov@si.edu

Deadline There are no deadlines; the office accepts applications throughout the year

OFFICE OF EQUAL EMPLOYMENT AND MINORITY AFFAIRS (OEEMA)

The Office of Equal Employment and Minority Affairs (OEEMA) directs, oversees, facilitates, and reports on all aspects of equal opportunity in the Smithsonian Institution's employment and business relationships while ensuring compliance with regulatory guidelines and Institutional policies.

Interns serving in OEEMA can expect direct interaction with staff on a constant basis and involvement with a wide range of projects, as the work of the office dictates.

Past OEEMA interns have gained skills and experience by assisting with projects such as:

- Editing and creating material for OEEMA's websites and outreach materials
- Updating databases with sources of diverse recruitment candidates and prospective vendors
- Photographing and videotaping employees and Individuals Associated with the Smithsonian for programmatic records and outreach materials

We expect a great deal from our interns; students interning in OEEMA can expect a challenging and enriching learning experience. Students applying for OEEMA internships must possess analytical and writing skills, the ability to conduct research, and a working knowledge of Microsoft Office.

Stipend Unpaid
Contact Shahin Nemazee
Phone (202) 633-6417
WWW http://www.si.edu/oeema

OFFICE OF EXHIBITS CENTRAL (OEC)

The Office of Exhibits Central supports Smithsonian museums and units in all aspects of exhibition design and production. All interns work under the guidance of OEC staff on current exhibit projects. OEC is organized into six units: design/editing, graphics, fabrication, model-making, project management, and administration. OEC projects are assigned to a project manager, who works with unit supervisors to assemble a team that works closely with clients to design and produce exhibits in accordance with the client's need. Interns are assigned to work on tasks appropriate to their qualifications and talents. Interns at OEC have the opportunity to exercise and strengthen their existing skills, to try-out and develop new exhibit design and production skills, and to exercise responsibility, creativity, and imagination within a supportive, encouraging environment. Design interns should have experience in graphic layout, typography, and design and should be able to prepare scaled architectural drawings. A background in fine arts and museum studies is also acceptable. Should be able to prepare hand-drawn or computer-generated presentation sketches. Knowledge of Illustrator, Photoshop, QuarkXpress, and Vector Works a plus. Applicants for a design internship should prepare a portfolio showing examples of their design work. Graphics ï¿½ Graphics interns will aid in the production of exhibition graphic elements. Tasks may include interpreting and implementing drawings and layouts, photo mounting, archival matting and framing, vinyl lettering, banner production, mounting and laminating digital prints, mounting and cutting exhibit labels, digital printing, desktop publishing and/or computer illustrating, using applications such as Adobe Illustrator and PhotoShop. Model Shop and Model-making interns should know how to use hand tools and power machinery and have art or shop experience. Tasks may include making models, dioramas, mannequins, and replicas, and fabricating custom mounts and brackets. Interns may gain knowledge with three dimensional software modeling programs, such as Rhino and Zbrush, and

three Dimensional scanning and printing. Fabrication – Fabrication interns should have basic carpentry skills and be able to lift and move heavy loads on occasion. Tasks may include cabinetry, sheet plastics work, painting and staining, crate construction, artifact packing, and exhibit installation. Project management interns should have some business experience and/or a background in museum studies. Tasks may include compiling and analyzing information for inventory, budgets, and scheduling. Interns will attend project and office administrative meetings, and may assist with the administration of project documentation.

WWW http://oec.si.edu/opportunities.html

OFFICE OF FACILITIES MANAGEMENT AND RELIABILITY (OFMR)

Facility Management Internship

Understanding the built environment will help you excel in any career choice. The Office of Facilities Management and Reliability (OFMR) is seeking enthusiastic interns to jour our dynamic facility management team. All majors are welcome to apply! Please visit our website for the most up to date information: si.edu/facilities

Why choose an internship with OFMR?

- The profession of facility management is growing
- The built environment is comprised of multiple disciplines including:
    - Technology
    - Business
    - Engineering
    - Construction Management
    - Architecture
    - Energy Management
    - Occupational Health & Safety

Term 12-16 consecutive weeks; 40 hours/week; multiple opportunities available
Stipend Yes
Deadline Flexible
Contact facilities@si.edu
WWW http://facilities.si.edu/internships/index.html

OFFICE OF GENERAL COUNSEL (OGC)

The Office of General Counsel (OGC) protects the legal interests of the Smithsonian Institution, a trust instrumentality of the United States. In carrying out that mission, the OGC advises the Smithsonian Board of Regents, Secretary, Under Secretaries, museum directors, and other managers on the administration of the Institution; represents the Smithsonian in litigation and other adversarial proceedings; issues final determinations on administrative tort and personal property claims; drafts exhibition, sponsorship, and licensing agreements; and generally monitors developments in the law for application to Smithsonian programs. The OGC is made up of 12 attorneys, whose work covers such diverse topics as tax, employment discrimination, import/export, federal appropriations, intellectual property, and environmental law. Legal interns in the OGC assist the attorneys in all subject matter areas. The interns work directly with all of the attorneys, performing traditional case law research, preparing legal memoranda for use in briefs and motions, reviewing agreements, surveying state law, and researching legislative history. When possible, interns are invited to attend hearings, depositions, and meetings. It is

a small and busy office, and the internship program is fairly informal. We hope that the interns will dive into the work, and, in doing so, expose themselves to and interesting and diverse law practice.

The internships are not compensated. The OGC usually seeks a second or third year law student for one internship (or externship) each semester and over the summer. Part-time, school term interns work an average of 15 hours a week. Full-time internships (or externships) also are available during the school year. Summer interns usually work full time for 10 weeks, but the schedules are flexible. Some interns have received law school credit for their OGC work. Others have received public interest grants from their law schools to cover their expenses.

Term Fall, spring, and summer. School term interns work an average of 15 hours a week. Summer interns usually work full time for 10 weeks, but the schedules are flexible.
Stipend The internships are not compensated.
Deadline August 1 (fall applications), November 1 (spring applications), and February 15 (summer applications).
Contact Farleigh Earhart, P.O. Box 23286, Smithsonian Office of General Counsel, Washington, DC 20026-3286
Email earhartf@si.edu
Phone (202) 633-5095
Fax (202) 357-4310
WWW http://intern.si.edu

OFFICE OF INVESTMENTS (OI)

The Smithsonian Institution has a $1 billion Endowment and a $200 million short-term working capital fund. The Endowment uses external investment managers to invest in diverse asset classes and strategies that include global equity, fixed income, hedge funds, private equity and real assets. The working capital fund is invested in high grade fixed income securities. The Smithsonian receives approximately 70% of its funding from the Federal government with the balance from its Endowment, research grants, philanthropic donations, and the income from its commercial activities.

The Office of Investments (OI) manages investments and is responsible for the growth, safety, and integrity of the Institution's financial assets. The Chief Investment Officer provides advice to senior management and unit managers on a range of financial issues, including the investment and management of the Institution's resources.

An internship with the Office of Investments provides the opportunity to gain practical skills and experience with institutional investment management. The program offers full-time and part-time opportunities in our Washington, DC office. Projects will be related, but not limited, to:

1) Assisting Investment staff in the review of manager performance by monitoring performance, analyzing holdings and portfolio strategies, examining risk, forecasting future performance, etc. Compare Smithsonian investment performance to that of the market and peers.

2) Reconciling data to ensure consistency between manager and custodian records and coordinates funds transfers between the Institution and investment managers. Maintain the Institution's formal written and electronic records of transactions and management decisions.

3) Providing analytical support on securities, financial markets, investment funds, and portfolio management

4) Analyzing financial data, identifying trends, and anticipating future earnings through economic analyses

5) Quantitative analytical methods and mathematical models applied to broad, complex issues and problems

6) Written and oral presentations, reports and correspondence

7) Working well with others, to accomplish the mission.

Term 400 hours over 10 weeks, flexible
Deadline August 1 (fall applications), November 1 (spring applications), and

	February 15 (summer applications).
Contact	Cathy Yoon, Special Assistant
Email	yoonc@si.edu
Phone	202-633-7138
Fax	202-312-1969

OFFICE OF INTERNATIONAL RELATIONS (OIR)

The International Center serves as a home for several independent units that foster the Smithsonian's international activities, and organize various types of international programs that are not ordinarily undertaken elsewhere within the Institution. Internships are created as the need arises, in connection with the development of specific projects by the various units.

International Center units include the Office of International Relations, the International Gallery, the Smithsonian Institution Monitoring and Assessment of Biodiversity Program, and the Washington office of the Smithsonian Tropical Research Institute. Some of these units occasionally have projects suitable for interns to work on; others rarely do. Thus, internship opportunities in the Center do not exist year-round or necessarily during the summer, but occur at random and sporadic intervals.

Applications will be considered from graduate students and undergraduates in their junior or senior years of college. Guided by a mentor, interns will be able to gain experience in an educational setting: duties might include research, writing, editing, scheduling, archiving, database management and light office work.

Term	2 month minimum
Deadline	Considered year-round
Contact	Francine Berkowitz, Office of International Relations
Email	fcb@si.edu

OFFICE OF POLICY AND ANALYSIS (OP&A)

Office of Policy and Analysis (OP&A) Internships are available to undergraduate and graduate students. An OP&A internship provides experience in conducting quantitative and qualitative policy-related studies of major Smithsonian programmatic and administrative activities. In addition, the office conducts quantitative and qualitative studies of Smithsonian visitors and program participants. Interns either work as collaborators with OP&A staff in data collection, analysis, and presentation of results or undertake independent projects. A social science related background (management, business, sociology, psychology, cultural studies, education, etc.) and some coursework in qualitative or quantitative research methods are helpful. Academic credit can be arranged. Applicants are encouraged to review several OP&A reports posted at http://www.si.edu/opanda/ for examples of the types of studies the office conducts.

If you are interested in pursuing an internship with OP&A, please submit a cover letter, resume, recent course paper, two references and proposed start dates to Zahava D. Doering. Electronic submissions are appreciated.

Term	Minimum of 10 weeks
Email	doeringz@si.edu
Phone	(202) 633-5588, M-F
WWW	http://www.si.edu/OPANDA/internships

OFFICE OF PUBLIC AFFAIRS (OPA)

Assists with the Smithsonian Folklife Festival, writing press releases, media advisories and public service announcements, as well as calls to reporters to "pitch" the Folklife Festival. Other support duties include compiling mailing lists, faxing and copying press releases, and stuffing press kits. Arranges interviews with reporters and Festival organizers, and escorts media to various Festival sites. Assists in putting together a publicity report detailing media coverage of the Festival. Also may be given some writing assignments for the Smithsonian employee newspaper, the Torch.

Contact Becky Haberacker, Internship Coordinator, Office of Public Affairs, Smithsonian Castle, Room 354, PO Box 37012, Washington, DC 20013-7012
Deadline Flexible – applications (resume with cover letter indicating internship proposal dates and internship objectives may be accepted at anytime)
Phone (202) 633-5183

OFFICE OF SPONSORED PROJECTS (OSP)

Administrative or Accounting/Financial Internship in Grant/Contract Administration

The Office of Sponsored Projects (OSP) provides assistance to Smithsonian staff who are seeking or have obtained external funding for sponsored project(s). A “sponsored project” is a research, education, exhibit, training or other activity that receives partial or full funding through the mechanism of a federal or non-federal grant or contract. OSP assists with the acquisition and usage of grants and contract funding for Smithsonian research, education and training. Assistance is provided to Principal Investigators, administrative units and central management staff.

Principal administrative functions of the office include advising on funding sources and availability; assisting with proposal preparation and submission, including meeting sponsor and Smithsonian requirements and development of the budget; reviewing and negotiating the terms and conditions of a proposed award and accepting the award on behalf of the Institution; and providing advice and assistance in development of the Institution’s research policies. In addition, federal research compliance policy (e.g. use of animals or human subjects in research) is developed and monitored by OSP staff. Training programs in all relevant areas are provided to Smithsonian staff on a regular basis.

Accounting/financial functions include monitoring sponsored project activities and expenditures to assure compliance with Smithsonian and sponsor policies and accounting standards; providing oversight for cash management of all grants and contracts; providing advice and problem resolution services to principal investigators; serving as the official Smithsonian audit liaison with auditors of government agencies and private foundations and corporations for grants and contracts. The office is also responsible for preparing, negotiating and applying the Smithsonian’s indirect cost system for grants and contracts.

Term Variable (minimum 2 months, 10-15 hours per week)
Stipend None
Deadline Open
Contact Karen Otiji, Assistant Director of Grant Management
Address P.O. Box 37012 MRC 1205, Washington, DC 20013-7012
Email otijik@si.edu
Phone (202) 633-7110
Fax (202) 633-7119

SMITHSONIAN AFFILIATIONS (SA)

Smithsonian Affiliations Internship

Smithsonian Affiliations offers internships focused on national outreach based on availability and current activities of the staff. Projects vary in focus and intensity and range from short-term, part-time appointments to full-time summer-long commitments. Working side-by-side with the Affiliations staff, interns develop specialized skills in national conference planning, membership management, fundraising, public relations, programmatic marketing, web management, and new media strategy. In addition, interns will develop professional networking skills while working collaboratively among the various Smithsonian museums and units to learn how to develop educational programming and coordinate object loans for Affiliates across the country.

Contact Elizabeth Bugbee – External Affairs Coordinator
Email BugbeeE@si.edu
Phone (202) 633-5304
WWW https://affiliations.si.edu/SecDetailPage.Asp?MenuID=155

SMITHSONIAN AMERICAN ART MUSEUM

The Smithsonian American Art Museum internship programs, beginning in 1968, are the oldest within the Smithsonian, and among the most structured. One staff member, who serves as the Intern Program Officer, oversees all aspects of the museum's two programs, mentors program participants, encourages mentorship relationships, provides advice and guidance in career development, maintains an "alumni" career database, and arranges the Alumni Reunion reception, held annually for all former American Art Museum interns and SI Fellows.

The Smithsonian American Art internship programs operate on an academic schedule, with fall, spring, and summer (eight weeks) semesters. Due to program scheduling needs, accommodations cannot be made for students on the quarter system, for short-term winter programs, or for other time periods that are different from the three semesters specified.

The Two Programs and Participation Requirements

1) The Advanced Level Programs is a comprehensive museum training program, designed to provide an in-depth overview of museum operations. Students participate 20 hours weekly for two semesters (fall and spring) or 40 hours weekly for one semester. The career objectives of each participant are considered in making placements. Fall semester assignments are made by the Intern Program Officer; spring semester assignments are chosen by participants, in consultation with the Intern Program Officer. Weekly workshops and seminars, taught by museum professionals, accompany department assignments during both semesters.
2) The Summer Program is designed for undergraduates considering a career in the art or museum field, with a focus on one office or department related to their interests. Participation is full-time, 40 hours weekly, for eight weeks, beginning early to mid-June and concluding late July or early August. Some academic and career develop workshops accompany museum assignments.

Program Qualifications:

Students from all academic backgrounds are eligible to apply to the programs above, however career need for an internship in the Smithsonian American Art Museum should be explained in the applicant's statement of purpose.

For consideration for placement in the Lunder Conservation Center, individuals must be currently enrolled in a four-year graduate level conservation program, or have demonstrated academics in chemistry or related areas, along with documented previous experience with a qualified, professional conservator.

For the Advanced Level Program, priority is given to applications from individuals currently enrolled in a graduate-level university or college program or to those with some previous museum experience who also have a degree from a four year college or university. Consideration for the Advanced Level Program will also be given to college seniors with exceptional academics. For the Summer Program, priority is given to individuals with little museum experience, who also hold a degree from a four-year college or university, or to students who are entering their college senior or junior year at the time of application. Graduate students with little previous museum experience will be considered for the Summer Program on an individual basis.

International Students

International students, living within the US, may apply to either the Advanced Level Program or the Summer Program, according to their eligibility. However, international students, living outside the US, are requested to make application only to the Advanced Level Program, as time is not available to complete the visa process prior to commencement of the Summer Program.

Academic Credit or Graduation Certification

Academic credit or certification for graduation may be awarded by the student's sponsoring institution through a contractual agreement with the Smithsonian American Art Museum. Applicants wishing to receive credit or graduation certification, or their academic advisors, should contact the Intern Program Officer for more information. All arrangements must be completed prior to the beginning of the internship.

Application Requirements and Deadlines:

There is no specific application form; candidates to either program should submit a statement of purpose explaining their careers goals and objectives, a resume, official or unofficial transcripts from all universities or colleges attended, and three recommendations (academic and/or professional). Materials may be emailed or sent by USPS, FedEx, or UPS, either as a package or as individual items. Recommenders may email their support letters directly to the Intern Program Officer. The deadline for application to both programs is March 1 each year; applications postmarked after that date will be wait-listed. Students who wish to increase their prospects for acceptance may apply to both programs, by submitting one application, but stating their availability for either program in their statement of purpose. Graduate students applying to the Advanced Level Program, who would like to be considered for the Mandil stipend, should state this and their reasons for requesting financial support, in their statement of purpose.

Applications for these programs are not currently available on the SOLAA system.

Phone (202) 633-8355
Email HollomonJ@si.edu
WWW http://Americanart.si.edu

SMITHSONIAN ASIAN PACIFIC AMERICAN CENTER (APAC)

The Smithsonian Asian Pacific American Center provides vision, leadership, and support for Asian and Pacific Islander American initiatives for the Smithsonian and works to better reflect their contributions to the American experience, world culture, and the understanding of our planet and the natural world throughout collections, research, exhibitions, outreach, and education programs.

Interns at the Smithsonian Asian Pacific American (APA) Center embark on an academic and professional journey while participating in unique Smithsonian activities. They will have the opportunity to develop an APA research project centered on their scholarly interests. They will have the opportunity to learn more about the museum industry by participating in the development of upcoming APA exhibitions, education materials, and public programs. Work is performed directly under a supervisor who will encourage the intern to analyze and reflect on the work at hand and to relate it to his or her academic, professional, and personal goals.

The duration of an internship may range from 10-15 weeks depending on academic quarter systems or semesters. An internship usually involves a schedule of 20 to 40 hours a week. However, it may be structured for any number of hours that are mutually agreeable to both the intern and the APA Center.

Applicants will be chosen based on their scholarly qualifications, experience working with APA communities, personal career goals, and the quality of a proposed research project and its suitability to the APA Center's missions and goals.

Applicants are generally current college students, recent college graduates (within one calendar year), and/or have been accepted to enter an advanced degree program. Most interns are at the senior or junior undergraduate level, though strongly qualified sophomores and freshmen will be considered. Because of the Smithsonian's world-class scholars, libraries, and research facilities, graduate students and pre-doctoral students are highly encouraged to apply. Internships are unavailable for high school students.

Internships are designed to increase the educational and professional skills of undergraduate and graduate students, and other individuals contemplating careers, in the professions, academic disciplines, and administrative functions represented at the Smithsonian.

Term	Spring, Summer, and Fall
Deadline	Spring 2014: November 1, 2013 Summer 2014: March 28, 2014 Fall 2014: June 27, 2014
Contact	Krista Aniel, Program Assistant (Outreach), Smithsonian Asian Pacific American Program, Capital Gallery, Suite 7065, MRC 516, PO Box 37012, Washington, DC 20013
Email	AnielKr@si.edu
Phone	202.633.2690
Fax	202.633.2699
WWW	http://apa.si.edu/internships.asp

Konrad Ng, Director

The Smithsonian Asian Pacific American Center promotes the appreciation, inclusion, and understanding of Asian Pacific American history, art, and culture through exhibitions, collections, research, and public programs. The Center works in partnership with museums, galleries, and centers throughout the Smithsonian, across the country, and around the world. For more information, please visit http://apa.si.edu.

PROGRAM STAFF

ANIEL, Krista L., Program Assistant (Outreach). B.A. (2006) Brigham Young University; M.A. (2009) Georgetown University. Research specialty: U.S. immigration control policy.

INOCENCIO, Gina Terre, Program Specialist. M.A. (1999) Asian American Studies, University of California Los Angeles. Research Specialties: Asian Pacific American culture and history. Asian Pacific American contemporary issues with a focus on community advocacy/social service providers and delivery of services.

LUIS, Adriel, Museum Curator.

MOMAYA, Masum, Museum Curator. B.A. Stanford University, Ed.M, Harvard University, Ed.D. Harvard University. Research specialties: feminist theory, international women's rights, embodiment, psychological anthropology, South Asian American experience, social media for social change.

NG, Konrad, Director, B.A. (1996) McGill University; M.A. (1999) University of Victoria; PhD (2006) University of Hawaii. Research specialties: Asian and Asian Pacific American popular culture, cinema, and new media.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY (SAO)

SAO Summer Intern Program

The SAO Summer Intern Program in astronomy offers summer research positions to students currently enrolled in a program leading to a bachelor's degree. Each intern works with a scientist on an individual research project. Potential areas of research include observational and theoretical cosmology, extragalactic and galactic astronomy, interstellar medium and star formation, laboratory astrophysics, supernova and supernova remnants, and planetary science. Also included in the program are weekly lectures, field trips, and workshops specifically designed for the participants. Applicants must be citizens of the US, or hold a valid green card. Graduating seniors are not eligible. Housing, stipend, and subsidized travel expenses to Cambridge are provided.

Term 9-10 weeks
Deadline February 1
Contact Coordinator, SAO Summer Intern Program
Phone (617) 495-7400
Email intern@cfa.harvard.edu
WWW http://hea-www.harvard.edu/REU/REU.html

CFA/SAO Solar REU Program

The Solar and Stellar X-Ray Group (SSXG) and the Solar, Stellar, and Planetary Group (SSP) at the Harvard-Smithsonian Center for Astrophysics (CfA) hosts a 10 week summer program for undergraduate students across the country to participate in cutting edge research on solar physics with CfA/SAO scientific mentors. Special seminars will be held to increase students' public speaking and computer programming skills. Students will learn from experience about scientific research and how to apply their academic work to real-world problems. Participants must be US citizens and full-time undergraduate students, preferably finishing their sophomore or junior years. Applications from traditionally underrepresented groups are encouraged. Housing, stipend, and subsidized travel expenses to Cambridge are provided. More information including contact and application information can be obtained from the website listed below.

Term 10 weeks
Stipend $500 per week
Deadline February 15
Contact Dr. Henry "Trae" Winter
Phone 617-495-7400
WWW www.cfa.harvard.edu/opportunities/solar_reu/

SMITHSONIAN CENTER FOR LEARNING AND DIGITAL ACCESS (SCLDA)

The mission of the Smithsonian Center for Learning and Digital Access (SCLDA) is to interpret the collective knowledge of the Smithsonian and serve as a gateway to the Institution's education resources. Through research, publishing, and staff development programs for the education and museum communities, the Center promotes the understanding and use of museums.

As the central office of education, SCLDA is well-positioned to give interns a broad overview of the Smithsonian Institution, introductions to the wide variety of work that museum and education professionals here are involved in, and an opportunity to participate in a deeper level with special projects. Acceptance into the program is competitive. SCLDA accepts about 10 interns yearly in the following 4 areas:

New Media and Online Conferences
Audience Research and Evaluation
Heritage Month Programs
Professional Development Programs

Qualifications will vary depending upon the project, but most are for upper-level undergraduate and graduate students. Student status, however, is not a prerequisite. Opportunities are generally not available for high school students.

Applications for a SCLDA internship must be made using the Smithsonian online application system https://solaa.si.edu. Paper applications will not be considered. *Please be aware that complete applications must include the following:* Internship program application form, Resume, Academic transcripts (unofficial are acceptable), Personal essay, Two letters of reference

Term Flexible; some weekend or evening programs; minimum length of 6 weeks with at least 20-hour work weeks
Stipend No
Deadline Rolling, but will be reviewed after the following dates:
Fall (October - December) July 15th
Spring (January - May) October 15th
Summer (June - September) February 1st
Contact Tracie Spinale, Internship Manager
Email tspinale@si.edu
WWW http://museumstudies.si.edu/Intern/scemsintern.htm

SMITHSONIAN ENTERPRISES (SE)

Smithsonian Enterprises operates retail, media, product development, licensing and other services which promote the Smithsonian mission while generating an essential source of unrestricted funding for the Institution. By providing products and services that reflect the mission of the museums and research centers, Smithsonian Enterprises plays a critical role in advancing the Institution's mission of the increase and diffusion of knowledge. Smithsonian Enterprises includes Smithsonian and Air & Space magazines, museum stores, restaurants, IMAX theaters, Smithsonian Catalogue, Smithsonian Channel, book publishing, and licensing.

Internships are project based, and are available in several business areas including: Publishing, Human Resources, Travel, e-Commerce, Retail Support, & Web Services. Candidates can view and apply to individual projects within Smithsonian Enterprises through the Smithsonian Online Academic Appointment System at https://solaa.si.edu.

Stipend None
Deadline Ongoing - Projects are based on needs of the business units and timelines are agreed upon by

mutual consent of the intern candidate and the supervisor

Contact Jay Sharp, Intern Coordinator
Email sharpj@si.edu
Phone (202) 633-6047

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER (SERC)

The Smithsonian Environmental Research Center's (SERC) Internship Program offers undergraduate and beginning graduate students a unique opportunity to gain exposure and experience in a research environment. The program enables students to work on specific projects under the direction of the Center's professional staff and is tailored to provide the maxi-mum educational benefit to each participant.

SERC is focused on understanding the causes and consequences of environmental change for marine, freshwater, and terrestrial ecosystems. Interns at SERC conduct independent projects (field of research and education) over 10-16 weeks, utilizing our 2,650 acre research site on the shores of the Chesapeake Bay to provide novel insights into some of the most profound issues challenging our world today; including habitat loss, climate change, and invasive species. Students will become familiar with much of the research being conducted at SERC, but they will devote most of their time to a project and content area of particular interest to them. In addition to their research, students participate in field trips, seminars, lectures, and an intern open house. All participants are expected to integrate what they have learned during their experience and present a brief seminar at the end of their stay.

Term 12-16 weeks, Winter/Spring/Summer/Fall
Stipend $500 per week
Deadline Winter/Spring: November 15
Summer: February 1
Fall: June 1
Contact Daniel E. Gustafson, Jr.
Email SERCintern@si.edu
Phone (443) 482-2217, M-F
Fax (443) 482-2380
WWW http://www.serc.si.edu/pro_training/internships/internships.aspx

SMITHSONIAN GARDENS (SG)

The Smithsonian Gardens manages the grounds of the Smithsonian museums in Washington, DC and develops horticultural displays and exhibitions in exterior and interior museum spaces that are enjoyed by millions of visitors each year. SG internships provide practical learning experiences in the extremely diverse field of horticulture. Assignments vary from one specific project to a broad range of activities in the many SG branches including garden and grounds maintenance, greenhouse production, landscape design, collections management (orchids, garden furnishings and horticultural artifacts, and garden archives), integrated pest management, and educational outreach. The Smithsonian Gardens accepts current and recently graduated undergraduate and graduate students studying horticulture, landscape architecture, museum studies, or other related fields. Selection is based on both an evaluation of the applicant’s application and available positions.

Term 10 to 16 weeks
Stipend Paid and unpaid internships available

Deadline Summer - February 1
Fall - June 1
Winter/Spring - November 1
Internships will begin approximately three months after the deadline.
Email gardens@si.edu
Phone (202) 633-5840

Archives of the American Gardens Internship

The Archives of American Gardens internship provides opportunities to perform various archival collections management tasks in the Archives of American Gardens, a growing photographic collection that documents American garden design and landscape history. This experience will help interns learn some of the practices necessary to prepare archival collections for outside researchers, curators, and staff. Assignments focus on cataloging garden images by describing their content according to recognized data standards, image digitization, computer automation of collection records, assisting with basic research and reference duties, and developing a range of outreach materials including blogs and text for web pages. Depending on which projects may be available to work on, interns may have an opportunity to organize and process photographic materials, develop finding aids, inventory, and/or perform basic preservation practices. Knowledge of and/or experience with archival practices preferred. Accuracy, attention to detail, and good writing skills are required. Summer intern applicants must apply for both the Archives of American Gardens' internship and the Garden Club of America, Garden History and Design Scholarship to be considered for a joint stipend awarded by these two organizations.

Stipend Paid and unpaid internships available
Deadline Summer – February 1
Fall – June 1
Winter/Spring – November 1
Internships begin approximately three months after the deadline
Email gardens@si.edu
Phone (202) 633-5840
Fax (202) 633-5697
WWW http://gardens.si.edu

SMITHSONIAN INSTITUTION ARCHIVES (SIA)

The Smithsonian Institution Archives offers internships in archival methods, institutional history, oral history, history of science, collections management, collections care (preservation and conservation), digitial preservation and curation, and electronic records management.

The Archives Division serves as a repository for documents of historic value about the Smithsonian, as the official memory of the Smithsonian and as a resource for scholars. Internships are provided for arrangement and description of institutional records, personal papers, and photographic and other collections in special media; encoding of finding aids for its website; digitization of collections; and conducting records surveys and developing records disposition schedules. These internships are considered apprenticeships under the tutelage of an archivist.

The Institutional History Division conducts research on the history of the Smithsonian, prepares scholarly and popular publications, exhibits, lectures, electronic and paper guides to specialized research areas, and records oral history and video history interviews. Internships provide an overview of the research and dissemination activities of an institutional history program, with a focus on specific topics. Prior course work in American history or the sciences is desirable, though not a prerequisite.

The Collections Care Division carries out preservation of collections in paper, photograph, and audio-visual formats. Preservation internships provide hands-on experience in preservation techniques, working with nine-

teenth and twentieth century Smithsonian records and personal papers of prominent administrators and scientists. The internships emphasize integrated preservation management, considering issues such as proper environment, housing, handling, and preservation reproduction of records. Conservation internships are occasionally available for current students of masters programs in conservation or post-graduates.

The Digital Services Division preserves and manages the digital collections of the Archives. This work spans a wide range of activities including: digitization of photographs, documents, sound, and moving images; preservation and curation of original electronic records; facilitating access to digital collections; and digital repository management. All internships provide hands-on experience and exposure to key issues in archival digital collections such as digital obsolescence, authenticity and provenance, conservation, and sustainability. Interns will work directly with records from the Archives' collections in digital and other formats.

Email ferranter@si.edu
Phone (202) 633-5906

SMITHSONIAN INSTITUTION LIBRARIES (SIL)

The Smithsonian Institution Libraries offers internship opportunities to graduate students, library professionals, and undergraduate students interested in exploring a library career in library and information science. Intern assignments may include a project or a structured practical experience. The Libraries selects interns based on its needs and on the specific education, training, skills, and interest of the applicant. While specific requirements may vary from project to project, a graduate student in library and information science, or an intern with library experience or subject expertise may participate in reference or interlibrary loan activities, creation of bibliographies, or cataloging projects. Undergraduate interns receive an over-view of library functions such as reference, circulation, acquisitions, cataloging, or preservation, and may assist in organizing collections, processing gift and exchange materials, or proofing and keying data.

Internships are available in all of the Libraries' divisions: Readers Services and Strategic Planning with its 22 branch libraries, Technical Services and Administration, and Digital Library and Information Systems. The lengths of internships vary, and the minimum length of an internship is one month. Stipends are offered for certain projects and funded internships may be available through the Smithsonian's Center for Education and Museum Studies and the Smithsonian Office of Fellowships and Internships.

Deadline Project-based, see website
Contact Internship Coordinator, Smithsonian Institution Libraries, 10th Street and Constitution Avenue, NW, Natural History Building, Room 2206, Washington, D.C. 20560-0154
Email rushinge@si.edu
Phone (202) 633-1708
WWW http://www.sil.si.edu/Galaxy.cfm?id=3.2

SMITHSONIAN INSTITUTION TRAVELING EXHIBITION SERVICE (SITES)

SITES organizes and circulates exhibitions to museums and other host venues around the U.S. The program includes exhibitions on art, humanities, and science. Exhibitions originate at the SI, but SITES also travels exhibitions from other, non-SI museums. Internships are available in exhibition development, public relations, education, registration, exhibit scheduling, public affairs, museum administration, and editing. Graduate students and visiting professionals preferred. Please note that we do not offer stipends.

Term Varies
Deadline None
Email trippettl@si.edu
Phone (202) 633-3102
WWW http://www.sites.si.edu

SMITHSONIAN LATINO CENTER (SLC)

Young Ambassadors

The Young Ambassadors Program (YAP) is a national program for graduating high school seniors aimed at fostering the next generation of Latino leaders in the arts, sciences, and humanities via the Smithsonian Institution and its resources. YAP is a college preparatory and leadership program encouraging participants to explore various academic and career opportunities through the lens of the Latino experience.

Students with an interest in and commitment to the arts, sciences, and humanities as it pertains to Latino communities and cultures are selected to travel to Washington, D.C. for a week-long seminar at the Smithsonian. This enrichment opportunity is a leadership development and skill-building training that exposes youth to a wide array of academic disciplines promoting higher education and encouraging the exploration and understanding of the Latino identity. The seminar, known as Washington Week, includes visits to the Smithsonian's Latino collections and one-on-one interaction with renowned experts from various fields as well as museum professionals. Following the training seminar, students participate in a four-week interdisciplinary internship in museums and other cultural institutions in 17 cities across the United States and Puerto Rico, including Smithsonian-affiliated organizations. This hands-on component allows students to gain transferable knowledge and apply the skills acquired during the training seminar to their internship assignments.

Term 5 weeks (summer)
Stipend $2,000.00
Deadline TBD

Internship Program

The Smithsonian Latino Center (SLC) offers academic internships for upper level high school students, undergraduate, and graduate students during the fall, winter/spring, and summer semesters. SLC internships are offered on a part-time and full-time basis for students with an interest and commitment to the arts, sciences, or humanities. Interns will learn about a variety of SLC projects with a main focus area on exhibitions, public program, education program, online resources, marketing, and development.

Term Fall, Winter/Spring, Summer
Stipend None
Deadline Rolling admissions
Contact Emily Key, Education Programs Manager, Smithsonian Latino Center, Smithsonian Institution, PO Box 37012, MRC 512, Washington, D.C. 20013-7012
Email slceducation@si.edu
Phone (202) 633-1240, M-F
Fax (202) 633-1132
WWW http://latino.si.edu/programs/youngambassadors.htm

SMITHSONIAN TROPICAL RESEARCH INTERNSHIP

Our goal is to enable students to develop working skills pertinent to future careers that contribute to the understanding of tropical biodiversity and its relevance to humankind-STRI's mission. The internship program is aimed at undergraduate or early-stage graduate students who have demonstrated potential for success in such careers. Interns will be selected based on merit and potential for achievement. However, placement depends upon the availability of a match between the applicant's interest and a new or ongoing project supervised by a STRI staff scientist. We encourage applicants to directly contact potential supervisors. Staff research profiles and contact information can be found at www.stri.org, under ""Scientific Staff."" If your research interests do not correspond to those of our staff, please let us know and we will send you a list of research affiliates and/or postdoctoral fellows carrying out research at STRI.

Only applications including a letter of support from a STRI supervisor indicating the project description, duties and responsibilities of the intern, will be considered. Please send complete applications on the following deadlines: the 15th of January, April, July, and October. Internships last 3 months and include a monthly stipend of $800 (total $2,400). They do NOT include travel allowances and/or research expenses.

Complete applications must include two components:

1) Documents from the candidate. Candidates should submit an internship application form (see STRI web page www.stri.org) with statement of career and internship goals (two pages maximum), 2 letters of recommendation and academic transcripts. Candidates should also submit a cover letter indicating why they are interested in a particular internship project and how participation will further their academic goals. These documents should be sent electronically in a single pdf or word file to fellows@si.edu.

2) Document from the proposed supervisor. The selected supervisor should send the letter of support indicating the project description, duties and responsibilities of the intern directly to the Office of Academic Programs. For further assistance in internship placement contact: fellows@si.edu. Selected interns can initiate tenure 8 weeks after being selected.

Term	3 months
Deadline	15th of January – Internships will begin 8 weeks after deadline
	15th of April – Internships will begin 8 weeks after deadline
	15th of July – Internships will begin 8 weeks after deadline
	15th of October – Internships will begin 8 weeks after deadline
Email	fellows@si.edu
WWW	http://www.stri.org

THE SMITHSONIAN ASSOCIATES (TSA)

Complementing Smithsonian research, exhibitions, and collections, TSA offers a curriculum consisting of hundreds of courses, lectures, tours, performances, seminars, and other activities. TSA interns are offered opportunities to learn about various aspects of educational programming for both adults and children, while contributing extensively to one of the world's great cultural institutions. More information can be found at: http://residentassociates.org/ Development: Support the Development Office through creating marketing materials, drafting grants and sponsor proposals, maintaining website text, and conducting research on funding sources. Discovery Theater: Support the Discovery Theater staff in all aspects: house management, ticketing and group sales, administration, and production support. Online Marketing: Support the Marketing staff by editing images

and HTML to be used in marketing campaigns and on social media sites as well as using web analytics software to research results from marketing campaigns. eMarketing & Customer Research: Support Marketing staff writing and editing program descriptions for use on the Web and in the creation of sales copy in email solicitations. National Education Outreach: Provide support in creating programs for national audiences including conducting research, developing contracts, and assisting with logistics coordination and marketing. Performing Arts: assist with research, booking, budgets, logistical set-up, and marketing. Provide program support during some evening and weekend programs, including box office and house management duties. Public Affairs: Assist with all aspects of publicizing TSA programs, fulfill press requests, and help draft media and calendar releases. Studio Arts: Provide program support for course workshops; and content for the Studio Arts blog, Studio Arts landing page, and Facebook page. Summer Camp: Support the team by assisting with the daily running of the 7-week camp program, supervising campers and assistants, up-keep of rosters and paperwork, parent communication, and supply organization and procurement. // Credit: College or university credit may be awarded by the student's sponsoring institution through advance agreement with student's college/university and TSA.

Email TSAInternships@si.edu
Phone (202) 633-8641
WWW www.residentassociates.org

MUSEUMS, RESEARCH INSTITUTES
AND
RESEARCH OFFICES

THE ANACOSTIA COMMUNITY MUSEUM

Camille Akeju, Director

The Anacostia Community Museum was founded and remains located within a residential, low- and mixed-income, largely African American community. The museum is dedicated to a mission centered around contemporary urban communities, and to a community-focused approach to research, documentation, and educational and cultural programming. Core to the work of the museum is the belief that active citizen participation in the recovery and preservation of community historical assets, in cultural and arts activities, and in community advocacy are important and powerful instruments in creating and maintaining a sense of community and civic ownership. By basing the museum's work upon direct engagement with local and surrounding communities, we seek to show the linkages between global matters and local concerns.

The permanent collection supports the museum's investigation of contemporary community life, and of issues and themes that shape and resonate within urban communities. Local and neighborhood collections materials are also developed and preserved for the use and benefit of community residents, neighborhood activists, family historians, and other researchers. An important goal of museum collections is the development of strategies to engage public audiences with the artifacts and other materials in the museum's collections.

Smithsonian interns and fellows assist the museum in bringing scholarship and formal research to research programs. In addition to the range of scholarship within the humanities and social sciences, the museum is particularly interested in students and researchers in the fields of social and human geography, community studies, cultural studies, and urban ecology. The museum has a strong focus on community-based documentation and research efforts—including oral history interviewing, community survey and mapping projects, and community-based collecting.

RESEARCH STAFF

AMOS, Alcione M., Museum Program Specialist. B.A. (1972) Faculdade de Filosofia, Brazil; MA (1974) Catholic University. Research specialties: impact of migration and immigration on urban populations, in particular post-Civil War population changes in Washington, DC; post-slavery societies, in particular study of Black Seminole society in the United States and Mexico and Afro-Brazilian returnees to West Africa in the 19th century.

CURTIS, Ariana A., Curator. B.A. (2002) Duke University; M.A. (2009) American University; Ph.D. (2012) American University. Research specialties: Racial constructions in the U.S.; Latino urban experiences; Blackness in U.S., Latin America, and the Caribbean; African Diaspora; urban immigration/migrations; neoliberalism/globalization.

GORMAN, Joshua, Collections Manager. B.A.(1999) University of Illinois Urbana-Champaign; M.A.(2004) University of Leicester; Ph.D.(2009) University of Memphis. Research specialties: histories of museums and collections; museum informatics; U.S. urban history; and critical race studies. Current projects: Topics in community museum collections care practices; histories of community and economic development east of the river DC.

JAMES, Portia P., Supervisory Curator. B.A. (1974) Wayne State University; M.A. (1984) Howard University. Research specialties: African-American social history; museum-community engagement.

LOWE, Gail S., Senior Historian. A.B. (1972) Harvard University/Radcliffe College; M.A. (1973) Yale University; M.S.L.S. (1978) Catholic University; Ph.D. (1992) George Washington University. Research specialties: U.S. history; African American church history; religious expression and experience; family and community history; and reform movements.

ARCHIVES OF AMERICAN ART

Kate Haw, Director

Founded in 1954, the Archives of American Art exists to foster new research in the history of the visual arts in the United States. It does so by collecting and preserving the letters, notebooks, photographs, and diaries of artists and their descendants; the unpublished writings art historians; the correspondence of art dealers; interviews with artists; and the records of major galleries and art organizations. The world's largest single source for such information, the Archives comprises more than sixteen million items.

Some of the notable twentieth-century collections available at the Archives are the records of the Leo Castelli Gallery, Holly Solomon Gallery, Macbeth Gallery, Downtown Gallery, and Betty Parsons Gallery; the Walt Kuhn papers, which include records of the 1913 Armory Show; the Edward Bruce and Holger Cahill papers, with documentation on New Deal art programs; and personal papers of Rockwell Kent, Joseph Cornell, Louise Nevelson, Jackson Pollock, and Arthur Dove. Significant nineteenth-century material includes the William Page, Jervis McEntee, George Catlin, and Hiram Powers papers, and extensive filmed collections of the correspondence of Thomas Cole, Winslow Homer, Asher B. Durand, John Kensett, Mary Cassatt, and James Abbott McNeill Whistler. Among institutional records on film are those of the Art Students League of New York, the Brooklyn Museum, the Whitney Museum, the Museum of Fine Arts in Boston, the Pennsylvania Academy of the Fine Arts, and the American Academy in Rome.

The holdings of the Archives are described on the Smithsonian Institution Research Information System (SIRIS). The SIRIS database is available on the Archives' website at www.aaa.si.edu. More than 100 collections are available online. Microfilm copies of many of the collections are available at the Archives' offices and through interlibrary loan.

The Archives also publishes the *Archives of American Art* Journal and sponsors symposia and lectures on art history subjects.

In addition to its primary research center at the Victor Building 750 9th Street, NW (at H), Suite 2200, Washington, DC 20001 the Archives maintains a New York Regional Center at 1285 Avenue of the Americas, Ground Floor, New York, New York 10019. (212) 399-5015.

The Archives also has four affiliated research centers for the use of unrestricted microfilm at the Boston Public Library, Copley Square, Boston, Massachusetts, (617) 539-5400; The Amon Carter Museum Library, Fort Worth, Texas, (817) 989-5040; The Huntington Library, San Marino, California (626) 405-2100; and the M. H. de Young Memorial Museum, Golden Gate Park, San Francisco, California, (415) 750-3600.

RESEARCH STAFF

KIRWIN, Liza, Deputy Director, B.A. (1979) Johns Hopkins University; M.L.S. (1984) Catholic University of America; Ph.D. (1999), University of Maryland, College Park. Research specialties: American art in the 1980s, Latino and African American art, personal papers and organizational records.

QUINN, Kelly, Terra Foundation Project Manager for Online Scholarly and Educational Initiatives , B. A. (1991) Trinity College; M.A.(1997) with Certificates (2005) and (2007) University of Maryland, College Park; and Ph.D. (2007), University of Maryland, College Park. Research specialties: African American visual culture, 20th century American social and cultural history, women's history, architecture and urbanism, public scholarship and digital humanities.

SAVIG, Mary, Curator of Manuscripts, B.A. (2006) University of Wisconsin, Madison; MA (2008) The George Washington University; PhD in progress, University of Maryland-College Park. Research specialties: contemporary craft, feminist art movements, material culture, digital humanities.

STIEBER, Jason, National Collector. B.A. (1995) University of Southern California; M.L.S. (2004) University of Maryland, College Park; Research specialties: Oral history, personal papers and organizational records.

ASIAN PACIFIC AMERICAN CENTER

Konrad Ng, Director

The Smithsonian Asian Pacific American Center promotes the appreciation, inclusion, and understanding of Asian Pacific American history, art, and culture through exhibitions, collections, research, and public programs. The Center works in partnership with museums, galleries, and centers throughout the Smithsonian, across the country, and around the world. For more information, please visit http://apa.si.edu.

RESEARCH STAFF

MOMAYA, Masum, Museum Curator. B.A. Stanford University, Ed.M,, Ed.D. Harvard University. Research specialties: feminist theory, international women's rights, embodiment, psychological anthropology, South Asian American experience, and social media for social change.

NG, Konrad, Director, B.A. (1996) McGill University; M.A. (1999) University of Victoria; PhD (2006) University of Hawaii. Research specialties: Asian and Asian Pacific American popular culture, cinema, and new media.

AFFILIATED RESEARCH STAFF

LUIS, Adriel, Museum Curator of Digital and Emerging Media. B.S. University of California, Davis. Research specialties: Independent media and underground culture, digital piracy, new media for social change, web trends, Black and Asian dynamics in America, Asian Pacific Americans in hip-hop, graphic design, and web development.

CENTER FOR FOLKLIFE AND CULTURAL HERITAGE

Michael Mason, Director

The Center for Folklife and Cultural Heritage is a research and educational unit of the Smithsonian Institution promoting the understanding and continuity of diverse, contemporary grassroots cultures in the United States and around the world. The Center's staff is culturally diverse, combining interdisciplinary scholars with technical specialists.

The Center's projects have received scholarly, public, and critical acclaim; its work on issues and methods of cultural representation has provided models for other organizations and activities in the U.S. and internationally.

The Center produces the Smithsonian Folklife Festival, Smithsonian Folkways Recordings, exhibitions, documentary films and videos, symposia, publications, and educational materials. The Center conducts ethnographic and cultural heritage policy oriented research, maintains the Ralph Rinzler Folklife Archives and Collections, and provides educational and research opportunities through fellowships, internships, and training programs. From time to time, the Center also produces major national cultural events consistent with its mission.

The annual Smithsonian Folklife Festival is a research-based, cultural exhibition, which for over the past forty four years has brought many thousands of traditional musicians, craftspeople, and other artists from many countries and every region of the U.S. to the National Mall to demonstrate their skills and artistry. Smithsonian Folkways Recordings is the nonprofit record label of the Smithsonian Institution. Its mission is the legacy of Moses Asch, who founded Folkways Records in 1948 to document "people's music," spoken word, instruction, and sounds from around the world. The Smithsonian acquired Folkways from the Asch estate in 1987, and Smithsonian Folkways Recordings has continued the Folkways commitment to cultural diversity, education, increased understanding, and lively engagement with the world of sound. The Ralph Rinzler Folklife Archives and Collections - the Center's archival holdings - documents research for, and presentation of, the Festival and other Center projects. Holdings include films, videotapes, still photographs, recordings, and research reports on thousands of Folklife traditions. Particularly rich materials exist for a full range of traditional American music, family folklore, occupational folklife, African American traditions, and Native American performance. The Moses and Frances Asch Collection comprises the largest part of the Folkways Records archive and consists of field, published, and unpublished recordings of world music and oral traditions, fifty years of ethnographic notes and documentation, historically important correspondence, and album cover artwork. Also made available by Smithsonian Folkways Recordings and held in the Ralph Rinzler Archives are the recordings, photographs, papers, and objects related to the Collector, Cook, Dyer-Bennet, Fast Folk, M.O.R.E. (Minority-owned Record Enterprises), Monitor, Paredon record companies, the Mickey Hart World series and UNESCO's Traditional Music of the World collection. In addition, the archive includes the papers of Lee Hays, Frederick Ramsey Jr., and Ralph Rinzler. A great deal of information is accessible through a central database and the world-wide Web home pages.

Opportunities for scholars include analytic studies of cultural representation and cultural conservation, collaborative research in specific areas of staff or programmatic interest, internships, and projects involving archival materials.

Websites: www.folklife.edu or www.folkways.edu

RESEARCH STAFF

BELANUS, Betty, Folklorist/Curator/Educational Specialist. B.A. (1977) Smith College; M.A. (1980), Ph.D. (1990) Indiana University. Research specialties: Material culture, folklore and education, public programming.

CADAVAL, Olivia, Folklorist/Curator. B.A. (1972), Ph.D. (1989) George Washington University. Research specialties: Latin American and Latino studies, American cultural history, material culture, folklife.

DEUTSCH, James I., Program Curator. B.A. (1970) Williams College; M.A. (1976) University of Minnesota; M.Ln. (1979) Emory University; Ph.D. (1991) George Washington University. Research specialties: Occupational folklife; veterans of World War II; American film and mass media.

EARLY, James Counts, Director, Cultural Heritage Policy. B.A. (1965) Morehouse College; A.B.D. (1975) Howard University. Research specialties: Culture and politics, Participatory cultural democracy & museology, cultural democracy statecraft policy, Capitalist and Socialist Discourses in Cultural Policy, Latin American and Caribbean history and politics, Afro-Latin politics and cultural democracy.

HUNT, Marjorie, Folklorist/Curator/Education Specialist. B.A. (1976) Simmons College; M.A. (1981), Ph.D. (1995) University of Pennsylvania. Research specialties: American folklife, material culture, occupational folklore, Italian-American folklore, culture and aging, public programming.

KIDD, Stephen, Festival Director. B.A. (1991) University of Pennsylvania; Ph.D. (2002) George Washington University. Research specialties: American culture, urban history, urban planning, information technology.

KIM, Sojin, Curator and Special Assistant to the Director. B.A. (1988) Brown University, M.A. (1991), Ph.D. (1998) University of California, Los Angeles. Research specialties: Asian American history and culture, Los Angeles history and culture, urban history, public history, vernacular landscape.

N'DIAYE, Diana Baird, Folklorist/Curator. B.A. (1973) New York University; M.A. (1979) State University of New York, Stony Brook; Ph.D. (1997) Union Institute. Research specialties: Africa and African Diaspora studies, immigrant and transnational culture and ethnicity; ethno-aesthetics; participatory research, cultural representation and cultural policy; culture and disability, multicultural education/social contexts.

PLACE, Jeffrey, Archivist. B.A. (1978) Kenyon College; M.L.S. (1987) University of Maryland. Research specialties: Sound archives, archives, traditional musics of the United States, record production, history of sound recordings.

SHEEHY, Daniel E., Director and Curator, Smithsonian Folkways Recordings. Ph.D. (1979) University of California, Los Angeles. Research specialties: Public sector folklore and ethnomusicology, popular folk music of Mexico, and mariachi music in Mexico and the U.S.

SMITH, Stephanie, Assistant Archivist. B.A. (1971) University of California, Santa Barbara; M.Litt (1975) University of Edinburgh; M.S.L.S. (1977) University of North Carolina; Ph.D. (1988) University of Edinburgh. Research specialties: English country dance in the U.S., Scottish traditional song and the Folk Revival, comparative British and Appalachian folksong traditions.

SONNEBORN, (Daniel) Atesh, Associate Director, Smithsonian Folkways Recordings. B. A.(1982) University of California, Santa Cruz; M.A.(1984) University of California, San Diego; Ph.D.(1995) University of California, Los Angeles. Research specialties: music in Islamic cultures, applied ethnomusicology, intellectual property rights in tangible and intangible cultural heritage.

AFFILIATED RESEARCH STAFF

ALBRO, Robert, Research Associate. B.A. (1989), M.A. (1992), PhD. (1999) University of Chicago. Research specialties: International cultural policy; cultural heritage; cultural rights, in international and multilateral contexts; politics and indigenous movements in Latin America and Bolivia.

BORDEN, Carla M., Research Associate. B.A. (1970) Barnard College; M.A. (1974) Columbia University. Research specialties: Contemporary (Asian) Indian culture, Balkan folk song and dance, interdisciplinary studies, cultural heritage policy and practice, Alzheimer's and cultural memory.

FREEMAN, Roland L., Research Associate, Photographer, Curator and Author. Honorary Doctorate (1997) Millsaps College. Research specialties: African-American folklife practices, expressive and material culture.

GROCE, Nancy, Research Associate. B.M. (1974), M.M. (1976), M.A. (1977), Ph.D. (1982) University of Michigan. Research specialties: Folklore; Ethnomusicology; American music; Anglo-Celtic music; musical instruments (organology); urban culture; New York City history and culture.

KURIN, Richard, Under Secretary for History, Art, and Culture. B.A. (1972) State University of New York, Buffalo; M.A. (1974), Ph.D. (1981) University of Chicago. Research specialties: Indigenous knowledge systems, kinship, religion, ethnicity, cultural policy, cultural presentation and representation, the cultures of south Asia and the United States, Hope diamond cultural history.

LORNELL, Kip, Research Associate. B.S. (1976) SUNY-Empire State; M.A. (1976) University of North Carolina; Ph.D. (1983) University of Memphis. Research specialties: American Vernacular Music.

REDDY, Sita, Research Associate. B.A. (1985), M.A. (1987) University of Delhi; Ph.D. (2000) University of Pennsylvania; Certificate in Museum Studies (2005) George Washington University. Research specialties: Cultural Heritage and cultural policy; Museology and museum studies; History of medicine and science; South Asia.

SEEGER, Anthony, Smithsonian Folkways Recordings Curator and Director Emeritus. B.A. (1967) Harvard University; M.A. (1970), Ph.D. (1974) University of Chicago. Research specialties: Ethnomusicology, audiovisual archives, music industry, social organization, cosmology, ritual, oral narrative, South American Indians, Brazil.

SEITEL, Peter, Senior Folklorist Emeritus. B.A. (1964), Ph.D. (1973) University of Pennsylvania. Research specialties: Occupational folklife, African folklife, epic, narrative, proverbs, computer applications in folklore, intangible-cultural-heritage policy.

VENNUM, JR., Thomas, Senior Ethnomusicologist Emeritus. B.A. (1957) Yale College; M. Mus. (1965) New England Conservatory; M.A. (1968), Ph.D. (1975) Harvard University. Research specialties: American Indian music, Haitian music, ethnomusicology.

COOPER-HEWITT, NATIONAL DESIGN MUSEUM

Caroline Baumann, Director

In October 1976, Cooper-Hewitt opened to the public in the Andrew Carnegie Mansion as the Smithsonian Institution's National Museum of Design. The Museum was created in 1897 by Sarah and Eleanor Hewitt, granddaughters of Peter Cooper, the founder of the Cooper Union, a liberal public institution for the advancement of science and art. In 1968, the collection became part of the Smithsonian Institution, and, in 1994, the name of the Museum was changed to Cooper Hewitt, National Design Museum. The Museum's collections place it among the foremost repositories of design and decorative arts in the world. The Museum was founded with the purpose of being thoroughly accessible for study and continues to acknowledge that tradition.

The mission of the Museum is to enrich the lives of all people by exploring the nature and impact of design. Through its activities and research, the Museum stimulates creative thinking; makes information about design accessible to a broad public; provides a national and international forum for experimentation and discourse on design issues; serves new audiences, particularly students across New York City and the United States; and inspires others to value human achievements in design.

The Museum's permanent collection contains more than 200,000 objects, representing contemporary and historical design in four curatorial departments—Drawings, Prints, and Graphic Design; Product Design and Decorative Arts; Textiles; and Wallcoverings—and embracing the fields of architecture, interior design, landscape design, product design, decorative arts, graphic design, and more.

The Textiles collection includes examples from around the world dating as early as the Han Dynasty in China (206 BC–AD 220). It is particularly strong in woven silks from the fourteenth through the nineteenth centuries; printed fabrics from the eighteenth through the twentieth centuries; embroideries from the sixteenth through the nineteenth centuries, including European and American samplers, men's caps, and waistcoats; and laces from the sixteenth through the twentieth centuries. Contemporary textile design from the twentieth and twenty-first centuries is also well represented.

The diverse collection of Drawings, Prints, and Graphic Design ranks as one of the world's foremost repositories of design for the decorative arts, architecture, interiors, and ornament. One of only a handful of American museums to hold a work by Michelangelo Buonarroti, the department has strengths in seventeenth- through early nineteenth-century Italian architectural and decorative drawings from the collection of Giovanni Piancastelli, curator of the Borghese Collection; eighteenth-century French architectural and decorative designs in drawings, prints, and books, from the collection of Jean-Léon Decloux, a turn-of-the-twentieth-century French architectural decorator, collector, and dealer; and other European designs for architecture and stage sets and watercolors of nineteenth-century European interiors. Works by Carlo Marchionni, Giuseppe Barberi, Felice Giani, and John Crace and Sons, for example, are represented in depth. The Museum also boasts a major collection of nineteenth-century American drawings, including more than 300 works by Winslow Homer; more than 2,000 works by Frederic Edwin Church, the largest such holdings in the world; and more than eighty works by Thomas Moran. Twentieth-century strengths include posters and costume designs by E. McKnight Kauffer; designs for textiles and wallpapers from the Wiener Werkstätte; and the archives of American industrial-design pioneers Donald Deskey and Henry Dreyfuss; and contemporary American graphic design.

The Product Design and Decorative Arts collection is international in scope and includes metalwork, ceramics, glass, furniture, jewelry, and product design of most periods and styles. Objects range from Egyptian artifacts and classical antiquities to present-day industrial design and one-of-a-kind objects. The department has exceptional holdings in ceramics from the eighteenth through the twentieth centuries; nineteenth- through twenty-first-century jewelry; product prototypes and models; metalwork in all categories; nineteenth- and twentieth-century seating furniture; Soviet propaganda porcelains; production glass; and cutlery.

The Wallcoverings department houses the largest collection of wallpaper and wallcoverings in the United States. The collection includes European and American production from the seventeenth through the twenty-first centuries, and is particularly strong in nineteenth-century French block-printed examples and twentieth-century

American production. Dutch gilded and embossed leathers, French stenciled domino papers, sample books, American bandboxes, and wallpaper fragments from historic homes are all part of the collection, which also includes a large research collection of published articles and advertisements related to wallcoverings.

Library

In addition to the four curatorial departments, Cooper-Hewitt also houses the National Design Library, a branch of the Smithsonian Institution Libraries. The Library contains more than 80,000 volumes in design and related fields, including approximately 8,000 rare books, 4,500 trade catalogs, and more than 120 subscriptions to design and architecture magazines. It also houses the archives of designers Henry Dreyfuss, Donald Deskey, George Nathan Horwitt, Donald Wallance, and Ladislav Sutnar, as well as an African-American and Latino-American design archive.

Special collections include more than one thousand volumes of World's Fair materials from 1844 to the present, with particular strengths in the 1851 *Great Exhibition of the Works of Industry of all Nations* at London's Crystal Palace and the 1893 *World's Columbian Exposition* in Chicago. The Library also holds a pop-up book collection of some 1200 titles; and 4,300 black-and-white Thérèse Bonney photographs of Paris and Art Deco architecture and design (1925–40). A critical resource for the joint Master's Program in the History of the Decorative Arts, jointly run by Cooper-Hewitt and Parsons The New School for Design, the Library also supports independent research projects by Smithsonian Fellows and other scholars and visitors.

Research Opportunities

The Museum is dedicated to engaging the public in all aspects of design through its exhibitions, publications, and educational programs. In addition to the areas of specialization mentioned above, specific groups in the Museum's collection that merit further study are: the Strater collection of Swiss enameled glass; the archives of the lighting and metalwork firm E. F. Caldwell; American art pottery of the late nineteenth and early twentieth centuries; archives of 20th-century designers such as the graphic-design firm M&Co.; and highly specialized collections, such as more than 4,000 matchsafes, locks and keys, jewelry and jewelry designs, buttons, and modern industrial design. The Textiles collection offers an opportunity to pursue detailed and technical research on European silk-weaving centers from the fourteenth through the eighteenth centuries, with the goal of establishing specific places of origin and the study of the relationships, differences, and influences of Greek, Turkish and North African embroideries from the seventeenth through the nineteenth centuries. Other opportunities include Italian eighteenth-century architectural and nineteenth-century stage designs; eighteenth-century French ornament prints; nineteenth-century European watercolor interiors and twentieth-century American machine-printed wallpaper. Contemporary design research opportunities include field research on contemporary graphic design, and product design. The Museum has on staff the first curator of Socially Responsible Design, offering research opportunities on design that address challenges faced by expanding population in global informal communities. Current field research has been conducted in eighteen cities across Asia, South and Central American, and Africa. Further research areas are collections management, management information systems related to collection inventory control, digitization, and retrieval, as well as registration functions related to temporary traveling and permanent exhibitions, textile and paper conservation, and general research for collections cataloging, exhibitions, publications, and programs.

RESEARCH STAFF

BROWN, Susan Jeanne, Assistant Curator of Textiles. B.A. (1987) Cornell University; M.A. (2001) Fashion Institute of Technology. Research specialties: Felt, technical textiles.

COFFIN, Sarah, Curator of 17th and 18th Century Decorative Arts, Head: Product Design and Decorative Arts Department. B.A. (1973) Yale University; M.A. (1975) Columbia University. Research specialties: 17th and 18th Century and Aesthetic Movement Furniture, Silver, and other Decorative Arts; Portrait Miniatures.

COMMONER, Lucy A., Head of Conservation. B.A. (1972) Brown University; Textile Design (1973-1974) Rhode Island School of Design. Research specialties: Textile conservation; folding fans; storage/exhibition materials and systems; fiber research.

DAVIDSON, Gail, Curator and Head, Drawings, Prints, and Graphic Design Department. B.A. (1963) Barnard College; Ph.D. (1980) Harvard University. Research specialties: Twentieth-century European and American design drawings; nineteenth-century design; seventeenth-, eighteenth-, and nineteenth-century French drawings and prints.

HALL, Annie, Senior Objects Conservator. B.A. (1991) University of Auckland, New Zealand; Dip. V.A. (1994) Manukau Institute of Technology, New Zealand; M.A. (2001) Royal College of Art/ Victoria and Albert Museum, London. Research specialties: Objects Conservation, Ethics, Contemporary Design (Jewelry), Collection Storage.

HERRINGSHAW, Gregory, Assistant Curator in charge of Wallcoverings. B.F.A (1987) Wayne State University; M.A. (1991) Fashion Institute of Technology, State University of New York. Research specialties: Wallcoverings, antique to contemporary, worldwide.

LUPTON, Ellen, Curator of Contemporary Design. B.F.A. (1985) Cooper Union School of Art; Ph.D. (2008) University of Baltimore. Research specialties: History and criticism of twentieth- and twenty-first century graphic and industrial design.

MCQUAID, Matilda, Deputy Curatorial Director. B.A. (1979) Bowdoin College; M.A. (1991) University of Virginia. Research specialties: Textiles; Contemporary design.

SCATURRO, Sarah, Textile Conservator. B.A. (1999) University of Colorado, Boulder; M.A. (2006) Fashion Institute of Technology. Research specialties: textiles and fashion history and theory, textile conservation, sustainable design, collections management, exhibition installation, preventive conservation.

SMITH, Cynthia E., Curator of Socially Responsible Design. B.S.I.D. (1987) Ohio State University; M.P.A. (2005) Harvard University. Research specialties: Socially responsible design.

TROPE, Cynthia, Associate Curator of Product Design and Decorative Arts. B.A. (1980) State University of New York, College, Oneonta; M.A. (1991) Parsons School of Design/Cooper-Hewitt, National Design Museum. Research specialties: Twentieth-century design: Scandinavian design; glass; care of museum collections.

VAN DYK, Stephen H., Chief Librarian. B.A. (1972) William Paterson College; M.S.L.S. (1973) University of North Carolina; M.A. (Candidate), Rutgers University. Research specialties: Architectural history.

AFFILIATED RESEARCH STAFF

BROMAN, Elizabeth, Senior Reference Librarian. B.S. City College of New York (1995); MS/MLS (1999) Pratt Institute, Brooklyn, NY. Research specialties: European and American Decorative Arts, American art, American cultural history, material culture, cemeteries and gravemarkers.

COHLMAN, Jennifer, Digital Services & Reference Librarian. B.A. (1998) University of Illinois, Urbana-Champaign; M.A. (2007) Queens College, City University of New York. Research specialties: digital project management.

KILLIAN, Jacquelann Grace, Curatorial Assistant. B.A. (2002) Pennsylvania State University; M.A. (2006) Bard Graduate Center: Decorative Arts, Design History, Material Culture. Research specialties: Nineteenth-century American material culture, with particular emphasis on interiors, furnishings, decorative arts, and architecture.

LIPPS, Andrea, Curatorial Assistant. B.A. (2000) University of Michigan; M.A. (2008) Cooper-Hewitt, National Design Museum and Parsons The New School for Design. Research specialties: Contemporary design, specifically social innovation.

PILGRIM, Dianne H, Director Emerita. B.A. (1963) Pennsylvanis State University; M.A. (1965) Institute of Fine Arts, New York University. Research specialties: nineteenth and twenieth century American decoative arts and design; 1850-1900 American decoative arts and design; 1920-1940s American design.

FREER GALLERY OF ART/ARTHUR M. SACKLER GALLERY

Julian Raby, Director

Freer Gallery of Art

The Freer Gallery, a gift to the nation by Detroit industrialist Charles Lang Freer (1854–1919), opened to the public in 1923 as the Smithsonian's first fine arts museum. Housing one of the most distinguished collections of Asian art in the world as well as an important collection of late-nineteenth and early-twentieth-century American art, the gallery's cultural treasures are presented as keys to understanding the civilizations that produced them.

Collections

The collection of the Freer Gallery spans 6,000 years and many different cultures, reflecting the taste and style of its founder, Charles Lang Freer. The Freer Gallery collections comprise approximately 7,727 examples of Chinese art; 6,488 Japanese examples; 786 works from Korea; 3,289 works from the Near East and the Eastern Mediterranean that include Gospels and biblical material; and 3,682 works from South and Southeast Asia. In addition, there are about 1,709 works of American art collected by Freer, including the world's largest assembly of James McNeill Whistler (1834-1903). The full Freer collection contains some 25,024 objects.

The gallery houses particularly distinguished collections of ancient Chinese bronzes and jades, painting and calligraphy, and ceramics; Korean ceramics of the Koryo dynasty; Japanese screens, paintings, sculpture, and ceramics; and Islamic manuscripts, painting, calligraphy, metalwork, ceramics, and glass from the Persian, Arab, and Turkish cultural spheres. Ancient Iranian metalwork is outstanding, as is a small collection of ancient Egyptian glass. The South and Southeast Asian collections include an important group of Mughal paintings as well as sculpture, ceramics, and Hindu painting. In addition to works by Whistler, the American painting collection includes works by other Americans, including Dwight W. Tryon, Thomas W. Dewing, and Abbott H. Thayer.

Publications and Lectures

The Freer Gallery cosponsors with the Department of the History of Art, University of Michigan, the annual scholarly journal *Ars Orientalis*. *Ars Orientalis* is a peer-reviewed annual volume of scholarly articles on the art and archaeology of Asia, including the ancient Near East and the Islamic world. Fostering a broad range of themes and approaches, it is intended for scholars in diverse fields.

Throughout its history, the gallery has produced a variety of publications, including the Oriental Studies series and the Freer Gallery of Art Occasional Papers. Today the gallery's publication program includes studies in conservation and scientific research, research on Asian art history, catalogues of the permanent collection and scholarly exhibition catalogues, in both print and online versions. The gallery sponsors scholarly workshop and symposia throughout the year, as well as a full program of public lectures and performances to complement the exhibition program.

Department of Conservation & Scientific Research (DCSR)

Through conservation and scientific research, the DCSR contributes to the overall efforts of the Freer Gallery of Art and the Arthur M. Sackler Gallery to achieve the highest standards for the collection, preservation, study, and exhibition of Asian art.

A permanent staff of twelve works hand-in-hand with a large, changing group of short-term employees, fellows, interns, and visiting scholars. The principle aims of the DCSR staff are the care and treatment of the collection and the use of scientific methods to study objects in the collection and related works of art. Major efforts are also made in conservation training, outreach efforts such as lectures to public and professional audiences, and collaborative work with other bureaus of the Smithsonian Institution and other national and international institutions. In addition to care of the collection, a major part of the conservation effort is the preparation of objects for exhibition. Scientific research in the Freer and Sackler focuses primarily on the study of the physical nature of works of art from Asian cultures, and ancillary research efforts address specific questions concerning the tech-

nical and material nature of art objects and the conservation of the collections. Additional information about the department's programs, research facilities, and fellowship and internship opportunities can be found at the following web site: http://www.asia.si.edu/visitor/conservation.htm.

Library

The research library originated with Charles Lang Freer's personal library and is one of the branch libraries in the Smithsonian Institution Libraries system. The library supports the research, exhibition, and educational programs of the Freer Gallery of Art and Arthur M. Sackler Gallery, and it serves outside researchers and the general public in the study of Asian art and culture and of American art of the late nineteenth and early twentieth centuries.

The Freer and Sackler galleries house the largest Asian art research library in the United States. Open to the public five days a week (except federal holidays) without appointment, the library collection consists of more than 84,000 volumes, including nearly 2,000 rare books. Half the volumes are in Chinese, Japanese and Korean languages. Book contents range from the Ming and Qing Dynasties of China, to woodblock printed books from Japan, to Western travel books on Asia. In 1995, the library was selected to be the official U.S. repository of art exhibition and collection catalogues published in Japan, and to date has received over 4,000 volumes. These catalogues are available via interlibrary loan service. Its on-line catalog, which can display Chinese, Japanese, and Korean characters, is accessible through the Internet: http://siris-libraries.si.edu/.

Archives

The Freer Gallery of Art and Arthur M. Sackler Gallery Archives is a manuscript and photograph repository dedicated to furthering the study of Asian and Middle Eastern art, archaeology and culture as well as turn-of-the-century American art. Our mission is to collect, preserve, organize, describe, and make available documentary materials that support the holdings and activities of the Freer Gallery of Art and Arthur M. Sackler Gallery. The Archives houses over one hundred and forty collections, amounting to over one thousand linear feet. Manuscript collections date from the early nineteenth century to the present, including the papers and records of art collectors, dealers, scholars and archaeologists, making the Archives a critical repository for the study of the advent and development of Asian art scholarship and appreciation in America. Our photography holdings are notable for mid to late 19th century views of Asia, and include important works by both western and native photographers and studios. Photographs and other visual documents from the Archives have been featured in numerous galleries exhibitions.

To see the breadth of our holdings please visit: http://tinyurl.com/FSG-Archival-Collections for an overview of our collections and digitized materials. Useful information about using the Archives and a growing number of electronic finding aids are available on the Archives' website at http://www.asia.si.edu/visitor/archives.htm. Please browse our Image Gallery (http://sirismm.si.edu/siris/sacklertop.htm) for a sampling of our visual images online, and also check out our Blog (http://si-siris.blogspot.com/) for special features on the Archives' collections.

Arthur M. Sackler Gallery

The Arthur M. Sackler Gallery, established in July 1982, received its initial collections through the gift of approximately one thousand objects from the collections of Dr. Arthur M. Sackler (1913–87). The gallery's primary goals are the advancement of scholarly knowledge and public appreciation of the arts of Asia. Founded to share the historical focus of its sister museum, the Freer Gallery of Art, the Sackler gallery has increased the range of Asian art activities at the Smithsonian while developing an active program of international loan exhibitions.

Collections

The Sackler Gallery collections include Chinese jades dating from Neolithic times (ca. 5000–1500 B.C.E.) into the nineteenth century; Chinese bronzes from the Shang (ca. 1700–1050 B.C.E.) through the Han (206 B.C.E.–C.E. 220) dynasties; Chinese paintings and calligraphy; Chinese lacquer; ancient Near Eastern ceramics

and metalwork; and stone, wood, and clay sculpture from South and Southeast Asia. The Vever Collection of Persian and Indian manuscripts, paintings, calligraphies, illuminations, and bookbindings was acquired by purchase in 1986. Other important additions have been Japanese works of art, including twentieth-century photographs, prints and ceramics; and art from South Asia, China, and Tibet. In 2004 the Gallery was given an important collection of Central Asian ikats by Dr. Guido Goldman. The Sackler embraces contemporary art and a wide range of media and artistic practices. The continuing acquisitions program is aimed at developing Gallery collections to reflect the full range of Asian art. Recent additions include the Gerhard Pulverer Collection of Japanese Illustrated Books, and the Robert O. Muller and Anne van Biema Collections of Japanese woodblock prints, making the Freer and Sackler a world leader in the study and display of Japanese graphic art.

Publications and Lectures

Please refer to the section under Freer Gallery of Art.

Department of Conservation & Scientific Research

Please refer to the section under Freer Gallery of Art.

Library

The research library, shared by the Freer Gallery of Art and the Arthur M. Sackler Gallery, supports the research, exhibition, and educational programs of the two museums. Please refer to the entry under Freer Gallery of Art.

Archives

Please refer to the entries under Freer Gallery of Art.

RESEARCH STAFF

ALLEE, Stephen D., Research Specialist: Chinese Literature and History. B.A. (1975) George Washington University; M.A. (1986) University of Washington. Research specialties: Chinese painting and calligraphy.

CORT, Louise Allison, Curator for Ceramics. B.A. (1966) Simmons College; B. Litt. (1969) St. Hugh's College, Oxford University. Research specialties: Historical and contemporary ceramics of Japan, Southeast Asia, and South Asia; Japanese textiles; Japanese baskets; other craft traditions of Japan, Southeast Asia and South Asia.

DIAMOND, Debra, Associate Curator South and Southeast Asian Art. B.F.A. (1981) Parsons School of Design; M.A. (1991) Hunter College; Ph.D. (2000) Columbia University. Research specialties: South Asian Art; Yoga History.

DOUGLAS, Janet G., Conservation Scientist. B.A. (1978) James Madison University; M.A. (1980) Bryn Mawr College. Research specialties: Technical studies on works of art and archaeology using scientific methods, inorganic materials such as stone, jade and metal.

FARHAD, Massumeh, Chief Curator and Curator of Islamic Art. B.A. (1977) Wellesley College; M.A. (1983), Ph.D. (1987) Harvard University. Research specialties: Islamic Art, Persian painting.

GLAZER, Lee, Associate Curator of American Art. Ph.D. (1996) University of Pennsylvania. Research specialties: American art of the nineteenth and early twentieth centuries; the Aesthetic movement; James McNeill Whistler; nineteenth-century British and American works on paper

McCARTHY, Blythe E., Andrew W. Mellon Senior Scientist. S.B. (1987), S.M. (1988) Massachusetts Institute of Technology; Ph.D. (1996) Johns Hopkins University. Research specialties: Technical studies of artifacts composed of inorganic materials, especially Asian glass and ceramics; materials characterization and non-destructive analysis methods.

MICKLEWRIGHT, Nancy, Head, Scholarly Programs and Publications. B.A., M.A., Ph.D. (1986) University of Pennsylvania. Research specialties: History of Photography in the Middle East, especially the Ottoman Empire; Ottoman painting and dress; gender issues in Islamic art.

NAGEL, Alexander, Assistant Curator of Ancient Near Eastern Art. M.A. (2003) Humboldt Universitaet zu Berlin; Ph.D. (2010)University of Michigan. Research specialties: Ancient Iran, especially Achaemenid and Sasanian Persian Material Culture and Archaeology, Greek and Roman Material Culture and Archaeology, Ancient Ceramics, Polychromy and Conservation Studies, Archaeometry, Plaster Casts and Creation and Development of Antiquities Collections in Washington DC.

ULAK, James T., Deputy Director and Curator for Japanese Art. B.A. (1968) Maryknoll College; M.Div. (1976) Maryknoll School of Theology; Ph.D. (1994) Case Western Reserve University. Research specialties: Japanese narrative painting of the 14th and 15th centuries.

WILSON, J. Keith, Associate Director and Curator of Ancient China. B.A. (1978) Williams College; M.A. (1983) University of Michigan; M.F.A. (1985) Princeton University. Research specialties: Chinese jades of the Neolithic through Han periods, bronzes of the Shang and Zhou dynasties, with particular interest in inscribed examples; Buddhist sculpture of the Six Dynasties period and Sui and Tang dynasties; Korean art of all periods.

YONEMURA, Ann, Senior Associate Curator for Japanese Art. B.A. (1969) Wellesley College; M.A. (1973) Princeton University. Research specialties: Japanese painting, calligraphy, prints, and lacquer.

AFFILIATED RESEARCH STAFF

BOSWORTH, Jenifer, Exhibitions Conservator. B.A. (1992) Cornell University; M.A. (1999) University of Durham, England. Research specialties: Conservation topics in the following specialties: exhibitions, ethnographic objects.

CHASE, Ellen, Objects Conservator. B.A. (1988) Williams College; M.A. (1993) New York University. Research specialties: Conservation of inorganic and organic materials with a focus on ceramics.

HARE, W. Andrew, Supervisory East Asian Painting Conservator. B.A. (1985) Oberlin College. Research specialties: Conservation of East Asian paintings.

HOGGE, David, Head of Archives. M.A. (1993) University of Washington. Research specialties: Japanese art.

JACOBSON, Emily, Paper & Photographs Conservator. B.A. (1984) Connecticut College; M.A. (1991) SUNY-Buffalo State College. Research specialties: Indian Miniatures; Islamic paintings and manuscripts.

JETT, Paul R., Emeritus. B.A. (1976) University of New Mexico; M.A.C. (1981) Queen's University. Research specialties: Technical studies of sculpture and ancient metalwork.

SLUSSER, Mary, Research Associate. B.A. (1942) University of Michigan; Graduate Studies (1942-1945) Institute of Fine Arts, New York University; Graduate Studies (1946-1947) Harvard University; Ph.D. (1950) Columbia University. Research specialties: Nepal and Himalayan related subjects in culture and art.

WANG, Daisy Yiyou, Project Manager, Chinese Art. B.A. (1998) University of International Relations, Beijing; M.A. (2000) University of International Relations; Ph.D. (2007) Ohio University. Research specialties: History of Collecting Chinese Art in the United States, Ancient Chinese Art, Buddhist Art, Ming and Qing decorative arts, Chinese influences on modern and contemporary American art.

THE HIRSHHORN MUSEUM AND SCULPTURE GARDEN

Kerry Brougher, Acting Director

The Hirshhorn Museum and Sculpture Garden, which opened to the public in October 1974, is the Smithsonian Institution's museum of modern and contemporary art. The collection was initially formed by a series of bequests, from 1966 through 1981, from its founding donor, Joseph H. Hirshhorn. Gifts from other donors and museum purchases have increased the scope of the collection, which now numbers almost twelve thousand works of art.

Collections

The collection, which is international in scope, encompasses American and European paintings, sculptures, prints, and drawings of the nineteenth century through the present as well as photography and moving-image works. In addition to such nineteenth-century artists as Thomas Eakins and Winslow Homer, the painting collection includes in-depth holdings of many twentieth-century Americans, including Josef Albers, Stuart Davis, Willem de Kooning, Arshile Gorky, Marsden Hartley, Morris Louis, Horace Pippin, Clyfford Still, and Frank Stella. Supplementing those are paintings by European and Latin American artists, notably Francis Bacon, Fernando Botero, Jean Dubuffet, George Grosz, Oskar Kokoschka, Matta, Giorgio Morandi, Antoní Tapies, and Joaquin Torres-García.

The well-known sculpture collection covers the history of European sculpture from the mid-nineteenth century through the present, with major holdings of works by Alexander Archipenko, Ernst Barlach, Constantin Brancusi, Alberto Giacometti, Oto Gutfreund, Barbara Hepworth, Aristide Maillol, Henri Matisse, Pablo Picasso, Medardo Rosso, and others. Complementing those are important sculptures by Americans such as Joseph Cornell, Gaston Lachaise, Elie Nadelman, Louise Nevelson, Isamu Noguchi, and David Smith. Monumental sculptures by Jeff Koons, Henry Moore, Claes Oldenburg, Auguste Rodin, and Tony Smith are featured in the Sculpture Garden and Plaza, as are a pavilion by Dan Graham, located near the reflecting pool, and a seasonally installed interactive piece by Yoko Ono.

Recent acquisitions have concentrated on international contemporary art, such as paintings and sculptures by John Baldessari, Joseph Beuys, Nick Cave, Tony Cragg, Carlos Cruz-Diez, Mark di Suvero, Dan Flavin, Lucian Freud, Robert Gober, Hans Haacke, Mona Hatoum, On Kawara, Ellsworth Kelly, Joseph Kosuth, Agnes Martin, Ana Mendieta, Bruce Nauman, Roman Opalka, Sigmar Polke, Gerhard Richter, Doris Salcedo, Fred Sandback, Yinka Shonibare, Nancy Spero, and Franz West. Recently acquired works in photography, installations, and moving-image include pieces by such artists as Doug Aitken, Walead Beshty, Tacita Dean, Omer Fast, Ori Gersht, Roni Horn, Isaac Julien, Nikki Lee, Anthony McCall, Gabriel Orozco, Paul Sharits, Beat Streuli, Thomas Struth, Hiroshi Sugimoto, and Wolfgang Tillmans.

Programs and Research Facilities

The Hirshhorn maintains an active exhibition schedule focused on exploring or re-examining key moments and figures in modern and contemporary culture and is dedicated to undertaking deep research and organizing projects that ask essential questions about the art and culture of yesterday, today, and tomorrow. Thematic exhibitions exploring aspects of modern and contemporary art have ranged from *Visual Music*, an alternative history of the abstract art of the past century featuring artists who explored ideas related to *synaesthesia* (a blending of the senses and synthesis of the arts), to *The Cinema Effect*, an exploration of contemporary moving-image art and the ways in which the cinematic has blurred distinctions between illusion and reality. Recent monographic shows have explored the oeuvre of such artists as Isamu Noguchi, Ana Mendieta, Jeff Wall, Brice Marden, Chuck Close, Robert Gober, Salvador Dalí, Ed Ruscha, Clyfford Still, Juan Muñoz, Hiroshi Sugimoto, Anselm Kiefer, Wolfgang Tillmans, Louise Bourgeois, Anne Truitt, Yves Klein, and Blinky Palermo.

The exhibition series titled *Directions*, began in 1987, focuses on emerging artists in the contemporary art world. Recent shows have highlighted Cai Guo-Qiang, Tony Oursler, Toba Khedori, Sam Taylor-Wood, Juliao

Sarmento, Shahzia Sikander, Leonardo Drew, Cathy de Monchaux, Tacita Dean, Ernesto Neto, Ron Mueck, Cecily Brown, Janet Cardiff, Jim Hodges, Oliver Herring, Jim Lambie, Amy Sillman, Terence Gower, Walead Beshty, John Gerrard, and Grazie Toderi. The Hirshhorn's popular Black Box series, which recently celebrated its five-year anniversary, features work by emerging and established artists and artist collectives, including Francis Alÿs, Phoebe Greenberg, Kimsooja, Rivane Neuenschwander, Hans Op de Beeck, Semiconductor, Superflex, Guido van der Werve, Laurent Grasso, Nira Pereg, among others, and represents a broad range of nations and approaches to new media. Ways *of Seeing*, an occasional exhibition program in which individuals involved in the art world—ranging from collectors to artists to composers to authors—organize an exhibition of works from the collection, has included guest curators like artist John Baldessari and collectors Giuseppe and Giovanna Panza. The museum schedule of special, temporary exhibitions is complemented by ongoing dynamic rotations of the collection, designed not only to showcase a wide range of the Hirshhorn's varied holdings, but also to encourage visitors to ask questions and experience art from a variety of perspectives. In addition to individual gallery installations of masterworks from the Hirshhorn's collection organized either around individual artists or themes, the Museum also presents major exhibitions drawn from its holdings. Recent examples include *Fragments in Time and Space*, *Josef Albers: Innovation and Inspiration*, *ColorForms*, and *Strange Bodies*.

To promote the study of modern and contemporary art, the museum cooperates with art historians, students, and visiting scholars from throughout the United States and abroad. Intern programs at the undergraduate and graduate levels offer opportunities prospective art professionals to partner with the museum's staff. Curatorial records on the permanent collection and a specialized library of thirty-six thousand volumes, supplemented by the papers of Elmer MacRae concerning the Armory Show of 1913, the Samuel Murray scrapbooks, and the Olga Hirshhorn Collection of Photographs of Artists, provide a rich source for research; graduate students, artists, and scholars may use the Museum's facilities by prior appointment.

RESEARCH STAFF

BEDFORD, Clarke, Conservator of Paintings and Mixed-Media Objects. B.A. (1969) Williams College; M.A. (1980) Cooperstown Graduate Programs. Research specialties: History of painting materials and techniques.

BROUGHER, Kerry, Chief Curator. B.A. (1974) University of California, Irvine; M.A.(1978) University of California, Los Angeles. Research specialties: 20th century and contemporary art, with an emphasis on photography, film, and new media.

FLETCHER, Valerie J., Senior Curator (Modern Art). B.A. (1973) Connecticut College; M.A. (1976), M. Phil. (1979), Ph.D. (1994), Columbia University. Research specialties: European and American art, 1880-1970, particularly modern sculpture.

HANKINS, Evelyn C., Associate Curator. B.A. (1990) University of California, Santa Barbara; M.A. (1994), Ph.D. (1999) Stanford University. Research specialties: American modernism; contemporary art; museum theory.

LAKE, Susan, Director of Collection Management/Chief Conservator. B.A. (1970) University of the Pacific; M.A. (1973) University of California, Davis; Ph.D. (1999) University of Delaware. Research specialties: Modern and contemporary art materials, microscopy.

AFFILIATED RESEARCH STAFF

BROOKE, Anna, Librarian, Hirshhorn Museum and Sculpture Garden Library, Smithsonian Institution Libraries. B.A. (1964), M.L.S. (1965) University of California, Berkeley; M.A. (1988) American University. Research specialties: Contemporary and modern art.

MUSEUM CONSERVATION INSTITUTE

Robert J. Koestler, Director

The Museum Conservation Institute (MCI) serves as the center for specialized technical collections research and conservation for all Smithsonian museums and collections. MCI combines knowledge of materials and the history of technology with state-of-the-art instrumentation and scientific techniques to provide technical research studies and interpretation of artistic, anthropological, biological, and historical objects and collections. Through its umbrella Healthy Environments, Healthy Practices, Healthy Collections initiative, MCI responds to the threats of environmental instabilities to cultural heritage in multiple and complex ways, including researching material degradation mechanisms, setting scientifically-based storage and display conditions, and developing and using less-invasive and less-damaging materials and procedures for collection conservation.

Priority research areas include:

Proteomics— gathering more information on the origin and condition of collections, cultural objects, and biological specimens from their protein materials

Modern museum and industrial materials—understanding the sustainability of modern materials to improve their preservation and conservation

Life in art and collections—detecting and controlling insects and microbes causing biodeterioration and mitigating the adverse consequences of historic bio-control, including toxic pesticide residues on collections

Imaging and nanotechnology—bringing new spectroscopic imaging and nanotechnologies to bear on collections to further understanding of composition, deterioration, and preservation

Historical technical studies—deriving meaning from collections through analysis with state-of-the-art instruments

MCI laboratories, located in the Museum Support Center in Suitland, MD., are equipped with advanced analytical instrumentation including: variety of mass spectrometers to analyze protein structure and function, stable isotope mass spectrometry, inductively coupled plasma mass spectrometry, Fourier transform infrared spectrometry, Fourier transform Raman spectrometry, dispersive Raman spectrometry, gas chromatography, gas chromatography-mass spectrometry, optical microscopy, scanning electron microscopy with energy dispersive spectrometry, micro-X-ray diffraction, X-ray fluorescence, X-ray radiography, ultraviolet-visible light spectrophotometry, 3-D mi-croscopy, and 3-D color scanning documentation, (http://www.si.edu/mci/english/about_mci/facilities/index.html).

Internships may be available for conservation or science students at various levels of accomplishment, including recent graduates of academic training institutions. Postdoctoral fellowships may become available for research in collaboration with MCI staff on projects in our priority research areas. For further details on these opportunities and application procedures, please see the introduction to this book.

RESEARCH STAFF

BALLARD, Mary W., Senior Textiles Conservator. B.A. (1971) Wellesley College; M.A. and Diploma in Conservation (1979) Institute of Fine Arts, New York University. Research specialties: Textile preservation and technical studies, particularly the light fading of dyes on fabrics; textile cleaning methods; and the biodeterioration of textiles.

BEAUBIEN, Harriet F. (Rae), Senior Objects Conservator. B.A. (1972) Beloit College; M.A. (1976) University of Chicago; Diploma in Conservation (1986) Institute of Fine Arts, New York University. Research specialties: Archaeological materials; field conservation issues.

CHAROLA, Asuncion Elena, Research Scientist. Ph.D. (1974) Universidad Nacional de La Plata, Argentina. Research specialties: Inorganic Porous Building Materials, their deterioration and conservation; Heritage Sites Conservation and Management.

DEPRIEST, Paula T., Deputy Director. B.A. (1978) Union University; M.S. (1983) University of Tennessee; Ph.D. (1992) Duke University. Research specialties: Systematics and evolution of lichens, coevolution of lichen-forming fungi and algae, lichen flora of northern Mongolia, traditional uses of lichens and plants by the reindeer herding Dukha.

FRANCE, Christine A., Physical Scientist. B.S. (2001) University of Maryland; M.S. (2004) North Carolina State University; Ph.D. (2008) University of Maryland. Research specialties: stable isotopic applications to paleontology, archeology, and ancient environments; diagenesis of fossil remains.

GRISSOM, Carol A., Senior Objects Conservator. B.A. (1970) Wellesley College; M.A. (1974) Oberlin College. Research specialties: Sculpture in bronze, stone, zinc, plaster, and wood.

KOESTLER, Robert J., Director. B.S. (1972) SUNY Stony Brook; M.A. (1977) CUNY Hunter College; M.Ph. (1983), Ph.D. (1985) CUNY City College. Research specialties: conservation science and collections preservation.

MADDEN, Odile M., Research Scientist. B.A. (1993) University of California, Los Angeles; M.A. (2001) New York University; Ph.D. (2010) University of Arizona. Research specialties: Conservation science; Technology and preservation of 20th century polymer composites (plastics); Pesticide residues on museum collections; Raman spectroscopy and surface-enhanced Raman spectroscopy (SERS); Artifact materials of animal origin; Application of laser technologies to the study and treatment of art and artifacts.

MOINI, Mehdi, Research Scientist. Ph.D. (1986) Michigan State University. Research specialties: Mass Spectrometry, Separation, and Proteomics.

TSANG, Jia-Sun, Senior Paintings Conservator. M.S. (1974) Bowling Green State University; M.S. (1985) University of Delaware. Research specialties: Conservation of paintings on canvas, on wood, on metal, or on paper and including mixed media and murals.

VICENZI, Edward P., Research Scientist. B.Sc. (1982) McGill University; M.S. (1985) University of Oregon; Ph.D. (1991) Rensselaer Polytechnic Institute. Research specialties: Advanced chemical microanalysis of museum specimens.

WACHOWIAK JR., Melvin J., Senior Conservator. B.A. (1981) Springfield College; M.S. (1989) Winterthur Museum/University of Delaware Art Conservation Program. Research specialties: New imaging techniques (3D scanning, extended depth of field in microscopy, reflectance IR); Characterization and treatment of paint, varnish, and wooden objects including furniture; microscopy of coatings; wood technology.

AFFILIATED RESEARCH STAFF

GIACCAI, Jennifer, Conservation Scientist. B.A. (1995) Macalester College; M.S.E. (1999) Johns Hopkins University. Research specialties: Application of infrared spectroscopy and GC-MS to the study of artists' materials; Investigation of degradation of artists' materials; Technical studies of artists' working methods and works of art; Application of new scientific techniques to the study of artists' materials and works of art, especially non-invasive techniques.

LITTLE, Nicole C., Physical Scientist. B.A. (2001), M.A. (2005) University of Missouri, Columbia. Research specialties: Chemical analysis of museum objects using inductively coupled plasma-mass spectrometry.

NATIONAL AIR AND SPACE MUSEUM

John R. Dailey, Director

The National Air and Space Museum has the largest collection of historic aircraft and spacecraft in the world. The Museum's goal is to explore and present the history, science, technology, and social impact of aeronautics and spaceflight and to investigate and exhibit the nature of the universe and our environment. The Museum's Department of Collections and Research entails five divisions that present varied opportunities for research and study. The Divisions of Aeronautics and Space History conduct studies on the origin and development of flight through the atmosphere and in space, while the Museum's Center for Earth and Planetary Studies carries out programs of basic research in planetary and terrestrial geosciences and remote sensing.

The Museum's preservation and restoration efforts occur at the Paul E. Garber Facility in Suitland, Maryland. The Museum's collection of nearly 55,000 artifacts includes over 350 aircraft and more than 250 rockets, spacecraft, and guided missiles. The collection also includes engines, propellers, instruments and avionics equipment, flight clothing and spacesuits, personal equipment, medals and awards, and a broad range of cultural items. The Museum's art collection exceeds 4,000 pieces. Opportunities for hands-on research of the Museum's collections should be proposed well in advance of applications because of the heavy schedule of the Collections Division.

The Archives Division contains a wide range of visual and textual materials, many emphasizing the technical aspects of aircraft and spacecraft. The archival collection contains approximately 12,000 cubic feet of material, including an estimated 2 million photographs, and 20,000 film and video titles. The archives holds over 500 collections of personal and professional records, and many other accessions too small to be treated as collections. Descriptions of many of these collections are available at http://www.SIRIS.si.edu/. A major attribute of these collections is their visual representation of aircraft and spacecraft through photographs and technical drawings. The archives also hold many technical manuals that document the design, construction, and performance of aircraft and spacecraft and the engines that powered them. The National Air and Space Museum Technical Files contain 1,920 cubic feet of aviation and space-related materials organized by subject in twenty-two series. Materials include photographs, press releases, clippings, correspondence, reports, brochures, and other documentation of individuals, organizations, events, and objects. Finding aids to some collections are available at http://www.nasm.edu/nasm/arch.

Historical research in the Museum is aided both by these internal resources as well as the proximity to holdings and expertise in the Washington area. The Museum has programs of scholarly collaboration with major universities and government labs including Cambridge, Cornell, Johns Hopkins, Oxford, Northwestern University, University of Virginia, and University of Pittsburgh. Museum professionals serve as committee members for scientists and historians working on advanced degrees at various universities.

Scientific research in terrestrial and planetary geology and geophysics is aided by collections of hard copy and digital planetary data housed in the Center for Earth and Planetary Studies. Included in the collections are more than 200,000 Gemini, Apollo, Skylab, Apollo-Soyuz and Space Shuttle prints and transparencies of Earth, selected Landsat images and digital data (primarily for Earth's desert regions), and complete sets of Ranger through Apollo images and photographs of the Moon. Images of the planets and their moons are available as prints, negatives and digital files. The Center has a variety of computers, and scanning and digitizing equipment, for use in research.

The Museum's library contains an extensive collection of books, periodicals, rare materials, and microforms in the following subjects: the history of aviation and spaceflight, aeronautics and astronautics, Earth and planetary studies, and astronomy. Access to a variety of electronic information sources is also available in the library at http://www.SIRIS.si.edu/. The library is a branch of the Smithsonian Institution Libraries.

Research is fundamental and integral to all of the work of the National Air and Space Museum. The staff works closely with many professional aviation, scientific, and historical societies, and maintains close research associations with other related museums, both in this country and abroad. In addition to the Smithsonian

Fellowships, the National Air and Space Museum provides research opportunities in history, science, and art that include fellowships, internships, a publications grant, and appointments as visiting scholars. Scholars are encouraged to apply for these opportunities:

- Charles A. Lindbergh Chair of Aerospace History
- Ramsey Fellowship in Naval Aviation History
- Daniel and Florence Guggenheim Fellowship
- A. Verville Fellowship
- Earth and Planetary Science Fellowship
- National Air and Space Museum Aviation/Space Writers Award
- Internships

AERONAUTICS DIVISION

The Aeronautics Division is responsible for the historical research and collecting activities of the National Air and Space Museum related to all aspects of flight in the atmosphere. The goal of the division is to preserve, document, and interpret the history of aeronautical technology within a broad and appropriate political, economic, and social context. As part of this responsibility, the division acquires, documents, and maintains a collection of historically significant artifacts for public exhibition, study, and reference. Staff members conduct historical research leading toward scholarly and popular publications, exhibitions, lectures, seminars, and other forms of public presentation. Staff members also respond to a broad range of requests from the public on matters related to the history of aeronautics.

RESEARCH STAFF

ANDERSON JR., John D., Curator, Aerodynamics. B.S. (1959) University of Florida; Ph.D. (1966) Ohio State University. Research specialties: Hypersonic aerodynamics, high-temperature gas dynamics, computational fluid dynamics, and history of aerodynamics.

COCHRANE, Dorothy S., Curator, General Aviation. B.A. (1972) Ithaca College; M.Ed. (1975) Lehigh University. Research specialties: General aviation, aerial photography, history of women in aviation.

CRELLIN, Evelyn, Curator, European Aviation. M.A. (1986) Leipzig University (Germany); Ph.D. (2006) University of the German Armed Forces, Munich (Germany). Research specialties: World War II German and Italian aircraft; World War II and Postwar Russian aircraft; Hanna Reitsch; Hugo Junkers; German women glider pilots in World War II.

CROUCH, Tom D., Senior Curator, Lighter-than-Air, Early Flight & Art. B.A. (1966) Ohio University; M.A. (1968) Miami University; Ph.D. (1976) Ohio State University. Research specialties: Technology and society, U.S. social history, aerospace history.

JAKAB, Peter L., Chief Curator & Curator of Early Flight, World War I, and Vietnam War aviation. B.A. (1980), M.A. (1982), Ph.D. (1989) Rutgers University. Research specialties: History of technology; history of aviation and aeronautical engineering; history of early flight; Wright brothers; World War I aviation.

KINNEY, Jeremy R., Curator, Aero Propulsion. B.A. (1994) Greensboro College; M.A. (1998), Ph.D. (2003) Auburn University. Research specialties: Air racing; Aircraft Propulsion; Interwar Military Aviation; Aircraft Design, Technology, and Manufacturing; History of Technology; Twentieth Century United States.

LEE, Russell E., Curator, Sport Aviation and All-Wing Aircraft. B.S. (1981) Southwest Texas State University; M.S. (1992) George Mason University. Research specialties: Sport aviation (includes glider, ultralight, and amateur-built aircraft), tailless and semi-tailless aircraft, development of composite structures in sport aircraft, influence of weather knowledge on sport of soaring flight.

PISANO, Dominick A., Curator, Social and Cultural History. B.A. (1966) Pennsylvania State University; M.S. (1974) Catholic University; Ph.D. (1988) George Washington University. Research specialties: Social and cultural aspects of American aviation; minorities in aviation; bibliographical and historiographical research in aviation.
SPENCER, Alex M., Curator. B.A. (1987), M.A. (1990) Pennsylvania State University; Ph.D. (2008) Auburn University. Research specialties: British and Commonweath military aviation, military flight clothing, aviation trophies and awards.

VAN DER LINDEN, F. Robert, Chair and Curator of Air Transportation, Special Purpose Aircraft. B.A. (1977) University of Denver; M.A. (1981), Ph.D. (1997) George Washington University. Research specialties: U.S. commercial aviation, interwar military and naval aviation, special purpose aircraft.

AFFILIATED RESEARCH STAFF

CONNOR, Roger, Museum Specialist, Instruments and Vertical Flight. B.S. (1993) Virginia Tech; M.A. (2002) George Washington University; M.A. (2010) George Mason University. Research specialties: Rotary-wing and V/STOL aviation; ground effect vehicles; navigation; aircraft instrumentation, avionics and flight management systems, ground support equipment; air traffic control; radar and electronic warfare; airports and infrastructure.

MOORE, Christopher, Museum Specialist, Model Aircraft and Armament-Ordnance. B.A. (1983) University of California, San Diego; M.A. (1997) George Mason University. Research specialties: Collections management.

CENTER FOR EARTH AND PLANETARY STUDIES

The Center for Earth and Planetary Studies (CEPS) is a scientific research unit of the National Air and Space Museum. The Center's staff is actively involved in planetary and terrestrial geologic and geophysical research using remote sensing data obtained by Earth orbiting satellites, manned and unmanned space missions, and field studies. Several members of the research staff participate on the science teams for current and future missions to Mars, including Mars Express, the two Mars Exploration Rovers, and the Mars Reconnaissance Orbiter, as well as the current MESSENGER mission to Mercury. Staff members are also actively involved in preparations for future missions to the Moon, the rocky inner planets, and the outer solar system.

Research activities include the geologic evolution of planetary surfaces, geologic mapping, comparative studies of volcanic and tectonic landforms on the Earth and other terrestrial planets, and geomorphology and surface dynamics in arid and semi-arid regions of the Earth.

The Center houses a NASA-supported Regional Planetary Image Facility that includes digital images and photographs of the Earth, Moon, and other planets and their satellites, as well as cartographic products generated from these images. This facility serves the research needs of the Center's staff and ensures that images and other planetary mission data are accessible to the larger community of investigators and interested public in the mid-Atlantic and southeastern regions of the United States.

Scientific investigations using digital images and other digital data are supported by a variety of software packages, including ISIS, PICS, PCI, and ARC/INFO. Online search capabilities of terrestrial and planetary databases are also available.

RESEARCH STAFF

CAMPBELL, Bruce A., Geophysicist, Center for Earth and Planetary Studies. B.S. (1986) Texas A&M University; Ph.D. (1991) University of Hawaii. Research specialties: Geophysical applications of imaging radar data, radar backscatter, volcanism, Venus geologic mapping, radar sounding of Mars.

CRADDOCK, Robert A., Geologist, Center for Earth and Planetary Studies. B.S. (1985) University of Georgia; M.S. (1987) Arizona State University; Ph.D. (1999) University of Virginia. Research specialties: Mars geology; lunar geology; fluvial processes; geomorphic analyses and quantitative modeling.

GRANT, John A., Geologist, Center for Earth and Planetary Studies. B.A. (1982) State University of New York; M.S. (1985) University of Rhode Island; Ph.D. (1990) Brown University. Research specialties: Planetary geology and process geomorphology.

IRWIN III, Rossman P., Geologist, Center for Earth and Planetary Studies. B.A. (1997) Virginia Tech; M.S. (2000) University of Virginia; Ph.D. (2005) University of Virginia. Research specialties: fluvial and arid zone geomorphology, paleohydrology, planetary resurfacing.

JOHNSTON, Andrew K., Geographer, Center for Earth and Planetary Studies. B.A. (1991) George Washington University; M.A. (1998) University of Maryland; Ph.D. (2013) University of Maryland. Research specialties: Geography; Remote sensing.

MAXWELL, Ted A., Senior Scientist Emeritus, Center for Earth and Planetary Studies. A.B. (1971) Franklin and Marshall College; M.S. (1973), Ph.D. (1977) University of Utah. Research specialties: Geomorphology, planetary geology.

WATTERS, Thomas R., Chair and Senior Scientist, Center for Earth and Planetary Studies. B.A. (1977) West Chester University; M.A. (1979) Bryn Mawr College; Ph.D. (1985) George Washington University. Research specialties: Structure/tectonics; planetary geology; tectonophysics and remote sensing.

ZIMBELMAN, James R., Geologist, Center for Earth and Planetary Studies. B.A. (1976) Northwest Nazarene College; M.S. (1978) University of California, Los Angeles; Ph.D. (1984) Arizona State University. Research specialties: Planetary geology and volcanology; arid land geomorphology; paleo-pluvial geology; remote sensing.

AFFILIATED RESEARCH STAFF

STRAIN, Priscilla L., Program Manager, Center for Earth and Planetary Studies. B.A. (1974) Smith College. Research specialties: Remote sensing; lunar geology.

DIVISION OF SPACE HISTORY

The Division of Space History (DSH) is the focal point for the space-related historical research, collecting and exhibit work of the Museum. Curators and staff within the department research and publish; engage in public outreach through exhibitions, lectures, and other means; and collect and manage the care of rocket and space artifacts in the Museum's National Collection. The Division embodies the Museum's mission to preserve, understand, and communicate the history of rocketry and space exploration, as part of the larger story of United States and world history. As a museum, our special strength is documenting this history through our artifacts. The Museum possesses an unparalleled collection that preserves many facets of rocketry and space exploration undertaken by the United States and, to a lesser degree, other countries. Our artifacts cover programs and technology created for human spaceflight, rocketry and missiles, computers and avionics, commercial satellites, military space, space sciences, ground- and space-based astronomy, and foreign space programs. These artifacts are on display in a number of venues: the Museum on the National Mall, at the Steven F. Udvar-Hazy Center, and, through the Division's active loan program, at museums around the United States and around the world.

Using the Museum's collections, as well as archival and bibliographic sources, the Division investigates the disciplines that use the vantage point of space, including astronomy, space physics, atmospheric sciences, communications, and life sciences, and also the means by which humans have probed or explored space, including rockets, launch vehicles, and spacecraft. Its research encompasses historical studies of space science and exploration, as well as technical surveys of space disciplines. In addition, the Division undertakes historical studies of the social and cultural, economic and political aspects of space flight and exploration.

RESEARCH STAFF

CERUZZI, Paul E., Division Chair and Curator, Aerospace Computing and Electronics. B.A. (1970) Yale University; Ph.D. (1981) University of Kansas. Research specialties: Aerospace electronics, computing, microelectronics, missile guidance & control.

COLLINS, Martin J., Curator, Civilian Applications Satellites. B.G.S. (1977) University of Michigan; M.A. (1985), M.L.S. (1985), Ph.D. (1998) University of Maryland. Research specialties: History of post-World War II science and technology; history and culture of communications satellites; globalization; oral history and archives.

DAVID, James E., Curator, National Security Space and Rocket Models. B.A. (1973) Occidental College; M.A. (1990) Johns Hopkins University School of Advanced International Studies. Research specialties: Intelligence and space programs; immediate post-World War II U.S. communications intelligence organization and policies; Federal records management; classification and declassification of federal records, location and accessibility of agency, White House, and Congressional records.

DEVORKIN, David H., Senior Curator, History of Astronomy and the Space Sciences. B.A. (1966) University of California, Los Angeles; M.S. (1968) San Diego State University; M.Phil. (1970) Yale University; Ph.D. (1978) University of Leicester. Research specialties: History of modern astrophysics; history of astronomy and the space sciences; oral history and biography.

LASSMAN, Thomas C., Curator, Rockets and Missiles Since 1946. B.A. (1991) Washington University; M.A. (1997) Johns Hopkins University; Ph.D. (2001) Johns Hopkins University. Research specialties: American institutional history; history of science and technology during the Cold War; history of American industrial research.

LAUNIUS, Roger D., Associate Director, Collections and Curatorial Affairs, Planetary Exploration Programs. B.A. (1976) Graceland College; M.A. (1978), Ph.D. (1982) Louisiana State University. Research specialties: Aerospace history; history of NASA; history of space exploration; planetary science; space access; colonies in space; human and robotic space exploration.

LEWIS, Cathleen S., Curator, International Space Programs and US Spacesuits and Inflight Clothing. B.A. (1980); M.A. (1983) Yale University; Ph.D. (2008) George Washington University. Research specialties: History of Russian and Soviet space programs; International cooperation in space; History of spacesuits; blacks in aviation and spaceflight; biological sciences in space.

NEAL, Valerie, Curator, Space Shuttle and Space Station History. B.A. (1971) Texas Christian University; M.A. (1973) University of Southern California; Ph.D. (1979) University of Minnesota. Research specialties: Post-Apollo human spaceflight (Skylab, Space Shuttle, Space Station); Shuttle-based space science, especially Spacelab missions.

NEEDELL, Allan A., Curator, Apollo, Skylab, ASTP Programs. B.A. (1972) Cornell University; M.A. (1974), Ph.D. (1980) Yale University. Research specialties: History of modern physical sciences and the organization of American science; history of space exploration; Apollo spacecraft and associated artifacts.

NEUFELD, Michael J., Museum Curator, Early Rocketry. B.A. (1974) University of Calgary; M.A. (1976) University of British Columbia; M.A. (1980), Ph.D. (1984) Johns Hopkins University. Research specialties: German rocketry and aeronautics; early rocket development; U.S. space and guided-missile history; World War II, the Holocaust, and strategic bombing.

WEITEKAMP, Margaret A., Curator, Social and Cultural Dimensions of Spaceflight. B.A. (1993) University of Pittsburgh; M.A. (1996), Ph.D. (2001) Cornell University. Research specialties: Space exploration in popular culture, including memorabilia and ephemera from actual space exploration as well as space science fiction memorabilia, merchandise, and props; space-themed toys; women in early U.S. space program.

AFFILIATED RESEARCH STAFF

LEVASSEUR, Jennifer Kay, Museum Specialist. B.A. (1999) University of Michigan; M.A. (2002) George Washington University; PhD (expected 2012) George Mason University. Research specialties: NASA photography program, NASM's human spaceflight camera and astronaut equipment collections, material culture and memory, visual culture.

Ramsey Room, National Air and Space Museum Branch, Smithsonian Institution Libraries

Named in honor of Admiral DeWitt Clinton Ramsey, an early naval aviator, this room contains rare library materials concerning the history of aviation and spaceflight. The William Burden collection of early ballooning works and the Bella Landauer Collection of aeronautical sheet music are housed in this room along with a large number of big-little books from the 1930s, the Tom Swift series, other children's books, and works by Jules Verne. In addition, the Ramsey Room contains a large number of first editions, many of them autographed by pioneers of flight. The William Upcott scrapbook with original letters written by the Montgolfier brothers in the 1870s also contains original prints and rare newspaper clippings collected by Upcott, a 19th-century British book dealer, and the 1836 Moon Hoax portfolio documents the hoax perpetrated by the New York Sun reporter R. A. Locke. The Ramsey Room is located within the Branch Library and adjacent to the Archives Division. The Smithsonian Institution Libraries encourages independent research projects by Smithsonian fellows and short-term visitors.

NATIONAL MUSEUM OF AFRICAN AMERICAN HISTORY AND CULTURE (NMAAHC)

Lonnie G. Bunch, Director

Legislation was signed in 2003 establishing the National Museum of African American History and Culture (NMAAHC). The Museum's building is scheduled to open on the National Mall in 2015. NMAAHC is dedicated to the collection, preservation, research, and exhibition of African American historical and cultural material reflecting the breadth and depth of the experiences of individuals of African descent living in the United States. Currently, in its pre-building phase, the museum is presenting exhibitions, producing publications, hosting public programs, and building its collections. Its growing collections include material culture, documents, and art from era of slavery, the period of Reconstruction, the Harlem Renaissance, the civil rights movement, and more recent developments in history and culture from 1968 to the present. This is a unique opportunity for students to work with a museum-in-the-making, and to contribute to the research for its exhibitions and programs.

The collections, exhibitions, research, publications, and educational programs serve the Museum's basic mission: to inspire a broader understanding of African American history and culture in a national and international context. In addition to exhibitions, the Museum interprets history and culture through performances and hands on activities, as well as music from America's past.

The Museum's programmatic objectives are flexible enough to encourage the creation of projects tailored to students' interests and needs. The student will have opportunities to develop and engage in a variety of projects that may include oral history projects, regional history, as well as art and cultural history. Under the supervision of museum staff, there is also the opportunity to engage in curriculum development and program evaluation projects. The Museum's growing permanent collection of artifacts, archives, photographic holdings, and art offers scholars interested in African American material culture excellent opportunities for research.

RESEARCH STAFF

GARDULLO, Paul, Museum Curator. B.A. (1986) Rutgers University; M.A. (2001), Ph.D. (2006) George Washington University. Research specialties: African American history and culture; American social and cultural history; public history; memory; race; popular culture, photography and visual culture, folklife.

GATES MORESI, Michèle, Curator of Collections. B.A. (1989), M.Phil. (1997), Ph.D. (2003) George Washington University. Research specialties: 19th century U.S. Social History, African American History, Material Culture Studies, Museum History, Collections Research.

NICHOLS, Elaine, Senior Curator for Culture. B.A. University of North Carolina Charlotte; M.S.S.A., Case Western Reserve University; M.A., University of South Carolina. Research Specialities: African American history and culture, historical archaeology, textiles/costumes, and African American funeral and mourning customs.

PRETZER, William, Senior Curator for History. B.A. (1972) Stanford University; M.A. (1976), Ph.D. (1986) Northern Illinois University. Research specialties: U.S. industrial history and social history, labor and technology, political movements, material culture and museum practice.

SERWER, Jacquelyn D., Chief Curator. B.A. Sarah Lawrence College; M.A. University of Chicago; Ph.D. City University of New York. Research specialties: American Art and African American Art, 19th century to the present; Museum Studies.

AFFILIATED RESEARCH STAFF

ANDERSON, Renée S., Museum Specialist. B.F.A. (1983) Virginia Commonwealth University; M.S. (1997), Ph.D. (2000) Virginia Polytechnic Institute and State University. Research specialties: clothing and textiles; design process.

FRANKLIN, John W., Program Manager. B.A. (1973) Stanford University. Research specialties: Cultural change in French-speaking West Africa and the Caribbean; African Diaspora studies; Cape Verde and Cape Verdian Americans; multicultural perspectives in cultural institutions; African American history and culture in U.S. museums.

WASHINGTON, Esther J., Director of Education. B.A. (1982) Howard University. Research specialties: K-12 object-based education, family programming, multiple learning styles, visitors with disabilities, technology/new media in museum settings.

NATIONAL MUSEUM OF AFRICAN ART

Johnnetta Betsch Cole, Director

The National Museum of African Art, established as a private museum in 1964, officially became a part of the Smithsonian in August 1979. It opened in its present home on the National Mall in 1987 and is a leading collecting, research and reference center for the visual arts of Africa. Through compelling, audience-centered exhibitions, scholarly publications and dynamic learning experiences, the Museum fosters public understanding and appreciation of the diverse cultures and artistic achievements of Africa from ancient to contemporary times.

Collections

The Museum's collections include outstanding examples of both historic and contemporary art, the latter the largest publicly held collection of its kind in the United States, as well as iconic works of popular arts that demonstrate the dynamic and visually compelling culture of change characteristic of Africa and African artists. Noteworthy among its holdings of traditional art are collections of royal Benin sculpture, Kongo sculpture, personal objects such as stools, headrests, pipes and containers, and central African ceramics. In 2005, the Museum acquired the important Walt Disney-Tishman African Art Collection as a gift from Walt Disney World Co., a subsidiary of the Walt Disney Company, and a documented collection of 1,500 African textiles, primarily from West Africa, formerly owned by Alastair and Venice Lamb of Great Britain was jointly acquired by the National Museum of African Art and the National Museum of Natural History. The Museum's collection of modern and contemporary art is particularly strong in works from Nigeria and South Africa. Portions of the Museum's collection and information on exhibitions and programs are available online through the Museum's Web site (africa.si.edu).

Programs and Research Facilities

The Museum has a changing loan exhibition program as well as exhibitions featuring the permanent collection. Exhibitions may focus exclusively on traditional or modern/contemporary art, or they may be a combination of the two. Exhibitions may be thematically focused, devoted to the art of a single artist or peoples, or explore a particular artistic tradition or movement.

The Museum's conservation department focuses on developing and applying appropriate preservation treatment for works of art, both traditional and contemporary, in the permanent collection, as well as preventive measures to arrest the deterioration of objects on exhibition, in storage, and on loan. The department maintains a 1,300 square foot laboratory and occasionally utilizes additional analytical expertise available throughout the Smithsonian for condition assessments and the technical study of African art objects.

The Warren M. Robbins Library of Smithsonian Institution Libraries is a specialized research library on African art and material culture. It has a collection of more than thirty-five thousand volumes and supports a wide range of research topics in African art, archaeology, history and cultural studies. The library collection is augmented by extensive files on African artists and files of other unpublished and ephemeral materials. The SIRIS online catalog (siris.si.edu) provides specific access to the collections.

The Eliot Elisofon Photographic Archives is a research and reference center devoted to the collection, preservation and dissemination of visual materials that encourage and support the study of the arts, cultures and history of Africa. The Archives collections contain approximately 350,000 items, including rare collections of glass plate negatives, lantern slides, stereographs, postcards, photographic albums, maps and engravings. It also includes film footage and videos, as well as collections of images deposited by noted Africanist scholars. The Archives staff works with art historians, anthropologists, photographers, filmmakers and other specialists in acquiring and preserving these visual resources. Archives staff also carries out photographic research and responds to requests from educational institutions, museums, scholars, publishers and the public. The SIRIS online catalog (siris.si.edu) provides access to selected holdings in the Archives collections.

The Museum is visited by national and international scholars who consult with the staff, examine the collections, and use the library facilities and photographic archives. Members of the Museum's research staff are available for lectures at educational institutions and for consultation with scholars, university faculty, museum professionals, and graduate and postgraduate students.

The Museum has an active public education program for children, schools and adults conducted through performing arts, workshops, lectures, films, tours, and outreach activities. Members of the educational staff are available for consultation with K-12 and college teachers.

RESEARCH STAFF

FREYER, Bryna M., Curator. B.A. (1970) Oakland University; M.A. (1993) Columbia University. Research specialties: African art history; Benin Kingdom; History of collecting; collection management.

KREAMER, Christine Mullen, Deputy Director/Chief Curator. A.A. (1972) Dutchess Community College, Poughkeepsie, NY; B.A. (1975) State University of New York, New Paltz; M.A.(1978), Ph.D.(1986) Indiana University. Research specialties: African art history; museum anthropology; museum studies, art and ritual; gender; African systems of knowledge.

MELLOR, Stephen P., Chief Conservator. B.A. (1976) George Washington University; M.S. (1981) University of Delaware. Research specialties: Conservation of ethnographic works of art.

MILBOURNE, Karen E., Curator. B.A. (1993) Bryn Mawr College; M.A. (1996), Ph.D. (2003) University of Iowa. Research specialties: Visual culture of Africa and its diasporas, contemporary art and artists, art and the environment, art and political representation, performance, new media issues, museum practice and exhibition theory.

STAPLES, Amy J., Senior Archivist. B.A. (1980) University of New Mexico; M.A. (1989) Temple University; Ph.D. (2002) University of California, Santa Cruz. Research specialties: Expeditionary/travel film; cinematic and photographic history; visual culture.

STOKES, Deborah, Curator for Education/K-12. M.A. (2000) Columbia College, Chicago. Research specialties: Object-based teaching and multi-disciplinary arts-integration; Yoruba art, Nigeria; Popular culture in Africa.

NATIONAL MUSEUM OF AMERICAN HISTORY

John L. Gray, Director

The Smithsonian's National Museum of American History, Kenneth E. Behring Center, is responsible for the collection, care, and preservation of more than 3 million objects and documents. The collections represent material evidence of the nation's heritage in the areas of science, technology, society, and culture. As sources for research, the Museum offers not only the historical objects collected by its curatorial divisions, but also significant collections such as prints, photographs, business Americana and trade literature, and engineering drawings. NMAH also houses a notable research library as well as the Dibner Library of the History of Science and Technology, which holds impressive collections of rare history of science texts in addition to World's Fair materials.

Viewing objects as principal expressions of human creativity, the Museum is interested in how they are made, how they are used, how they express human needs and values, and how they influence society and the lives of individuals. As a national museum, NMAH's natural focus is on the history of the United States of America, including its roots and connection with other cultures. Although the scope of the Museum is broad and its activities interdisciplinary, the Museum seeks to contribute to cultural, political, economic, and technological history through research that derives its evidence principally from material artifacts.

The collections, exhibitions, research, publications, and educational programs serve to achieve the Museum's basic mission: to help people understand the past in order to make sense of the present and shape a more humane future. In addition to exhibitions, the Museum interprets history through demonstrations, performances, and hands-on activities, as well as music America's music, past and present. The Museum, which opened in 1964, averages about 5 million visitors annually.

In addition to the Smithsonian Fellowships, NMAH provides research opportunities through internships and fellowships with the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation. Scholars are encouraged to apply for these opportunities; see the sections on Other Internships and Other Fellowships in this book.

NMAH will undergo renovations during the next several years, but the building will remain open and accessible to staff members and to fellows. However, access to certain research materials and collections may be limited. New fellows should consult with their Smithsonian advisors well in advance of the start of the appointment about specific research needs.

OFFICE OF CURATORIAL AFFAIRS

The Office of Curatorial Affairs preserves, documents, interprets, and makes accessible the scholarship and collections of the Museum in support of the Museum's mission and in accord with standards of quality and practice that maintain the Museum's leadership in the field. The office is made up of four departments: Affiliations, Collections Management Services, Collections Support, and History.

The office provides vision for the Museum's scholarly and collection development activities; coordinates and integrates activities in the departments and ensures responsible and coordinated management of resources within and between the departments; and aids all of curatorial affairs in prioritizing projects and program activities.

RESEARCH STAFF

ALLISON, David K., Associate Director. B.A. (1973) St. John's College; Ph.D. (1980) Princeton University. Research specialties: Computer technologies; military technology; social history of technology.

ELLIS, Janice S., Sr. Paper Conservator, NMAH, B.S. (1983) Rutgers College; M.S. with Advanced Certificate in Conservation of Books and Archives (1991) Columbia University; Research specailities: Archive and library

preservation and conservation, including: books, documents, art on paper, numismatics, philately, and photographic media.

DEPARTMENT OF HISTORY

The department's collecting units document the development of science, technology, society, and culture in the United States. Holdings are particularly strong in the areas of instrumentation, communications, machinery, manufacturing equipment, and manufactured products. Collections also focus on the everyday life of Americans, with specialties ranging from the material aspects of the home and workplace, to traditional folk arts and 20th-century popular culture, to the enrichment of the visual arts and music, to the political history of the country. In interpreting these artifacts – primarily through exhibitions, publications, and public programs – the emphasis has been on understanding the social and cultural contexts in which they were produced and used and their impact on American society.

AFFILIATED RESEARCH STAFF

BROUSSARD-SIMMONS, Vanessa, Archivist. B.A. (1981) University of Maryland; M.A. (1987) George Washington University. Research specialties: Advertising and business ephemera; preservation of archival materials.

DIVISON OF ARMED FORCES HISTORY

The division collects and documents the history of the armed forces of the United States from colonial times to the present through both material objects and graphic works, supported by archival and library resources.

Uniforms, Accoutrements, and Insignia

These collections contain uniforms, accoutrements, and insignia from the U.S. Army, Navy, Marine Corps, Army Air Corps, and Coast Guard. Uniform collections include such objects as: headgear, footwear, buttons, belts, field equipment, rations, and personal effects. Smaller sub-collections within this subject include U.S. women's uniforms, foreign uniforms, and ancillary service uniforms. Accoutrement collections include: holsters, slings, scabbards, bandoliers, and ammunition pouches and 500 pieces of horse equipment, mainly saddles. Insignia collections include: badges of rank, decorations, awards, and trophies.

Flags

The collections contain US national flags including the Star-Spangled Banner and U.S. Army, Navy, Marine Corps, Army Air Corps, and Coast Guard related flags. There is also a discrete foreign flag collection.

Firearms and Ordnance

This collection contains military and sporting long arms, military and civilian handguns, submachine guns, machine pistols, machine guns, grenade launchers, military and naval cannon, artillery and small arm ammunition, artillery and small arm accessories (ramrods, cleaning rods, and powder flasks) and edged weapons (swords, knives, and presentation pieces) and pole arms.

Arts and Graphics

These collections contain paintings, illustrations, posters (broadsides), and prints ranging from the 19th century to modern day. They cover a range of topics including battle scenes, recruitment drives, portraits, and depictions of uniforms. A majority of the collection deals with World War I military art.

Gunboat "Philadelphia"

A warship used by the Continental forces under General Benedict Arnold in the battle of Valcour Island on Lake Champlain in 1776. The ship was burned and sunk in the battle and raised in 1935. It came to the Smithsonian in 1960.

Japanese American Internment

This collection explored a period when racial prejudice and fear upset the delicate balance between the rights of the citizen and the power of the state. The 200 plus objects tell the story of Japanese Americans before, during, and after their internment between the years 1942-1945.

Numismatics

Include a spectrum of materials illustrating the historical development of money since early times. Particularly well-represented are coins and currencies from ancient Greece, the Far East, and Russia. The collection includes a vast amount of material on United States coins, medals, paper currencies, and script. The certified proofs of the U.S. notes are an excellent source of research for paper money experts.

September 11th Collection

The division houses the bulk, but not all, of the Museum's collections that relate to the September 11, 2001, attacks on the United States. In December 2001, the U.S. Congress made it the responsibility of the National Museum of American History to collect and preserve artifacts relating to the September 11th attacks on the World Trade Center, the Pentagon, and the Flight 93 Pennsylvania crash. The collection contains materials from all three sites.

RESEARCH STAFF

HACKER, Barton C., Curator. B.A. (1955 &1960), M.A. (1962), Ph.D. (1968) University of Chicago. Research specialties: Science, technology, and the military; comparative world military history; women's military history.

JONES, Jennifer Locke, Chair and Curator. B.A. (1985) George Washington University. Research specialties: Twentieth-century U.S. military history, Japanese Americans and World War II; World War II homefront; Vietnam Memorial and Vietnam war; U.S. National flags.

AFFILIATED RESEARCH STAFF

GOLDEN, Kathleen, Associate Curator. B.A. (1985) Rutgers University. Research specialties: Naval History, Naval and Military History Collections.

MILLER, David, Associate Curator. B.A. (1987), M.A. (1992) George Mason University. Research specialties: American War of Independence and Early National Period; firearms and edged weapons.

VINING, Margaret, Curator. B.A. (1979), M.A. (1981) George Washington University. Research specialties: Women's military history, military material as primary research resources, military art.

YEH, Cedric, Deputy Chair and Associate Curator. B.A. (1992) Brandies University; M.A. (1996) George Washington University. Research specialties: Collections Management; September 11th National collection, Japanese American Internment Era collections, Asian Pacific American History and Culture.

DIVISION OF CULTURE AND THE ARTS

The Division of Culture and the Arts dedicates itself to educating and inspiring its audiences by preserving and presenting their heritage.

The division carries out its mission through collections research, exhibitions, publications, teaching and lectures, performances, broadcasts, and other presentations. The areas of focus for some collections and programs are: music, dance, theater, film, broadcast media, sports, recreation, popular culture, photographic history, printing and the graphic arts.

RESEARCH STAFF

BOUDREAU, Joan, Curator. B.A. (1978) Boston College Certificate of Accomplishment U.S.D.A. Graduate School, Natural Field Studies (1986). Research specialties: History of printmaking; history of printing; environmental history; government printmaking & the American West.

BOWERS, Dwight Blocker, Curator, Entertainment History. B.A. (1978) Hiram College; M.A. (1981) University of Connecticut. Research specialties: American drama and theater history; musical theater history and performance; American film history; American popular music, 1900-1955; history of recorded sound especially American musical theater and popular vocalists; American popular culture.

HASSE, John Edward, Curator of American Music. B.A. (1971) Carleton College; M.A. (1975), Ph.D. (1981) Indiana University, Bloomington; Certificate in Business Administration (1981) Wharton School, University of Pennsylvania. Research specialties: Music in American culture, 1860-present; history of jazz, ragtime, rock, blues, soul, country, popular song, etc.; history of the recording industry and music business in America; Duke Ellington; music of New Orleans and the Mississippi River; children's songs; the canons of American music; American history through popular song; world jazz; music museums.

PERICH, Shannon Thomas, Associate Curator. B.A. (1993), B.F.A. (1993) University of Arizona; M.A. (1996) George Washington University. Research specialties: History of photography, snapshot and vernacular photography, history of digital photography, Richard Avedon.

SLOWIK, Kenneth, Curator and Artistic Director, Smithsonian Chamber Music. Performer's Certificate (1973) Mozarteum, Salzburg; B.M. (1976), M.M. (1977) Roosevelt University; D.M.A. (1996) Johns Hopkins University. Research specialties: Baroque, classical, romantic and early-20th-century performance practices; use of historical instruments in contemporary performances; French literature of the viola da gamba.

WRIGHT, Helena E., Curator. B.A. (1968) Bryn Mawr; M.L.Sc. (1975) Simmons College. Research specialties: Visual culture, including prints and photomechanical processes; history of print collecting; business history of American printmaking; women's work in graphic arts trades.

AFFILIATED RESEARCH STAFF

DELANEY, Michelle A., Director, Consortium for Understanding the American Experience. B.A. (1987) Manhattanville College; M.A. (1991) George Washington University. Research specialties: History of Photography, origins of the Smithsonian's photography collection, Daguerreian era photography and early color photography, photography of motion, Pictorialism and art photography, contemporary photojournalism, and Washington D.C. photographers.

HOOVER, Cynthia Adams, Curator Emeritus, Musical Instruments. B.A. (1957) Wellesley College; M.A.T. (1958) Radcliffe College; M.F.A. (1961) Brandeis University. Research specialties: Cultural, social, and technological

history of musical instruments, especially the piano, made and used in America; music in eighteenth- and nineteenth-century American life; interpretation of American material culture.

HUGHES, Ellen Roney, Curator Emeritus. B.A. (1965) Salve Regina University; M.A. (1991), Ph.D. (2001) University of Maryland. Research specialties: U.S. Social and Cultural History; Sport, Leisure and Physical Fitness History; Material Culture Studies; Museum Studies; Popular Culture.

JENTSCH, Eric, Associate Curator. B.A. (1993) St. Louis University; M.A. (1996) George Washington University. Research specialties: Pharmacy and consumer health products, psychology and psychiatry.

KLUCK, Stacy, Deputy Chair. B. Mus. (1982) Concordia College. Research specialties: Music and Musical Instruments, Sound Recordings, Entertainment, and collections care and management.

ROGERS, Jane, Associate Curator. B.A. (1986) University of Maryland. Research specialties: Fire fighting and rescue; sports and leisure, Popular Culture.

STURM, Gary K., Curator Emeritus. B.A. (1970) Beloit College jointly with University of Copenhagen. Research specialties: Violin family of musical instruments; American folk music and instruments.

SWEENEY, Melodie, Associate Curator. B.A. (1975) Mary Washington College; M.A. (1983) University of South Carolina. Research specialties: Bedcoverings and bed linens, woven coverlets, printed textiles 17th and 18th century, collections storage.

WEAVER, James M., Curator Emeritus and Founder Chamber Music Society. B.Mus. (1961), M.Mus. (1963) University of Illinois. Research specialties: Use of early instruments in present-day performance; keyboard performance practice.

DIVISION OF HOME AND COMMUNITY LIFE

The Division of Home and Community Life cares for, researches, and develops collections that represent the daily life of America's diverse population from the 17th to the 21st century. Subjects explored include home furnishings, food, clothing, domestic production, religion, community organizations, and patterns of migration and immigration. Childhood and the development of leisure time are examined, along with the roles technology and invention play in home and community life. The examination of these themes leads to a greater understanding of the American experience. The collections include ceramics and glass, textiles, domestic life, and costume, as well as the ethnic, education and religion collections of the former Division of Community Life. The staff shares its research and collections with the public through exhibitions, publications, lectures, and behind-the-scenes tours of its storage areas.

RESEARCH STAFF

DAVIS, Nancy Ellen, Curator. B.A. (1970) Russell Sage College; M.A.T.(1976), Ph.D. (1987) George Washington University. Research specialties: American material/visual culture; technologies in the home; Asian influence on American material culture; consumption and market studies; gender studies.

GREEN, Rayna D., Curator and Director of the American Indian Program. B.A. (1963), M.A. (1966) Southern Methodist University; Ph.D. (1973) Indiana University. Research specialties: American and American Indian food history and food ways; American and American Indian material culture; American Indian cultural history; American Indian agriculture; American Indian women; American folklife and popular culture.

RUFFINS, Fath Davis, Curator. B.A. (1976) Radcliffe College; A.B.D. (1976-79) Harvard University. Research specialties: African American history and culture; racial construction and ethnic identity; museum studies, historic preservation, exhibition development public history.

AFFILIATED RESEARCH STAFF

LILIENFELD, Bonnie, Deputy Chair and Curator. B.A. (1984) University of Chicago. Research specialties: Ceramics made, used, and marketed in the U.S. with an emphasis on late 19th and early 20th century; 20th-century public transportation (America on the Move exhibition); History of the Bracero program (1942-64).

VELASQUEZ, Steve, Associate Curator. B.A. (1994) University of Missouri; M.A. (1997) George Washington University. Research specialties: Latino identity and material culture, Latin American material culture; Latin American archaeology, Post Classic (Aztec) ceramics from Central Mexico.

YEINGST, William H., Chair and Curator. B.A. (1976) Allegheny College. Research specialties: American social history; household and family life with an emphasis on domestic furnishings.

DIVISION OF MEDICINE AND SCIENCE

The division preserves and interprets the rich material legacy of the biological, medical, and physical sciences.
Collections are:

Biological Sciences

Molecular biology and biotechnology instrumentation, special apparatus and instrumentation used for field and laboratory research and in classroom education, artifacts documenting the social and political history of biology, artifacts relating to the roles of women and minorities in science, and trade literature associated with these areas. The environmental history collection focuses on the material culture of the environmental movement and conservation.

Computers

Include electronic computers and related electronic devices, software, records, and ephemera that document in material form the evolution of computers and their pervasive effects on modern American society.

Mathematics

Include astrolabes, drawing instruments, slide rules, mechanical calculating machines, cryptographic instruments, geometric models, and other objects pertaining to mathematics and mathematics teaching, especially in the 19th and 20th centuries.

Medical Sciences

Crude drugs, patent medicines, biological, drug manufacturing apparatus and containers, laboratory equipment, eyeglasses, cardiac and other surgical instruments, artificial organs, dental equipment, microscopes, radiology apparatus, diagnostic instruments, quack medical devices, and veterinary medicines and equipment. There are growing collections related to the history of disability, alternative or complementary medicine, molecular medicine and genetic engineering, and public health. These are supplemented by trade catalogs, posters, advertising literature, business records, and audio-visual manuscript materials.

Modern Physics

Artifacts related to 20th-century physics, notably nuclear fission and its applications, subatomic particle accelerators and detectors, and atomic clocks.

Physical Sciences

Include apparatus of astronomy, chemistry, classical physics, meteorology, navigation, and surveying. Of particular importance are instruments used to explore, survey, and analyze the North American continent; instruments used for science education in American schools; and research apparatus from academic, government, and industrial laboratories. Trade literature supplements the collection.

RESEARCH STAFF

KIDWELL, Peggy Aldrich, Curator. B.A. (1971) Grinnell College; M.Phil (1974), Ph.D. (1979) Yale University. Research specialties: History of mathematical instruments and mathematics teaching.

OTT, Katherine, Curator. B.U.S. (1976) University of New Mexico; Ph.D. (1991) Temple University. Research specialties: History of the body, disability, ethnic and folk medicine, integrative and alternative medicine, ophthalmology, plastic surgery, dermatology, medical technology, prosthetics and rehabilitation, sexuality; visual and material culture, ephemera.

STINE, Jeffrey K., Chair and Curator. B.A. (1975), M.A. (1978), Ph.D. (1984) University of California, Santa Barbara. Research specialties: Environmental history; history of science and technology policy.

WARNER, Deborah J., Curator. B.A. (1962) University of Chicago; M.A. (1963) Harvard University. Research specialties: History of scientific instruments; history of celestial cartography; women in science and technology.

AFFILIATED RESEARCH STAFF

CHELNICK, Judy M., Associate Curator. B.A. (1976) William Smith College; M.A. (1979) Case Western Reserve University. Research specialties: History of medicine and dentistry, particularly the history of surgical instrumentation, the history of cardiology, bionics, neonatology and the Bristol-Myers Squibb 18th Century Apothecary.

FORMAN, Paul, Curator Emeritus. B.A. (1959) Reed College; M.A. (1962), Ph.D. (1967) University of California, Berkeley. Research specialties: Historical development of physics in the 20th century, and intimations of its development in the 21st in consequence of the transition from the modern to the postmodern era.

SEEGER, Ann M., Deputy Chair. B.S. (1975) Catholic University of America. Research specialties: Science education, in fields of biological sciences and chemistry.

SHERMAN, Roger Essleck, Associate Curator. B.A. (1979) Yale University. Research specialties: History of physics, especially experiments, instruments, and apparatus.

TURNER, Steven, Curator. B.S. (1976) University of Nebraska. Research specialties: History of astronomy; history of physics; science education.

WENDT, Diane, Associate Curator. B.A. (1982) College of William and Mary. Research specialties: History of Pharmacy and Public Health: including materia medica, patent medicines, health and hygiene products, pharmaceutical manufacturing, and drug advertising.

DIVISION OF POLITICAL HISTORY

The Division of Political History is dedicated to the study of American democracy and the material culture that has shaped its history. The division gives particular attention to the political principles, practices and institutions that have shaped the political culture of the United States. The division focuses on political relationships between groups and interests, institutions of government, and changing practices of representative and participatory democracy in a nation of diverse people and cultures.

The division is especially interested in changing definitions of citizenship and political rights; contested political ideologies; governmental policies and their impact; the role of political parties; elections; protest and reform movements; varied and changing expressions of nationalism; predictive opinion and media effects; and traditional political techniques and forms of communication.

The collections document the history of American democracy and the nation's political culture from colonial settlements to the present. The collection is divided into four major areas:

Political Campaign Collection

The Political Campaign Collection is the largest holding of presidential campaign material in the United States and includes banners, signs, campaign ephemera, novelties, documents, photographs, voter registration material, ballots, and voting machines.

General Political History Collections

The General Political History Collections includes personal and ceremonial objects associated with the presidency, White House, and first ladies; inaugural items; material associated with national political figures and events; home front and civil defense material; national symbols, and items related to government policies and organizations.

Reform Movements Collections

The Reform Movements Collections includes material that documents women's history and suffrage, civil rights, labor history, and groups and individuals that have organized and demonstrated around political, social, economic and international issues throughout American history.

RESEARCH STAFF

BIRD, William L., Curator. B.A. (1973) University of Maryland; M.A. (1975) University of Arizona; Ph.D. (1985) Georgetown University. Research specialties: Twentieth-century political campaign promotion and advertising.

GRADDY, Lisa Kathleen, Deputy Chair and Curator. B.A. (1985) University of Maryland; M.A. (1987) Texas Tech University. Research specialties: Women's History Collection, Political History Collection, First Ladies Collection.

RAND, Harry, Senior Curator. B.A. (1969) City College of New York; M.A. (1971), Ph.D. (1974) Harvard University. Research specialties: Cultural assumptions in the material culture of fine arts of the twentieth-century in America and Europe; religion's cultural expression in theology & sustainable architecture; the methodology of art history.

RUBENSTEIN, Harry R., Chair and Curator. B.A. (1974), M.A. (1979) University of New Mexico; M.A. (1983) George Washington University. Research specialties: Labor history; American social history; U.S. political history.
SMITH, Barbara Clark, Curator. B.A., M.A. (1973) University of Pennsylvania; Ph.D. (1983) Yale University. Research specialties: Social, cultural, and political history of early America; American Revolution; women's and gender history; public history, theory and practice.

DIVISION OF WORK AND INDUSTRY

The division collects the material culture of American industry and interprets it in relation to the country's social and cultural history. Our collections, exhibits, public programs, research and writing put America's agricultural, business, economic, engineering, industrial, and transportation heritage into historical context to better understand and explain technology and American history, society and culture. The major collection areas are:

Agriculture and Natural Resources Collections

These collections include agricultural machinery; food processing technology and food packaging containers; mining, especially coal mining; petroleum; fisheries including whaling.

Industrial History Collections

These collections focus on machines for working metal and wood, and the industrial context that makes sense of those machines; process control devices; robotics; material related to industrial management, including images taken by Frank and Lilian Gilbreth for scientific management studies; miscellaneous industrial machinery and products.

Engineering History Collections

These collections include prime movers, steam and gas engines and wind and water power devices, and many models and toys; extensive archival, model and photographic collections relating to civil engineering works, including bridges, tunnels, buildings and railroad rights-of-way.

Electricity

These collections preserve and explore the history of electrical science and technology. Holdings include electrostatic devices; lamps, generators, meters and other power system components; communications technology such as telegraphy, telephony, magnetic recording, radio, and television; and masers, lasers, transistors and chips.

Mechanisms Collections

These collections comprise watches and clocks (European and American); typewriters; mechanical phonographs; experimental phonograph records; and locks.

Transportation Collections

These collections include automobiles, trucks, and motorcycles, bicycles and animal-drawn vehicles; automobile accessories, highway and travel objects, and other road transportation objects; rigged and half-hull ship models; more than 7,000 ship design plans; large collections of photographs, scrimshaw, and marine paintings; locomotive models and a small number of full-scale railroad cars and locomotives; and archival materials relating to rail transportation.

RESEARCH STAFF

JOHNSON, Paula J., Curator. B.A. (1976) Gustavus Adolphus College; M.A. (1981) University of Texas, Austin. Research specialties: American maritime history and folklore; Chesapeake Bay maritime history; North American fisheries and fishing communities; boats and boatbuilding; American food and wine history.

JOHNSTON, Paul F., Curator. B.A. (1972) Middlebury College; Ph.D. (1981) University of Pennsylvania. Research specialties: Maritime history, marine art and nautical archaeology of the United States and worldwide; automobiles and motorcycles.
LIEBHOLD, Peter, Chair, Division of Work and Industry. B.F.A. (1980) Maryland Institute College of Art. Research specialties: Culture of work, management practice, manufacturing technology, methods and motivations of technological change, immigration and migration, visual culture.

STEPHENS, Carlene, Curator. B.A. (1971) Muhlenberg College; M.A. (1976) University of Delaware. Research specialties: History of time in the United States.

TOLBERT, Susan, Deputy Chair. B.S. (1974) Longwood College. Research specialties: Office collections, transportation collections, early suburban development and transportation.

WALLACE, Harold, Associate Curator. B.A. (1982), M.A. (1994), Ph.D. (in progress) University of Maryland, Baltimore County. Research specialties: Electric light and power; electrical communication technology; electrical science.

WHITE, Roger, Associate Curator. B.A. (1975) University of Maryland, Baltimore County; M.A. (1977) University of Delaware. Research specialties: Social history of the automobile; automobile design and manufacturing; travel and tourism.

WITHUHN, William L., Curator Emeritus. M.B.A. (1977), M.A. (1980) Cornell University. Research specialties: Relationships of railroads to the social history of the United States; twentieth-century railroad vehicle design; and the economic and technological history of the automobile.

ARCHIVES CENTER

The Archives Center supports the mission of the National Museum of American History by preserving and providing access to documentary evidence of America's past. The Archives Center's collections complement the Museum's artifacts and are used for scholarly research, exhibitions, journalism, documentary productions, school programs, and other research and educational activities.

More than 100 Archives Center collections occupy more than 20,000 fee of shelving in the American History building and in offsite storage locations. In addition to paper-based textual records, many Center collections contain photographs, motion picture films, videotapes, and sound recordings.

The collections are particularly strong in the areas of technology, invention and innovation, advertising, and American music. The Archives Center's holdings support research into a wide range of historical topics and themes. Examples include the roles and activities of American women, cultural depicture and ethnic imagery, consumer culture, and popular expression.

RESEARCH STAFF

HABERSTICH, David E., Curator of Photography. B.F.A. (1963) Rochester Institute of Technology; graduate study in art history (1963-64) Indiana University; M.L.A. (1970) Johns Hopkins University. Research specialties: History of photographic art and technology; conservation of photographs; history of twentieth-century art, especially Dada, Futurism, and Surrealism; history of documentary photography; history of Smithsonian photographic collections.

AFFILIATED RESEARCH STAFF

FLECKNER, John A., Senior Archivist. B.A. (1963) Colgate University; M.A. (1965 & 1970) University of Wisconsin. Research specialties: Archives administration; archives education.

KEEN, Catherine, Archivist. B.A. (1978) George Washington University. Research specialties: History of Washington, D.C.; history of technology collections, collections on history of sports.

ORR, Craig A., Archivist. B.A. (1980), M.A. (1984) University of Delaware. Research specialties: Archives; history.

RICHARDSON, Deborra A., Archivist (Chair). B.Mus. (1977) Howard University; M.L.S. (1979) University of Maryland. Research specialties: Early twentieth-century African American music; Duke Ellington; African American music and research collections; archives administration; sheet music.

ROBINSON, Franklin, Jr., Archives Specialist. B.FA. (1981) The Catholic University of America, M.A. (1988) American University. Research specialities: Popular culture, performing arts, agriculture, colonial Mid-Atlantic, LGBT.

SHAY, Wendy, Audio-visual Archivist. B.A. (1976) Indiana University; M.A. (1983) Cooperstown Graduate Programs, State University College, Oneonta, New York. Research specialties: Moving image archives administration; moving image preservation techniques; visual anthropology.

THE JEROME AND DOROTHY LEMELSON CENTER FOR THE STUDY OF INVENTION AND INNOVATION

The Center was established in 1995 to document, interpret, and disseminate information about invention and innovation, to encourage inventive creativity in young people, and to foster an appreciation for the central role invention and innovation play in the history of the United States.

Through oral and video history interviews, the Center chronicles the work of living inventors in many areas, from music to microelectronics to carpentry. Information about these and other collections at NMAH relating to invention is available on the Center's home page (http://invention.smithsonian.org) and a Center database tracks papers and records of modern inventors around the country. The Center runs symposia and conference on topics relating to invention and society and fellowships and student interns further increase both the base of knowledge on invention and accessibility to it. The Center also sponsors programs for school-age children to inspire them not only to learn more about invention and inventors but to tap their own creativity in new ways.

RESEARCH STAFF

BEDI, Joyce E., Senior Historian. B.A. (1977) Northeastern University; M.A. (1983) James Cook University. Research specialties: History of technology, invention, photography.

BRODIE, Jeffrey L., Deputy Director. B.A. (1991) University of California, Berkeley; M.A. (1993) University of Connecticut; Ph.D. (2005) George Washington University. Research specialties: United States History, American Revolution, early National Period.

FRITZSCH, Laurel, Curator, B.A. (2004) Lawrence University; M.A. (2007) University of Leicester. Research Specialties: Stigmatized sub-cultural groups

HINTZ, Eric S., Historian. B.S. (1996) University of Notre Dame; M. A. (2005), Ph.D. (2010) University of Pennsylvania. Research specialties: history of 19th and 20th-century science and technology; invention, innovation, and R&D; U.S. business and economic history; science, technology, and religion.

MOLELLA, Arthur P., Director. B.A. (1965) Syracuse University; M.A. (1968), Ph.D. (1972) Cornell University Hon DSc. Westminster University, London. Research specialties: Science, technology, and society in the U.S.; process of invention; technology and modernism; technology and urban planning.

SMITH, Monica M., Exhibition Program Manager. B.A. (1992) Pomona College. Research specialties: 19th and 20th century American invention, including invention and development of the electric guitar; relationship among invention creativity, and play, and the inventive process.

AFFILIATED RESEARCH STAFF

KARVELLAS, Anna. Places of Invention Web and Affiliates Project Coordinator. B. A. (1992) University of Michigan with Highest Honors. Research specialties: arts and culture, including the history and evolution of American roots music; William Steinway and Steinway & Sons; history of the physical and cultural development of New York City, particularly urban planning in Western Queens; the relationship between geography, natural and man-made resources, and community in hot spots of invention.

OSWALD, Alison L., Archivist. B.A. (1989) St. Bonaventure University M.S. (1992) Ball State University M.L.S. (1994) State University of New York. Research specialties: American inventors and history of technology, science and health care related collections.

SMITHSONIAN INSTITUTION LIBRARIES IN NMAH

Dibner Library of the History of Science and Technology

The Dibner Library of the History of Science and Technology has major holdings of rare materials in the history of science and technology, with over 35,000 rare books dating from the 13th to the 20th centuries. Established in 1976 as the first rare book library of the 20-branch Smithsonian Institution Libraries' system, the facility is located on the first floor of the Museum. The strengths of the Dibner Library's collections are in the fields of mathematics, astronomy, classical natural philosophy, theoretical physics (up to the early twentieth century), experimental physics (especially electricity and magnetism), engineering technology (from the Renaissance to the late nineteenth century), and scientific apparatus and instruments. The rare books include significant holdings of works by Galileo Galilei, Johannes Kepler, Euclid, Carl Friedrich Gauss, Leonhard Euler, René Descartes, Pierre Simon, marquis de Laplace, Aristotle, and many others. Scientists represented by significant holdings in the 1,800 manuscript-group collection include Dominique François Arago, Humphry Davy, John William Lubbock, Isaac Newton, Henri Milne-Edwards, Hans Christian Ørsted, Henry Hureau de Sénarmont, Benjamin Silliman, Jr., and Silvanus P. Thompson. Other collections of note in the library include nearly 2,000 volumes on world's fair and exposition materials, (ca. 1850-1920). More information about the Library and its collections can be found on its home page: **http://library.si.edu/libraries/dibner**

The Smithsonian Institution Libraries encourages independent research projects by Smithsonian fellows and short-term visitors, and currently offers three resident scholar programs. The Dibner Library Resident Scholar Program annually offers support for individuals working on a topic relating to the history of science and technology collections in the Dibner Library. The Baird Society Resident Scholar Program offers support for research in certain other special collections throughout the SI Libraries including the World's Fairs Collection. The Margaret Henry Dabney Penick Resident Scholar Program supports scholarly research into the legacy of Patrick Henry and his political circle, the early political history of Virginia, the history of the American Revolution, founding era ideas and policy-making, as well as science, technology, and culture in colonial America and the Early National Period. For further information on these programs please visit the Libraries' Research & Internships: http://library.si.edu/about/internships-and-fellowships.

American History Branch, Smithsonian Institution Libraries

The National Museum of American History Branch Library, part of the Smithsonian Institution Libraries system, is a notable research library covering broad aspects of American social, cultural, political, economic, and technological history. The Library is available for use by researchers and fellows at the Museum. The Library also encourages independent research projects by Smithsonian Fellows or Short-Term Visitors using one of the Library's most remarkable collections: some 500,000 items of trade literature representing an estimated 30,000 companies which describe and advertise products of American business, industry, agriculture, and the decorative arts. The collection includes advertising brochures, technical manuals for manufacturers and repair shops, instruction manuals for consumers, mail order catalogs, pattern and design books, price lists, parts lists, factory record books, and company histories. Another collection, the World's Fairs and Expositions, is a collection of published international exposition and world's fair materials, strongest in the period from the early fairs of the mid-nineteenth century up to the First World War. It is available on microfilm and arranged by fair name. Access to specific reels is possible using the SILs' publication, The Books of the Fairs (1992) or through its online catalog. Projects could encompass the study of industrial development, consumer trends, marketing techniques, and social history. More information about the library and its collections can be found on its home page (http://www.sil.si.edu/libraries/nmah/).

NATIONAL MUSEUM OF THE AMERICAN INDIAN

Kevin Gover, Director

In 1989, the National Museum of the American Indian (NMAI) was established by an Act of Congress transferring the distinguished collections of the Museum of the American Indian, Heye Foundation, to the Smithsonian Institution. The mission of the museum is to advance knowledge and understanding of Native cultures of the Western Hemisphere—past, present, and future—through partnership with Native people and others. The museum works to support the continuance of culture, traditional values, and transitions in contemporary Native life.

As a source for research, the National Museum of the American Indian offers not only one of the largest and most comprehensive collections of Native American objects in the world, but also significant archival, photograph, and film and video collections. The museum's research programs are essential to its operation. The professional staff is concerned with exhibitions, public programs, and educational programs as well as collections research and other curatorial duties. Discus-sions, seminars, and symposia support the exchange of ideas among national and international researchers and the general public. Publication opportunities are available through exhibition and collection-related catalogues as well as scholarly books that explore the history and significance of Native cultures and offer Native perspectives.

To compliment its research programs, the museum offers educational opportunities, interpretive programming, and hands-on workshops for the general public, families, and school groups at facilities in Washington, D.C., and New York City. NMAI's Education Office offers professional development for educators, and creates teaching materials for classroom use. The museum's Cultural Arts programming provides opportunities for visitors to experience the living arts, lives, and con-cerns of Native peoples through performances by artists, musicians, dancers, actors, writers, and storytellers as well as film and video programs. NMAI's Film and Video Center (FVC), located at the George Gustav Heye Center in New York orga-nizes the biennial Native American Film and Video Festival, one of the country's longest-running Native film festivals. The FVC's bilingual (English/Spanish) website, www.nativenetworks.si.edu, offers a wealth of information about Native media.

In addition to the Smithsonian fellowships, NMAI provides educational opportunities through its own internship and fellowship programs. These programs are designed for students interested in the museum profession and related program-ming. They offer exceptional guided work and/or research experience using the resources of NMAI. Placements can be made at any of the museum's three facilities. To learn more about these opportunities or to apply, please visit our website, www.AmericanIndian.si.edu.

Facilities

The George Gustav Heye Center (GGHC), located in the historic Alexander Hamilton U.S. Custom House in New York City, opened to the public in 1994. The GGHC hosts exhibitions, music and dance performances, films, and symposia. It also houses the museum's internationally recognized Film and Video Center.

The Cultural Resources Center (CRC), a state-of-the-art facility in Suitland, Maryland, houses the more than 800,000 objects in the museum's collections and serves as a hands-on research center for Native and non-Native visitors.

The museum on the National Mall, opened to the public in 2004, in Washington, D.C., is the museum's major exhibition space—offering three floors of permanent and changing exhibitions. The building is also a center for performances, films, special events, and educational activities.

Collections

The NMAI's collections holdings total approximately 1 million items, organized as four major collection categories. While discrete, the collections are intertwined: each contains items that refer to and document one another: the Photo and Media Archives include images of NMAI objects in use in Native communities or in

excavation contexts and the Paper Arc-hives includes fieldnotes and accompanying documentation for all aspects of the collection.

Object Collections (more than 840,000 items represented by 270,000+ catalogue numbers), divided into Archaeology, Ethnology, and Modern and Contemporary Arts. The collections represent all major culture areas of the Americas and almost all tribes of the United States, most of those from Canada, and a smaller number from Mexico, Central and South America, and the Caribbean. Chronologically, the collection includes artifacts from the Paleo-Indian period to contemporary art. Object types range from the strictly utilitarian to masterworks of Native American art. Many are of great historical or aesthetic importance.

Photographic Archives (approximately 324,000 images) document nearly all aspects of Native American life from the mid-nineteenth century to the present as well as images document Museum of the American Indian and NMAI events, exhibits, staff research, expeditions throughout the hemisphere, repatriations, and behind-the-scenes work.
Media Archives (approximately 12,000 items) document Native American life in North, Central, and South America; NMAI events, exhibits, behind-the-scenes work, and objects; Native-produced media created from the late 1800s through the present. The collections include museum production materials, including raw footage, finished productions, research record-ings, and recordings of NMAI events.

Paper Archives (1522 linear feet of records) date from the 1860s to the present preserve the documentary history of the NMAI, its predecessor, the Museum of the American Indian, Heye Foundation (MAI), and their collections as well as other materials, including the organizational papers of the National Congress of American Indians (NCAI) and related papers.

Museum Scholarship Group

The Museum Scholarship Group (MSG) conducts original research for scholarly publication and public dissemination, exhibitions, and educational programming and provides museum staff with substantive factual and culturally appropriate information in the multidisciplinary field of American Indian studies. The disciplines of history, geography, and art provide cohesion and context for the museum's diverse programming. In keeping with the museum's unique mission, research focus-es on Indigenous perspectives, and includes active and reciprocal engagement with indigenous communities to ensure that research is not only balanced and equitable, but also empowers Indigenous peoples to exercise authority over their own cul-tural expression.

Staff undertakes research on NMAI collections, material culture, museum history and interpretation, research and collaborative methodologies, individuals associated with the collections, and other subjects. The museum seeks to coordinate the overall improvement and enhancement of all NMAI collections information, set and maintain information standards, and make collections information accessible to staff and all external constituents.

In 2008, within the Museum Scholarship Group, NMAI established an Office for Latin America (OLA) to effectively direct and coordinate NMAI skills, expertise, and efforts in support of work with Latin American Indigenous communities and research, public programs, repatriation efforts and collections study related to Latin America. OLA coordinates Latin American initiatives and projects and guides these efforts toward increased effectiveness through relations with governmental authorities, indigenous community civil authorities, and culture-bearing leaders in indigenous communities.

Also part of the Museum Scholarship Group, the Repatriation Office, formed in response to the National Museum of American Indian Act (Public Law 101 185), handles repatriation requests; coordinates community visits; prepares research reports; and makes recommendations regarding repatriation and deaccession to the Board of Trustees. The goal of the museum's repatriation policy is to support the continuation of ceremonial life among Native peoples; to foster and support the study by Native peoples of their own traditions; and to forge

consensus between the museum and Native communities while accounting for and balancing the interests of each.

RESEARCH STAFF

ADAMS, James Ring, Senior Historian. B.A (1966) Yale College; Ph.D. (1983) Cornell University. Research specialties: Contact period and impact on European political theory, as determinant of subsequent legal and ideological framework for interaction with Native population; Emphasis on 16th century Spanish debate culminating in Valladolid disputation; 17th century English religious and economic exploitation culminating in John Locke; 18th century French narratives culminating in Jean-Jacques Rousseau.

ASH-MILBY, Kathleen E., Associate Curator. B.A. (1991) University of Washington; M.A. (1994), University of New Mexico. Research specialties: Contemporary Native American art with an emphasis on non-traditional art forms including new media, painting, sculpture, installation and photography.

BARREIRO, Jose Eugene, Assistant Director for Research. B.A. (1988) University of Minnesota; M.A. (1990) State University of New York; Ph.D. (1992) State University of New York, Buffalo. Research specialties: Indigenous Caribbean Legacies; Indigenous Culture-based development; American Indian Contemporary Issues.

FELDMAN, Carrie Lynn, Research Specialist. B.A. (1996) Georgetown University; M.A. (2004) George Washington University. Research specialties: Repatriation.

GANTEAUME, Cécile R., Associate Curator. B.A. (1979), M.A. (1994) New York University. Research specialties: North American ethnology and material culture, especially Apachean and Southeastern material culture; MAI-HF and NMAI ethnographic collections history; symbolic anthropology.

HER MANY HORSES, Emil, Associate Curator. B.A. (1979) Augustana College; (1995) Loyola University, Chicago. Research specialties: Northern Plains Tribal Arts.

HERMAN, Douglas, Senior Geographer. B.A. (1983) Dartmouth College; M.A. (1988), Ph.D. (1995) University of Hawaii, Manoa. Research specialties: Indigenous Geography, Native Science, Spiritual Ecology, Environmental Issues, Colonialism, Hawaii and Pacific Islands.

HIRSCH, Mark, Researcher. Ph.D. (1984) Harvard University. Research specialties: 19th and 20th century social and cultural history; U.S. Indian policy; Native American perceptions of time, work, and leisure.

MATOS, Ramiro, Museum Specialist. B.A. (1959), Ph.D. (1962) University of San Marcos. Research specialties: South American archaeology; Andean archaeology, ethnology, ethnohistory, and cultural continuity; Inka culture and ethnohistory; grassroot community development in the Peruvian central highlands.

McMULLEN, Ann, Curator. B.A. (1981) Dartmouth College; M.A. (1990), Ph.D. (1996) Brown University. Research specialties: Native American ethnology, history, and material culture; ethnohistory; indigenous historiography; history of museums; history of ethnographic research and collecting; 20th-century Native American art/craft; invention of tradition/cultural revitalization; ethnicity, identity, and material culture.

SEIG, Lauren, Research Specialist. B.A. (1991) University of Florida; M.A. (1996) University of Illinois, Urbana-Champaign. Research specialties: U.S. archaeology, repatriation.

SMITH, Paul Chaat, Associate Curator. (1973) High Point High School. Research specialties: Popular culture, museums, 1970s U.S. political activism, romanticism, contemporary art, photography, history.

TAYAC, Gabrielle, Historian. B.A. (1989) Cornell University; A.M. (1993), Ph.D. (1999) Harvard University. Research specialties: Chesapeake Region Native American Societies; Indigenous Social Movements; Museum Education; Sociology of Religion; Ethnic Identity

VIDAURRI, Cynthia L., Folklorist. B.A. (1979) University of Texas; M.A. (1991) Texas A&I University. Research specialties: Cuban, Mexican, and Mexican-American/Chicano folklore; U.S. - Mexico borderlands; traditional medicine, religious folk art; ranching culture;folk religion; cultural/heritage tourism.

AFFILIATED RESEARCH STAFF

STARR, Sandra, Research Specialist. B.A. (1968) Florida State University; M.A.(2002) University of Florida. Research specialties: American Indian art and history, providing primary sources for content for museum programs, education and exhibitions with subjects in general.

TRAUTMANN, Rebecca, Reseach Specialist. B.A. (1996) University of Texas, Austin. Research specialties: Modern and contemporary Native American art; Plateau baskets.

Museum Assets

Collections Management

Research areas and interests of the Collections Management Office include compiling and maintaining collections information; controlling and monitoring environments; traditional care and handling of Native art and objects; packing and moving collections; location control; collections management databases; and the management of rights and permissions.

Conservation

Conservation staff care for NMAI's collections and actively pursue research related to the collection, preservation, study, and exhibition of Native American objects. Ongoing research focuses on: testing and evaluating materials for storage, packing, exhibition casework, and mounts; identifying hazards in NMAI's collections and developing mitigation strategies; providing material analysis on items related to NMAI's collections; identifying new technologies for preservation and treat-ment of collections; and developing strategies for training conservation students that incorporate collaborative approaches to conservation.

RESEARCH STAFF

HEALD, Susan, Senior Textile Conservator. B.A. (1985) George Washington University; M.S. (1990) Winterthur Museum/University of Delaware Art Conservation Program. Research specialties: Conservation of ethnographic textiles and clothing, fiber identification, structural analysis of textiles, methods of fabrication, methods for storing and exhibiting textiles and clothing.

KAMINITZ, Marian, Head of Conservation Department. B.F.A. (1979) California College of Arts and Crafts; B.A. (1981), B.S. (1981) University of Tennessee, Knoxville; M.S. (1984) Winterthur Museum/University of Delaware Art Conservation Program. Research specialties: materials and techniques of manufacture, feathers, basketry, fibers, hides, sinew; conservation decision making with indigenous communities, new technologies for collections preservation and treatment, conservation training strategies incorporating collaborative approaches.

KAPLAN, Emily, Objects Conservator. B.A. (1984) University of Massachusetts; M.A. (1993) Queens University, Kingston, Canada. Research specialties: Materials and technology of archaeological and ethnographic objects of the Americas, particularly Andean region.

MCHUGH, Kelly, Objects Conservator. B.A. New York University, M.A. New York University. Research Specailties: Collabrative conservation, caring for contemporary art collection

NATIONAL MUSEUM OF NATURAL HISTORY

Kirk Johnson, Sant Director

Established in 1910, the National Museum of Natural History (NMNH) has grown to become the Smithsonian's largest museum and research unit, and today it is one of the world's premier scientific institutions as well as one of the most visited museums in the world–attracting more than seven million visitors a year, with millions more visiting online. The Museum's mission is to increase knowledge and inspire curiosity, discovery, and learning about nature and culture through outstanding research, collections, exhibitions, and education, in support of a sustainable future.

Steward of the largest natural history collections in the world, NMNH holds more than 127 million specimens and cultural objects that document the history and formation of Earth, the diversity and evolution of life on the planet, and our shared human heritage. These collections are an unparalleled resource for the study and understanding of the natural world and our place in it. Every year, we welcome thousands of national and international researchers to our headquarters in Washington, DC and to our satellite facility– the Museum Support Center –in Suitland, MD, who use the collections to address a variety of research questions pertaining to geology, paleontology, biology, and anthropology, as well as other interdisciplinary fields. And at any given time, over two million specimens are on loan to universities and research centers worldwide. Cited in more than 1,200 scientific publications annually, the Museum's collections are the foundation of our research and educational programs, and their relevance to science and society continues to grow as new technologies are applied to their study and analysis. Broadening access to the collections is a key priority for the Museum, and several digitization efforts are underway to make them more readily available online to the international science community, policy-makers and the public at large.

The Museum's research activities focus on three broad themes: (i) the Formation and Evolution of the Earth and Similar Planets, (ii) the Discovery and Understanding of Life's Diversity, and (iii) Human Diversity and Cultural Change. Within these themes, described below, the scope of our work is as varied as the interests of our scientists, whose explorations and inquiries take place on every continent, in more than 80 countries, and range from the depths of the ocean to the outer regions of space. The Museum is currently organized into seven departments: anthropology, botany, entomology, invertebrate zoology, mineral sciences, paleobiology and vertebrate zoology. We work on questions and issues often too complex for any one institution to solve alone and therefore collaborate with museums, universities and research centers across the United States and the world, as well as with national government agencies such as the United States Departments of Agriculture, Defense, Commerce, the Interior, and other federal and state agencies. We also support a large and vibrant academic community, including scientists from affiliated government agencies based at the Museum, external researchers, interns and fellows. The results of our research – as well as that of others using our collections – are made available not only through scholarly papers and books, but also through exhibitions, symposia, courses, lectures, workshops, and numerous Web sites.

Science Collection Profile

Total Specimen Count: 127.2 million
Number of Types: 874,878
Annual New Acquisitions: 236,325
Specimens Loaned: 2.8 million

In addition to advancing its core research themes, the Museum is also working to advance the six priority initiatives, which integrate our research, collections and outreach activities. Each of the six represents an area that has special relevance and urgency to society, where the Museum has a comparative advantage, and where we are poised to make substantial progress over the next decade. Designed to be long-term and transformational for the Museum, they build on our strengths and will expand our partnerships within the Smithsonian and with external collaborators.

Aligned with our efforts to expand and preserve our natural history collections and make them more broadly accessible, and to continue making fundamental contributions to our knowledge and understanding of nature and culture, is our commitment to the training of future generations of scientists and museum professionals. Every year we offer several professional development and training opportunities for national and international students

and researchers–from internships for high school and undergraduate students to conduct research under the mentorship of Museum scientists, to fellowships for pre-and postdoctoral students, as well as other professionals, to pursue independent research topics. By cultivating and supporting a vibrant, diverse and inclusive academic community we aim to play a critical role in building scientific capacity to deepen our understanding of Earth processes, biodiversity and evolution, as well as our origins and cultural diversity, and to advance knowledge that can help us to make more informed decisions about the management of our planet.

Office of the Director

RESEARCH STAFF

CODDINGTON, Jonathan, Associate Director for Research and Collections. B.A. (1975) Yale; M.A. (1978), Ph.D. (1984) Harvard University. Research specialties: Systematics and behavior of spiders; species richness estimation; theory and design of biological inventories.

HAYEK, Lee-Ann, Chief Mathematical Statistician and Senior Research Scientist. A.B. (1965) Emmanuel College; Ph.D. (1978) University of Maryland. Research specialties: Mathematical statistical modeling and scientific problem solution for complex biological and environmental systems. Subspecialties in quantitative and statistical field ecology / paleoecology/ biological diversity, especially marine.

JOHNSON, Kirk. Sant Director. A.B. (1982) Amherst College; M.S. (1985) University of Pennsylvania; Ph.D. (1989) Yale University. Research specialties: Cretaceous paleogene; paleobotany, stratigraphy, geochemistry.

KNOWLTON, Nancy, Sant Chair in Marine Sciences. A.B. (1971) Harvard University; Ph.D. (1978) University of California, Berkeley. Research specialties: Systematics, evolution, ecology and behavior of marine invertebrates, particularly shrimps and corals, marine biodiversity, systematics, evolution, conservation.

NMNH Research Programs

Arctic Studies Center: Millennium of Change (http://www.mnh.si.edu/arctic/)

The program investigates the effects of environmental change on several circumpolar regions, including Alaska and Labrador. Research foci include: the impacts of climate change, the extension of the Labrador current and its influence on Inuit culture distribution and research on the responses of modern indigenous groups to the changing Arctic environment. Contact: William Fitzhugh

Biodiversity of the Guiana Shield (http://botany.si.edu/bdg/index.html)

The Guiana Shield (the Shield) is a distinct geologic region that is biologically extremely rich but remains poorly known. Because it is an ancient, fairly isolated geological area, the Shield has high endemism and many undescribed taxa. Approximately 60-70% of the natural habitat of the Shield remains pristine but these natural areas are now seriously threatened. An understanding of the Shield biota must be gained in order to inform conservation decisions and to address current issues such as climate change. BDG is based in the Department of Botany but is an interdepartmental and inter-unit (across the Smithsonian) program with worldwide collaborators. Contact: Vicki Funk

Evolution of Terrestrial Ecosystems (http://www.mnh.si.edu/ETE/)

Understanding the structure, function and dynamics of ecological communities is a central goal of ecology. Paleobiologists are engaged in parallel efforts to reconstruct paleocommunities using associations of fossil plants and animals. ETE is building on over 20 years of observation, documentation, and interpretation of ecological patterns in the terrestrial fossil record, especially those relating to major periods of global change, to develop a common “currency” between recent and deep time community ecology. Contact: Anna K. Behrensmeyer

Frontiers in Phylogenetics

The long term goal of this program is to create a world-leading center for research and training in all aspects of phylogeny reconstruction and its applications in biology, medicine and agriculture. Frontiers is partnering with SI and UMD informatics experts to provide NMNH phylogeneticists with the advanced informatics infrastructure needed for next-generation phylogenetics, including hardware and software support for managing terabyte-scale data sets, and grid-based supercomputing power for analyses. Contact: Michael Braun and Sean Brady

The New Global Volcanism Program (http://www.volcano.si.edu/)

The mission of the new Global Volcanism Program is to understand global patterns in volcanology in space and time, and to meet the needs of the next generation of volcanologists. Volcanoes take the pulse of the Earth, indicating an energetic environment beneath the surface that can nurture life – or destroy it. The data systems that lie at the core of this program will drive three central research questions in coming years: (1) What do volcanoes reveal about Earth's mantle? (2) How can volcanic hazards be quantified, modeled, and predicted? and (3) Can we recognize new patterns in global volcanism by integrating physical eruptive data with the chemistry of erupted products? The new GVP will build and maintain new geoinformatics tools that will directly facilitate research efforts. Contact: Elizabeth Cottrell

Program in Human Ecology and Archaeobiology (http://anthropology.si.edu/archaeobio/)

The Program in Human Ecology and Archaeobiology (PHEA) is an integrated research, collections, and education program focused on understanding ancient and more recent human-environmental interactions around the world. Research on the ecological and behavioral context of plant and animal domestication and the origins of agriculture is a central focus of PHEA, as is documenting how past human societies have adapted to and shaped a range of different ecosystems world-wide. Contact: Torben Rick

NMNH Priority Initiatives

Deep Time Initiative

Understanding Impacts of Environmental Change on the Evolution of Life on Earth

Humans are now altering the life-support systems of the entire planet, marking a unique moment in Earth's 4.56-billion-year history. It is essential that we understand how global systems change over time and develop sustainable strategies for the management of natural systems. The Museum has the largest fossil collection in the world with 40 million specimens and a team of expert scientists studying the evolution of the Earth and its biological communities over time. However, our Paleobiology exhibitions are outdated and in urgent need of a complete overhaul, and our online resources dedicated to this critical topic are limited. At a time when the public is increasingly aware of the impact of climate change on our planet and our own livelihoods, we want to encourage society to learn from the past and how humans are changing the future. We aim to establish the Smithsonian as the world leader in understanding global change over time. Contact: Kay Behrensmeyer

Encyclopedia of Life (http://www.eol.org/)

A Web Page for Every Species

Launched in 2007, the Encyclopedia of Life (EOL) is an online biodiversity resource that seeks to provide global access to knowledge about life on Earth, offering 'one-stop shopping' for authoritative information on all known and named species. EOL engages a wide audience of educators, citizen scientists, academics and the general public and serves as a vital tool to increasing our collective understanding of life on this planet, and to safeguarding the richest possible spectrum of biodiversity. The project brings together several of the world's leading natural history institutions, including the Smithsonian Institution, the Field Museum of Natural History, Harvard University, the Marine Biological Laboratory, Missouri Botanical Garden and the Biodiversity Heritage Library consortium.

Other institutions from around the world continue to be invited as collaborators. The EOL Secretariat is hosted at the Smithsonian Institution's National Museum of Natural History in Washington, DC. Contact: Robert Corrigan

Global Genome Initiative (http://www.mnh.si.edu/ggi/)
Preserving the Diversity of the Tree of Life
The Global Genome Initiative aims to preserve the planet's genetic diversity by sustaining the next generation of biodiversity collections and helping to solve many of humanity's biological challenges and, in the process, transform the Museum into a 21st century institution. The diversity of genomes holds great potential for explaining the evolutionary relationships of organisms and supporting advancements in agriculture, medicine, environmental stewardship, and even national security. Contact: Jonathan Coddington

Human Origins Initiative (http://humanorigins.si.edu/)
What Does It Mean to be Human?
Our origin and evolution as humans is a compelling scientific question. Where did we come from and how have we changed over time? What are the main characteristics that make us human? The Human Origins Initiative addresses these and other challenging questions, and expands our understanding of human evolution. Our researchers are investigating the evolution of human ancestors in Africa and Asia, focusing particularly on how human adaptations relate to environmental change over millions of years. The initiative has strengthened the human origins research program in collaboration with institutions and scientists from developing countries, established the Peter Buck Chair in Human Origins, and designed and completed the renovations for the David H. Koch Hall of Human Origins. Contact: Richard Potts

Ocean Initiative (http://www.mnh.si.edu/ocean/)
Understanding and Preserving the Diversity of Life in the Ocean
The Ocean Initiative is a multi-faceted endeavor to build upon the distinguished history of marine science research at the Museum. The initiative works on several fronts: to engage, educate, and inspire visitors through state of the art displays in the Museum's new Ocean Hall and through an education program that includes family events and lectures; to communicate ocean issues to the broader public and educators via the Museum's Ocean Portal (http://ocean.si.edu/); and to expand understanding of our oceans through a diverse array of research efforts including a global ocean observatory network and genetic barcoding of the ocean's vast diversity of marine life at ocean observatory sites. Contact: Nancy Knowlton

Recovering Voices Initiative (http://anthropology.si.edu/recovering_voices/)
Preserving Endangered Languages and Traditional Knowledge
An estimated 90 percent of the world's more than 6,000 languages will disappear or be threatened with extinction by 2100. The loss of languages in small indigenous communities—and the associated loss of traditional knowledge embodied in those languages—is universally regarded as one of the 21st century's key global societal challenges. The Museum hosts the National Anthropological Archives and the Human Studies Film Archives and holds vast ethnological and natural history collections from many parts of the world. These resources support the documentation of many of the world's extinct and endangered languages and assist global efforts to preserve indigenous languages and knowledge systems. In collaboration with other units of the Smithsonian and external partners, this new initiative will assist community-based efforts to document, preserve, and revitalize language and knowledge. Contact: Joshua Bell

NMNH Central Programs

Catalog of Life (http://www.catalogueoflife.org/)
The Catalogue of Life, led by Species 2000, working in partnership with ITIS, is a quality-assured checklist of more than 1.3 million species of plants, animals, fungi and micro-organisms, about 70% of all those known to science. COL is designed to provide consistent and reliable information on the taxonomy of biological species. Contact: Thomas Orrell

Consortium for the Barcode of Life (http://barcoding.si.edu/index.htm)
The Consortium for the Barcode of Life (CBOL) is an international initiative devoted to developing DNA barcoding as: an accurate and reliable tool for scientific research on the taxonomy of plant and animal species; a practical, cost-effective tool for assigning unidentified specimens to their correct species; and a system for expanding interest and activity in taxonomy. Established in 2004 with the support of the Alfred P. Sloan Foundation, CBOL is an alliance of more than 170 institutions (e.g. natural history museums and herbaria), research organizations (e.g. genetic sequencing labs and bioinformatics groups) and private sector partners (e.g. technology developers) representing over 50 countries who are involved in building specimen-based DNA barcoding resources. The group also includes government agencies that will benefit from the application of rapid species identification. Contact: David Schindel

Global Biodiversity Information Facility (http://www.gbif.org/)
Established by governments in 2001 to encourage free and open access to biodiversity data, via the Internet, GBIF is global network of 57 countries and 47 organizations that promotes and facilitates the mobilization, access, discovery and use of information about the occurrence of organisms over time and across the planet. Contact: Thomas Orrell

Integrated Taxonomic Information System (http://www.itis.gov/)
The Integrated Taxonomic Information System (ITIS) provides authoritative taxonomic information on more than 632,000 accepted scientific names, synonyms, and common names for terrestrial, marine, and freshwater species from all biological kingdoms. It presents the names in a standard classification that contains author, date, geographic (native vs. non-native), and bibliographic information related to the names. The system focuses on global species, with an emphasis on North America, and is accessible via the World Wide Web in English, French, Spanish, and Portuguese. Through ITIS, users can access the current scientific names of organisms and synonyms. ITIS is a standard reference for taxonomic information that facilitates biological data sharing and biological inventory, monitoring, and research. The ITIS database is made available for broad, continual use by government agencies, scientists, and the public by linking an advanced relational database to Web technology, tools, and services. Contact: Thomas Orrell

NMNH Central Facilities

Biorepository (http://www.mnh.si.edu/rc/biorepository/index.html)
Located at the Museum Support Center (Pod 3), this cutting-edge facility is designed to provide long term care for the museum's frozen, non-human, biological collections. The biorepository facility has the capacity to house more than 4.2 million items at temperatures of -20˚, -80˚, or -190˚ C and primarily includes specimens from Botany, Entomology, Invertebrate Zoology, and Vertebrate Zoology. Contact: Chris Huddleston

Caribbean Coral Reef Ecosystems Program (http://www.ccre.si.edu)
Carrie Bow Cay Field Station, Belize
The Caribbean Coral Reef Ecosystems (CCRE) Program was formally established in 1985 although the program has its roots in a collaborative mangrove and reef research project begun in 1972. CCRE is dedicated to field and

laboratory research in all science disciplines contributing to our knowledge of Caribbean coral reef and related ecological systems, present and past. Carrie Bow Cay, a 0.4 hectare (1 acre) sand island on top of the southern Belize barrier reef serves as a field laboratory for scientific investigators from NMNH and co-investigators from other Smithsonian units. The facilities at Carrie Bow Cay can accommodate up to 6 scientists and staff for 1-3 weeks at a time. The laboratory building houses a wet lab with flow-through seawater and dry lab spaces with stereo and compound microscopes and limited lab supplies. Three outboard skiffs (15-25 ft.) are available for use as well as full SCUBA amenities. A station manager and a cook are always on duty. Contact: Valerie Paul

Imaging

Imaging is comprised of two units in three photographic studios and two laboratories located at the Natural History Building and the Museum Support Center. Working together in direct support of the research interests of NMNH scientists, affiliates and other SI staff are the Center for Scientific Imaging and Photography (CSIP) and the Scanning Electron Microscopy Lab (SEM Lab).

- ***Center for Scientific Imaging and Photography (CSIP).*** Responsible for creating images of the Museum's exhibits, collections, personnel, scientific events, research , and public programs for publication, research, documentary, and technical purposes in conventional film and digital formats. Studios are well equipped with the latest technology and staffed with exceptionally skilled, world renowned photographers who produce only the finest images. Working under a variety of conditions from the studio to the field they are here in support of first class research providing stunning and scientifically accurate photography and printing. Contact: Donald Hurlbert

- ***Scanning Electron Microscopy Laboratory.*** The Scanning Electron Microscope (SEM) Lab provides for the examination and photography of microscopic specimens. The SEM Lab supports the research interests and conservation efforts of NMNH scientists by providing state-of-the-art instrumentation, training in its use, and assistance in preparing samples for study. The SEM Lab is equipped for conventional preparation, whole mount replicas, whole mount preparations and high resolution scanning electron microscopy. The laboratory has two conventional SEM's plus an environmental SEM enabling research on difficult, uncoated, or hydrated materials. A high quality stereo microscope allows researchers to overcome the lack of depth of field typically encountered in light optics. The SEM Lab also includes a vacuum evaporator, high-resolution sputter coater, critical point dryer, freeze dryer and all other ancillary support equipment for specimen preparation and examination. Any NMNH researcher, with the approval of their department chair, can use the facility, instrumentation and all equipment for which they have received training. Contact: Scott Whittaker

Joseph F. Cullman 3rd Library of Natural History (http://www.sil.si.edu/Libraries/cullman/)

The Joseph F. Cullman 3rd Library of Natural History holds a world-class collection of rare materials in the history of anthropology and the natural sciences, with over 12,000 rare books dating from the 15th to the 19th centuries. Opened in 2002, the facility brings together subject-specific collections previously scattered across twelve separate locations in three buildings. The Library provides cross-disciplinary strengths in the narratives and reports of early voyages of exploration and scientific expeditions (including 19th-century archival material in the Russell E. Train Africana collection), catalogues of natural-history collections from the Renaissance into the modern era, and publications on field-collecting and museum preservation techniques in the 18th and 19th centuries. In addition, the Cullman Library holds the personal library of founder James Smithson, the Deshayes card file on molluscan taxonomy, the Wheldon & Wesley (natural-history booksellers) card index 1950-2000, and a collection of decorated 19th-century bindings from the Institution's former Horticulture Library. Contact: Leslie Overstreet

Laboratories of Analytical Biology (http://www.mnh.si.edu/rc/lab/index.html)

The Laboratories of Analytical Biology (LAB) serve the research community of the NMNH in the pursuit of focused, first class science with an experienced staff, shared instrumentation, support and training. The aim of LAB is to enhance the research environment and contribute to general scientific literacy by providing current technological resources in the areas of molecular biology and scientific computing. The LAB genomics facilities include an 8,000 square-foot laboratory and office complex at MSC and a newly constructed 13,000 square-foot satellite facility in NMNH. Lab space and equipment provide the capability of performing a full range of comparative modern molecular methods and include separate pre- and post-PCR facilities. Automated DNA extractors, staffed capillary DNA sequencing instruments, dozens of PCR machines, including a real-time PCR capability, microfluidic separation technology for DNA, RNA and proteins, automated robotic liquid handlers, and cloning areas are housed within the genomics core. Newly acquired donations of next-gen sequencing instrumentation and industry partnerships will serve the genomics needs of NMNH and SI science in the post-genomic age. Computer facilities include Macintosh and PC compatible computers and a new, expanded parallel computing cluster connected in a network to facilitate the collection and analysis of molecular data. LAB also provides access to key-served molecular analytical software. All NMNH researchers and affiliated staff, with the approval of their department chair, can request LAB access, bench space, pilot project subsidies, as well as use of computer facilities and equipment. Contact: Lee Weigt

Natural History Libraries (http://www.sil.si.edu/libraries/nmnh-hp.htm)
The NMNH Library was formed as an administrative entity in 1981 and is one of 20 libraries within the Smithsonian Institution Libraries. It consists of a main location plus 15 specialized collections. The library features scholarly, highly technical and research-oriented materials in cross-disciplinary topics within the general areas of interest to the NMNH. It contains about 120,000 items on general science, biology, ecology, evolution, biodiversity, geology, paleontology, conservation and other subjects. There are over 500 journal subscriptions and a large number of journals received on exchange. The NMNH Main Library and its satellite locations all have strong collections of 19th- and 20th-century literature. In addition, the National Agricultural Library, the Library of Congress, the National Library of Medicine, and the Geological Survey Library make the Washington area one of the best in the country for bibliographic research. Contact: Ann Juneau

Smithsonian Marine Station at Fort Pierce (http://www.sms.si.edu/)
701 Seaway Drive, Fort Pierce, Florida 34949

The Smithsonian Marine Station (SMS), located in Fort Pierce on the east coast of central Florida, is a center for research and education in the marine sciences. SMS is a facility of the NMNH and serves as a field station that draws more than 100 top scientists and students each year from the Smithsonian and collaborating institutions around the world. The facility is situated in a biogeographical transitional zone where there is access to both tropical and temperate biota, and the Gulf Stream is easily accessible with its abundance of long-distance larvae and rich plankton. A diverse fauna is found in the variety of habitats from the mangroves, seagrass beds, and mud flats of the Indian River Lagoon to the sandy beaches and worm reefs of the oceanic coast and the various substrata of the offshore continental shelf including coquinoid limestone ledges, oculinid coral reefs, and shell hash plains. The SMS specializes in studies of marine biodiversity and ecosystems of Florida.

Research focuses on the Indian River Lagoon and the offshore waters of Florida's east central coast, with comparative studies throughout coastal Florida. Ongoing research programs include the systematics and ecology of algae and protists; life histories of meiofaunal organisms, sipunculans, polychaetes, and gastropods; ecology of foraminiferans; systematics, reproduction, and ecology of several groups of echinoderms and crustacea; and studies of mangrove ecosystems. The resident science program concentrates on life histories of marine invertebrates, benthic ecology of the Indian River Lagoon and near shore reefs, marine plant-animal interactions, and chemical ecology of seaweeds and invertebrates.

The facilities at the SMS include an 8,000 square-foot laboratory/office building and a residence for visiting scientists on an 8-acre campus. Available for use by visiting scientists are laboratories for histology, confocal and electron microscopy, electrophoresis, DNA studies, biochemistry, a small industrial shop, and offices and labora-

tories for individual scientists. Specialized equipment includes recirculating sea water systems, equipment for preparing tissues for light and electron microscopy, a scanning/ transmission electron microscope (STEM), confocal microscope, centrifuges, an ultra-cold freezer, equipment for electrophoresis studies, a thermocycler for DNA analyses, high-performance liquid chromatographs, a gas chromatograph/mass spectrometer, and a UV-visual spectrophotometer. There is also a wide variety of light microscopes and photographic, video and computer equipment. The SMS owns four boats for use in field studies: a 17-foot Boston Whaler and 21-foot Carolina Skiff for research within the Indian River lagoon, a 21-foot center-console boat to access near-shore waters, and a 39-foot boat, the R/V SUNBURST, for work on the nearby continental shelf. Contact: Valerie Paul

RESEARCH STAFF

PAUL, Valerie, Head Scientist. B.A. (1979), Ph.D. (1985) University of California San Diego, Scripps Institution of Oceanography. Research specialties: Marine chemical ecology, marine plant-herbivore interactions, coral reef ecology, and marine natural products.

AFFILIATED RESEARCH STAFF

RICE, Mary E., Emeritus Senior Scientist. B.A. (1947) Drew University; M.A. (1949) Oberlin College; Ph.D. (1966) University of Washington. Research specialties: Systematics and development of the Sipuncula; research on reproductive biology and comparative developmental patterns, larval biology and metamorphosis of marine invertebrates; biology of rock-boring organisms; development and distribution of oceanic larvae.

NMNH Partnerships with Affiliated Agencies

National Systematics Laboratory (http://www.nefsc.noaa.gov/nsl/mainpage/)
National Oceanic and Atmospheric Administration (NOAA)

The partnership between the National Oceanic and Atmospheric Administration (NOAA) and NMNH began in 1871. The National Systematics Laboratory (NSL) was formally established in 1942. Through this partnership NSL scientists sta-tioned in-residence at NMNH conduct research on marine biodiversity and provide information and scientific services to a wide array of customers and stakeholders in both the public and private sectors, with special emphasis on marine organisms of economic or ecological importance to the United States. Contact: Michael Vecchione

AFFILIATED RESEARCH STAFF

COLLETTE, Bruce B., Adjunct Scientist, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.S. (1956), Ph.D. (1960) Cornell University. Research specialties: Systematics, evolution, zoogeography, anatomy, and biology of marine fishes, especially Scombroidei (mackerels and tunas), Xiphioidei (billfishes), Beloniformes (needlefishes and halfbeaks), and Batrachoididae (toadfishes).

COLLINS, Allen Gilbert, Adjunct Scientist, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.A. (1987) Amherst College; Ph.D. (1999) University of California, Berkeley. Research specialties: Evolutionary history and systematics of cnidarians and sponges.

MUNROE, Thomas, Adjunct Scientist, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.A. (1973), M.S. (1976) Southeastern Massachusetts University; Ph.D. (1987) College of William and Mary. Research specialties: Systematics, evolution, biogeography, and biology of marine fishes, especially the flatfishes, Order Pleuronectiformes.

NIZINSKI, Martha, Adjunct Scientist, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.S. (1983) West Virginia Wesleyan College; M.S. (1986) University of Maryland; Ph.D. (1998) College of William and Mary. Research specialties: Taxonomy, systematics and biodiversity of decapod crustaceans; biodiversity and community ecology of the invertebrate faunal assemblage associated with deepwater coral reefs off the southeastern U.S.

VECCHIONE, Michael, Adjunct Scientist, Systematics Zoologist and Director, National Marine Fisheries Service Systematics Laboratory. B.S. (1972) University of Miami; Ph.D. (1979) College of William and Mary. Research specialties: Systematics, development, biogeography, and ecology of cephalopods.

Systematics Entomology Laboratory (http://www.ars.usda.gov/main/site_main.htm)
United States Department of Agriculture (USDA)

The US Department of Agriculture, Systematics Entomology Laboratory (SEL) and the Smithsonian have worked to-gether since 1881. Together NMNH and SEL have developed one of the largest and most important insect collections in the world, comprising more than 35 million specimens. SEL scientists in-residence at NMNH focus their efforts on providing taxonomic identification services to Federal, state, and private organizations and individuals as well as conducting research on insect groups that are major agricultural pests and potential invasive species to the U.S. Contact: M. Alma Solis

AFFILIATED RESEARCH STAFF

BROWN, John W., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1983) San Diego State University; Ph.D. (1988) University of California, Berkeley. Research specialties: Systematics and biogeography of the moth family Tortri-cidae (Insecta: Lepidoptera); biogeography of the peninsula of Baja California; conservation biology; and faunal inventories.

BUFFINGTON, Matthew, Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1997) University of California, Riverside; M.S. (2000) Texas A&M; Ph.D. (2005) University of California, Riverside. Research specialties: Systematics of parasitic Hymenoptera, specifically the Cynipoidea, Proctotrupoidea and Platygastroidea; molecular systematics; digital imaging techniques involving small insects.

CHAMORRO, Lourdes. Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1998) Ohio State University; Ph.D. (2009) University of Minnesota, St. Paul. Research specialties: Chrysomelidae, specifically Trichoptera.

GATES, Michael W., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1992) Hendrix Col-lege; M.S. (1995) Oklahoma State University; Ph.D. (2000) University of California, Riverside. Research specialties: Taxonomy and sys-tematics of Chalcidoidea (Hymenoptera), especially Eurytomidae and Eulophidae; collecting techniques, rearing and diversity of Chalcidoidea; digital imaging and image databasing.

HENRY, Thomas J., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1971) Purdue Uni-versity; M.S. (1980) Pennsylvania State University; Ph.D. (1995) University of Maryland. Research specialties: Systematics of Heteroptera (Hemiptera), especially Berytidae and Miridae.

KONSTANTINOV, Alexander S., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. M.A. (1981) Belarusian State University; Ph.D. (1988) Zoological Institute, St. Petersburg, Russia. Research specialties: Systematics, comparative mor-phology, biogeography, and host plants relationships of leaf beetles (Chrysomelidae) with particular emphasis on flea beetles, worldwide.

KULA, Robert, Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1998) Peru State College; M.S. (2001) Texas A&M University; Ph.D. (2006) Kansas State University. Research specialties: Systematics of Ichneumonoidea, particu-larly parasitoids of cyclorrhaphous flies.

LINGAFELTER, Steven W., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1989), M.S. (1991) Midwestern State University; Ph.D. (1996) University of Kansas. Research specialties: Systematics and taxonomy of Cerambycidae and Curculionidae (longhorned wood boring beetles and weevils); bionomics of Silphidae (carrion beetles).

McKAMEY, Stuart H., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1985) University of California, Berkeley; M.S. (1989) North Carolina State University; Ph.D. (1994) University of Connecticut. Research specialties: Bio-systematics of Auchenorrhyncha, principally Membracoidea (leafhoppers and treehoppers).

MILLER, Gary, Research Associate and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A.(1980) Millersville State College; M.S. (1982) University of Tennessee, Knoxville; Ph.D.(1991) Auburn University. Research specialties: Systematics and taxonomy of the Aphidoidea.

NICKLE, David A., Research Associate and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1970) Temple Uni-versity; M.S. (1973), Ph.D. (1976) University of Florida. Research specialties: Biosystematics of Orthoptera, especially Tettigoniidae and Gryllotalpidae (katydids, mole crickets), and Isoptera (termites).

NORRBOM, Allen L., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1980) Drexel Uni-versity; M.S. (1983), Ph.D. (1985) Pennsylvania State University. Research specialties: Systematics (taxonomy, nomenclature, identification) and natural history of true fruit flies (Insecta: Diptera: Tephritidae) and related families.

OCHOA, Ronald, Research Associate and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1983) University of Costa Rica, San Jose; B.S. (1985); University of Costa Rica; M.S. (1989) CATIE, Costa Rica; Ph.D. (1996) Brigham Young University. Research specialties: Systematics of plant feeding mites (ACARI: Prostigmata); Eriophyidae, Tarsonemidae, and Tenuipalpidae; mite-host-plant relationships; tools for identifying economically important phytoparasites.

POGUE, Michael G., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1974) University of Colorado; M.S. (1981) University of Wyoming; Ph.D. (1986) University of Minnesota. Research specialties: Systematics, phylogenetics, and biodiversity of Noctuidae (Lepidoptera); special interest in species of agricultural importance, worldwide.

SCHEFFER, Sonya, Research Associate and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1986) Oberlin Col-lege; MS (1990) University of Cincinnati; Ph.D. (1995) State University of New York, Stony Brook. Research specialties: Molecular sys-tematics of plant-feeding insects, particularly agromyzid flies; host-use evolution and speciation.

SOLIS, M. Alma, Adjunct Scientist, Research Entomologist and Research Leader, Systematic Entomology Lab., ARS-USDA. B.A. (1978), M.A. (1982) University of Texas, Austin; Ph.D. (1989) University of Maryland. Research specialties: Systematics of snout moths (Pyra-loidea); Pyraloidea of Neotropical areas, particularly Costa Rica.

VANDENBERG, Natalia J., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1978), Ph.D. (1987) University of California, Berkeley. Research specialties: Taxonomy of larval and adult Coleoptera, especially systematics and zoo-geography of Coccinellidae.

WOODLEY, Norman E., Adjunct Scientist and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1976) Washington State University; Ph.D. (1983) Harvard University. Research specialties: Taxonomy and phylogeny of Diptera (especially Brachycera, Orthorrhapa, and Oestroidea).

Patuxent Biological Survey Unit (http://www.pwrc.usgs.gov/history/bsphist2.htm)
United States Geological Survey (USGS)

Collaborations between the U.S. Geological Survey, Patuxent Biological Survey Unit and the NMNH began in 1889. Through this partnership, biologists stationed at NMNH conduct collections-based research on the systematics and biodiver-sity of vertebrate species and curate the North American collections of amphibians, reptiles, birds, and mammals. Annually BSU biologists accession more than 50 collections totaling over 10,000 specimens of amphibians, reptiles, birds, and mam-mals to the NMNH Collection. Highlights from 2011 include the Walter Bulmer Collection of more than 2,500 bird speci-mens and nearly 3,000 mammal specimens collected from throughout the West Indies, Central America, and the Southeastern United States. Contact: Robert Reynolds

AFFILIATED RESEARCH STAFF

CHESSER, Robert Terry, Adjunct Scientist and Research Zoologist, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. Georgia State University; Ph.D. (1995) Louisiana State University. Research specialties: North American birds; seasonal distribution of South American austral migrant birds; biogeography and systematics of birds;

modern molecular and cladistic techniques for reconstruction of phylogeny, character evolution, and biogeographic history.

FOSTER, Mercedes S., Research Zoologist Emeritus, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. (1963), M.A. (1965) University of California, Berkeley; Ph.D. (1974) University of South Florida. Research specialties: Evolution, ecology, and behavior of birds; tropical ecology; biodiversity methods; frugivorous birds, fruit nutrition, and seed dispersal.

GARDNER, Alfred L., Adjunct Scientist and Research Zoologist, Biological Resources Division, Patuxent Wildlife Research Center, U.S. Geological Survey. B.S. (1962), M.S. (1965) University of Arizona, Tucson; Ph.D. (1970) Louisiana State University, Baton Rouge. Re-search specialties: Systematics and nomenclature of mammals of the Western Hemisphere.

McDIARMID, Roy W., Adjunct Scientist and Research Zoologist, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. (1961), M.S. (1966), Ph.D. (1969) University of Southern California. Research specialties: Natural history and evolution of amphibians and reptiles, especially Neotropical forms; morphology and evolution of amphibian eggs and larvae (tadpoles); standard methods for inventory and monitoring species; world snake diversity; bibliographic history of herpetology.

WOODMAN, Neal, Adjunct Scientist, Research Zoologist and Curator of Mammals, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. (1980) Earlham College; M.S. (1982) University of Iowa; M.Phil. (1986), Ph.D. (1992) University of Kansas. Research spe-cialties: Taxonomy, systematics, biogeography, morphology, and phylogenetics of mammals, especially the Soricidae (shrews); tropical mammal communities.

Walter Reed Biosystematics Unit (http://www.wrbu.org/)
Department of Defense (DOD)

The Walter Reed Biosystematics Unit (WRBU), supported by the Walter Reed Army Institute of Research (WRAIR), is a unique resource for mosquito taxonomic research and a world leader in the development of insect disease vector identification tools and distribution prediction methods. WRBU scientists at NMNH utilize the vast NMNH mosquito collection to accomplish their work. Contact: Pollie Rueda and Lewis Long

AFFILIATED RESEARCH STAFF

FOLEY, Desmond, Adjunct Scientist, Walter Reed Biosystematics Unit. B.S.(1979) University of New England; M.S. (1984), Ph.D. (1997) University of Queensland. Research specialties: Molecular systematics, distribution modelling, biogeography, and spatial ecology of mosquitoes.

RUEDA, Pollie M., Research Entomologist, Walter Reed Biosystematics Unit. B.S. (1976), M.S. (1980) University of the Philippines; Ph.D. (1984) North Carolina State University. Research specialties: Mosquito Biosystematics (Culicidae, Diptera).

WILKERSON, Richard C., Research Entomologist, Walter Reed Biosystematics Unit. B.A. (1968), University of North Carolina; M.S. (1973), Ph.D. (1978) University of Florida. Research specialties: Mosquito Systematics.

NMNH Tenant Organizations

Center for Tropical Forest Science (http://www.ctfs.si.edu/ and http://www.sigeo.si.edu/)
Smithsonian Institution Global Earth Observatory

The Center for Tropical Forest Science (CTFS) is a global network of forest research plots committed to the study of tropical and temperate forest function and diversity. The multi-institutional network comprises more than forty forest re-search plots across the Americas, Africa, Asia, and Europe, with a strong focus on tropical regions. CTFS monitors the growth and survival of about 4.5 million trees of approximately 8,500 species. CTFS conducts long-term, large-scale research on forests around the world to: increase scientific understanding of forest ecosystems, guide sustainable forest management and natural-resource policy, monitor the impacts of climate change, and build capacity in forest science

The Smithsonian Institution Global Earth Observatory (SIGEO) is an outgrowth of and companion to the Center for Tropical Forest Science (CTFS). SIGEO builds on and expands the CTFS global network of forest plots, transforming it into a platform for a broader range of scientific investigations.
The CTFS SIGEO relocated from previous headquarters at Harvard University to NMNH in 2012. This move to NMNH enhances coordination efforts for the 46-plot research network, which partners with more than 75 institutions in 21 countries, including NMNH, Smithsonian Conservation Biology Institute (SCBI), and Smithsonian Environmental Research Center (SERC). Contact: Stuart J. Davies

Council of American Overseas Research Centers (http://caorc.org/index.html)

Founded in 1981, the Council of American Overseas Research Centers (CAORC) is a private not-for-profit federation of independent overseas research centers that promote advanced research, particularly in the humanities and social sciences, with focus on the conservation and recording of cultural heritage and the understanding and interpretation of modern socie-ties. CAORC fosters research projects across national boundaries, encourages collaborative research and programmatic and administrative coherence among member centers, and works to expand their resource base and service capacity.

CAORC member centers maintain a permanent presence in the host countries where they operate—in Europe, Latin America, the Near and Middle East, South and Southeast Asia, and West Africa. The centers are the primary vehicle through which American scholars carry out research vital to our understanding of and intersection with other cultures. Some centers have existed for over a century while others were founded in the decades following World War II in response to American scholarly needs and host country invitations. Nearly four hundred American universities, colleges, and museums hold multi-ple memberships in the centers which serve their institutional members, individual fellows and members, as well as affiliated scholars through a broad range of research- and teaching-support services. Funding is awarded from sources including the U.S. Department of State, the U.S. Department of Education, and the Smithsonian Institution, as well as from private foundations and individuals. Contact: Mary Ellen Lane

THEME I: The Formation and Evolution of the Earth and Similar Planets

Our Earth and planetary scientists endeavor to understand the cosmic origins and continuing evolution of Earth and similar planets. Our world-renowned collections of minerals, gems, rocks, ores, and meteorites, and our unprecedented database of volcanic activity, reveal the history of our dynamic planet. Research strategies include: Planetary Formation and Evolution; Evolution of Earth-like Planets; and Planetary Habitability to increase our knowledge and understanding of what makes planets suitable for life.

DEPARTMENT OF MINERAL SCIENCES (http://mineralsciences.si.edu/)

The mission of the Department of Mineral Sciences is to seek answers to questions about the origin of the solar system, planetary differentiation, the debate about possible traces of ancient extraterrestrial life, insights into crustal and mantle pro-cesses that are linked to understanding volcanism, earthquakes and plate tectonics, and improved knowledge of interactions of minerals with the hydrosphere, atmosphere, and biosphere.

Research

Broad, long-term research now underway in the Department of Mineral Sciences includes studies of rocks dredged and drilled from the deep oceans; field and laboratory investigations of active volcanoes; systematic investigations of major mineral groups, including crystallographic and structural examination; analysis of global volcanic patterns for the past 10,000 years; chemical and mineralogical analysis of meteorites; geochemistry of metamorphic rocks and fluids; the tectonic evolution of high pressure low temperature metamorphic terrains; fluid-mineral-microbe interaction and biomineralization. Research strengths include meteoritics, mineralogy, petrology, and volcanology.

Collections

Mineral Sciences Collection Profile

- *Number of Specimens*: 687,066

- *Types*: 1,056

The Department of Mineral Sciences curates collections of minerals, gems, rocks, ores, meteorites, tektites, and volcanologic data/images that are among the largest and most complete in the world. The ever-expanding collections constitute large reservoirs of source material for a great variety of research questions in meteoritics, mineralogy, petrology, geochemistry, and economic geology.

National Meteorite Collection

The U.S. National Meteorite Collection is one the largest and among the best museum-based collections of meteorites in the world, particularly strong in iron meteorites. The collection includes over 45,000 samples representing about 17,000 different meteorites, including meteorites collected in Antarctica as part of the U.S. Antarctica Meteorite Program, as well as meteorites from the Moon and Mars, including 10 of the approximately 50 known Martian meteorites. The collection has over 12,000 polished thin sections and contains pieces of every type of meteorite. Contacts: Linda Welzenbach and Timothy McCoy

National Gem and Mineral Collection

The National Gem and Mineral Collection is one of the greatest collections of its kind in the world with highly prized objects as well as comprehensive mineralogical reference material. The collection traces its origins to the minerals that were bequeathed by James Smithson, along with the money to establish the Smithsonian Institution, over 150 years ago. The col-lection adds specimens through gifts, purchases using private endowments established for that purpose, field collection, and exchange. In particular, the gem collection has been built almost entirely by gifts from individuals. There are approximately 380,000 mineral specimens and 10,000 gems, making it one of the largest of its kind in the world including such famous pieces as the Hope Diamond and the Star of Asia Sapphire. Contacts: Russell Feather, Paul Pohwat and Jeffrey Post

National Rock and Ore Collection

The National Rock and Ore Collection is divided into over forty sub-collections for ease of research use. These collec-tions together number about 283,086 catalogued and computer inventoried specimens. Large and very well documented collections of mantle xenoliths, ocean basin lavas, ores and edifice and eruption keyed volcanic rocks have worldwide coverage. Additional highlights include historically significant collections, especially of the United States Geological Survey specimens, island rocks, petrologic features, petrographic and lithological reference collections, building stones, and impactites. Important collections available for study but not yet catalogued include the Shoemaker impactites, Boyd and Wilshire xenoliths, Chao and Cameron ore deposits, Bateman granites, the Buddington teaching Collection and the Princeton Theses Collection.

Most of the rocks and ores are part of the Locality Collection. This collection is organized into small suites of rocks from the same locality, such as a particular quadrangle or geological setting. These are typically petrogenetically related and usually described in at least one reference. The Volcanological Reference Collection includes specimens from approximately 300 different volcanoes or volcanic fields. Many are from dated eruptions. This collection, organized by eruption year, in-cludes a large suite from the Hawaiian Volcano Observatory of eruptive material from Kilauea and Mauna Loa volcanoes. The collection also includes drill cores from the Kilauea Iki and Makaopuhi lava lakes. The Ore Collection is a systematic collection of metallic ores and mineral commodities. The collection includes metal-bearing minerals and massive ore-bearing material (primarily from major U.S. mines opened prior to 1930), as well as some non-metallic minerals and commodities such as pigments, abrasives, salts, clays, and hydrocarbons. The Sea Floor Rock Collection includes dredged and cored spec-imens from mid-ocean ridges, seamounts, and fracture zones, as well as a large manganese nodule collection. The Impactite Collection includes shocked rocks from impact structures around the world. Often the corresponding meteoritic material is also represented in the National Meteorite Collection. The Building Stones Collection features rocks utilized for building and ornamentation, and is composed primarily of material received from the Centennial Exposition at Philadelphia in 1876 and from the Tenth Census at the close of an investigation into the quarrying industries of

the U.S. in 1880. Most specimens are from domestic quarries, with some foreign varieties represented. Contacts: Leslie Hale and Sorena Sorenson

Facilities

The Department of Mineral Sciences is well equipped for the study of rocks and minerals. In addition to a capability for classical gravimetric analysis in the wet-chemistry laboratory, the instrumentation includes an electron microprobe and an analytical scanning electron microscope, and X-ray diffraction facilities. Also available are an infrared spectrometer, CCD imaging and spectroscopy with a cathodoluminescence microscope, and numerous optical microscopes. The Department has a time-of-flight secondary ion mass spectrometer, which can analyze the elemental compositions of minerals on the nanoscale, and a microdiffractometer, which can non-destructively obtain an X-ray diffraction pattern from a small area on a polished sample. A well-equipped shop for preparation of thin and polished sections provides supporting services to the scientific staff. The facilities include a room-size rock saw to section exceptionally large rocks as well as meteorites. At the Museum Support Center in Suitland, Maryland, the Department maintains a clean room modeled on the facility used for Moon rocks at NASA's Johnson Space Center.

Fieldwork

Geologists from the Department conduct fieldwork at sites around the world. Recent research areas have included: the famous jade mines of Burma (Myanmar) and Mesoamerican jade quarries in Guatemala; emerald deposits of North Carolina; gem pegmatite deposits in the United States; deep submersible study of a large submarine caldera south of Japan, where active ore forming processes are occurring; young lava flows from Kilauea volcano in Hawaii and acid-mine drainage sites in Appalachia.

Publications

The Bulletin of the Global Volcanism Network is published monthly by the Department's Global Volcanism Program. The departmental newsletter, NMNH Geoscience, is published quarterly and is accessible on the web.

Education and Outreach

Members of the Department are actively involved in a number of education-related and outreach programs within and outside of the Institution such as public lectures, traveling exhibits, hosting of interns and fellows, and collaborating with a variety of university and other agency partners.

Libraries

The Mineral Sciences library contains about 15,000 volumes and 100 journal titles and focuses on mineralogy, gemology, volcanology, meteorites, petrology, and geochemistry.

Programs and Partnerships

Global Volcanism Program (http://www.volcano.si.edu/)

The Global Volcanism Program (GVP) is the hub of an international network for monitoring, reporting, and maintaining data related to volcanic activity around the world. The GVP plays a leadership role in global volcano information - tracking events as they happen, building the database of critical information, and using these resources both for NMNH research pro-jects and for answering questions about volcanology from other scientists, the media, and the public. The large and growing database contains information for more than 1,500 active volcanoes from around the world and more than 10,000 of their known eruptions in the last 10,000 years. Most of these data are now available on our website, along with our systematic monthly and weekly volcanic activity reports, the latter in collaboration with the USGS Volcano Hazards Program. The GVP also maintains extensive collections of maps, images, and other resources for Earth's active volcanoes. The GVP collaborates with non-Smithsonian scientists and organizations concerned with volcano hazards, airline safety, geothermal energy, and global cli-

mate change, including the USGS, the Department of Energy, the National Aeronautical and Space Administration (NASA), National Oceanographic and Atmospheric Administration, and the Federal Aviation Administration. Contact: Elizabeth Cottrell

Antarctic Meteorite Program (http://mineralsciences.si.edu/research/meteorites/antarctica/index.htm)

The Antarctic Meteorite Program was established in 1976. Cooperatively administered by the Smithsonian Institution, the National Science Foundation, and NASA, the focus of the Program is the collection, curation, and long-term storage of meteorites recovered from the Antarctic ice sheets. Curators in the Department of Mineral Sciences classify each of the meteorites returned and publish these results in the Antarctic Meteorite Newsletter, issued twice a year by NASA's Johnson Space Center. The Smithsonian also curates Antarctic meteorites, where the entire collection will eventually reside. Of the 17,000 distinct meteorites in the Smithsonian's National Meteorite Collection, more than 15,000 come from Antarctica. Contact: Catherine Corrigan

RESEARCH STAFF

ANDREWS, Benjamin, Geologist. B.A. (2002) University of Oregon; M.S. (2004) University of Alaska; Ph.D. (2009) University of Texas, Austin. Research specialties: Volcanic processes and hazards ranging from magmatic storage and recharge conditions, through eruption, to deposition; rates of mass, momentum, and energy transfer in different volcanic and geologic processes; analog modeling, optical flow velocimetry, turbulence analysis, sample grain size and component analysis, experimental petrology, electron microscopy, and crystal isotope stratigraphy.

COTTRELL, Elizabeth, Research Geologist. B.S. (1997) Brown University, Ph.D. (2004) Columbia University. Research specialties: experimental geochemistry and petrology, volcanology.

MACPHERSON, Glenn J., Geologist. B.S. (1972) University of California, Santa Cruz; Ph.D. (1981) Princeton University. Research specialties: Origin of the solar system using geochemical studies of meteorites and comets; origin of the continental margin of North America using geochemical studies of ancient volcanic rocks.

McCOY, Timothy J., Geologist and Chair of Mineral Sciences. B.S. (1986) Eastern Illinois University; M.S. (1990) University of New Mexico; Ph.D. (1994) University of Hawaii, Manoa. Research specialties: Meteorites; igneous evolution of small bodies in the early solar system; martian volcanological history derived from meteorites.

POST, Jeffrey E., Mineralogist; Curator of Gems and Minerals. B.S. (1976) University of Wisconsin, Platteville; Ph.D. (1981) Arizona State University. Research specialties: Environmental mineralogy; single crystal and powder X-ray diffraction; electron microscopy; manganese oxide minerals; clay minerals; computer modeling of mineral structures, rietveld analysis; gemology.

SANTELLI, Cara, Geologist. B.S. (2000) University of Wisconsin, Madison; Ph.D. (2007) Massachusetts Institute of Technology/Woods Hole Oceanographic Institution. Research specialties: Biologically induced mineral precipitation and dissolution; microbiologically mediated metal redox transformations; fungal biogeochemistry; deep biosphere; fluid-mineral interactions.

SORENSEN, Sorena S., Geologist . B.A. (1978), Pomona College; Ph.D. (1984) University of California, Los Angeles. Research specialties: Metamorphic petrology; major, minor, and trace element geochemistry of metamorphic and igneous rocks; field studies of metasomatic fluid/rock interactions; petrotectonic evolution of high P/T and arc-related metamorphic terranes.

AFFILIATED RESEARCH STAFF

BULLOCK, Emma, Geochemist. B.S. (2001) University of Manchester; Ph.D. (2006) The Open University. Research specialties: Chronology of the early solar system; formation of calcium-aluminium rich inclusions (CAIs, isotopic systems (oxygen, magnesium, silicon) within CAIs, petrology of primitive carbonaceous chondrites, cometary samples; aqueous alteration to primitive carbonaceous chondrite parent bodies, alteration to sulfide minerals, sulfur isotopes.

CORRIGAN, Catherine, Geologist. B.S. (1995) Michigan State University; M.S. (1998) Michigan State University; Ph.D. (2004) Case Western Reserve University. Research specialties: Meteorites.

GOREVA, Yulia. Geologist. Ph.D. California Institute of Technology. Research specialties: Origin and Evolution of meteorites.

FISKE, Richard, Geologist Emeritus. B.S. (1954) Princeton University; M.S. (1955) Princeton University; Ph.D. (1960) Johns Hopkins University. Research specialties: Structure of Kilauea Volcano, Hawaii; explosivity of Kilauea Volcano; submarine pyroclastic volcanism along the Izu Bonin arc, Japan; Mesozoic volcanic rocks of the central Sierra Nevada, California.

THEME II: Discovering and Understanding Life's Diversity

Our biologists and paleontologists are interested in the diversity and evolution of life on Earth. They play a major role in the discovery and classification of species, as well as in the study of the patterns and processes that explain the distribution of life in the past and present. As the scientific research focus of five Departments (Paleobiology, Botany, Entomology, Invertebrate and Vertebrate Zoology), our researchers draw on our unparalleled collections of animals, plants, and other organisms present and past. Research strategies include: Encyclopedia of Life to discover and describe the diversity of species; Forces of Change to understand the evolutionary and ecological forces that affect diversity; and Biology of Extinction to understand the extinction of species and loss of habitats, whether past or present, and provide strategies for reversing human impacts and restoring and protecting species and habitats.

DEPARTMENT OF BOTANY (http://botany.si.edu)

The Department of Botany's mission is to discover and describe plant life in marine and terrestrial environments, to interpret the evolutionary origin and processes responsible for this diversity, and to understand how humans are affected by and have altered plant diversity on the planet. The Department of Botany hosts events and activities throughout the year to explore and recognize achievements in the botanical community, including the Smithsonian Botanical Symposium.

Research

Research in the Department of Botany focuses on plant systematics in the broadest sense: taxonomy, nomenclature, investigations in comparative anatomy and morphology, molecular systematics, phylogenetics, phytogeography, cytology, ecology, evolutionary theory, and economic botany. Numerous floristic studies have been lead by the Department (floras of the Hawaiian and Marquesas Islands, Puerto Rico and the Virgin Islands, the Washington-Baltimore Area, as well as, Burma [Myanmar], the Guianas, the Caribbean, and Venezuela), while other research projects are aimed at elucidating phylogeny, evolutionary development, and broad questions of classification. Both modern and fossil species of many plant groups, including the algae, mosses, and flowering plants, are currently being studied.

Collections

The United States National Herbarium is the major facility in the Department. The Herbarium was established in 1848, dating back almost to the foundation of the Smithsonian Institution (1846). Collections of plants resulting from various early government expeditions were first deposited in the National Institute, named originally in 1840 as the National Institution for the Promotion of Science. Later these plants were turned over to the newly founded Smithsonian. Of particular interest among these were the large collections (50,000 specimens representing 10,000 species) from the U.S. South Pacific Exploring Expedition, under the command of Lt. Charles Wilkes, U.S.N., which formed the basis for the U.S.

Botany Collection Profile

- *Number of Specimens*: 5 million
- *Types*: 100,000

National Herbarium. The earliest expeditions sponsored in part by the Smithsonian included the explorations of Charles Wright in Texas and New Mexico in 1848.

The U.S. National Herbarium has 5 million specimens collected from worldwide locations. About 20% of these from select families, collectors and geographical areas are inventoried and have data available through an online searchable data-base. In addition, more than 200,000 high resolution digital images of specimens are accessible online. The oldest specimen in the collection is a member of the Scrophulariaceae that was collected sometime between 1584 and 1589. The majority of the Herbarium is arranged phylogenetically by family and genus, and within each genus according to geographic region and further alphabetically by species. The collection includes all major plant groups and is among the ten largest in the world, accounting for about 8% of the plant collection resources in the United States. Most of the specimens in the collection are standard mounted herbarium sheets, although several small collection subsets of fluid preserved specimens are available for some groups, as well as, bulky parts - typically large specimens stored in boxes or trays and microslide collections. The herbarium includes approximately 108,000 inventoried type specimens from all areas of the world but is richest in North Ameri-can and New World tropical species, with additional strengths in the Pacific Islands, the Philippines, and the Indian subcontinent. The Department maintains extremely active loan and acquisition programs. Over 25,000 specimens are lent annually around the world. About 20,000 specimens are acquired annually, primarily through exchange and fieldwork.

The Herbarium maintains several important special collections including the DC Herbarium, featuring over 65,000 specimens from the Washington-Baltimore Area, including Plummers Island in the Potomac River. The Richard H. Eyde floral microslide collection includes over 21,500 serial sections representing 114 families of flowering plants, with special strengths in Cornaceae, Onagraceae, and Rubiaceae. Other important collection resources include the Wood Collection housed at the Museum Support Center (MSC), with over 42,500 specimens representing almost 3,000 genera with an additional 6,400 microslides of wood sections. The pollen and spore reference collection includes over 7,500 microslides repre-senting a wide variety of plant families. The bamboo collection is especially diverse. In addition to over 37,000 inventoried herbarium specimens, the collection is supplemented with over 3,600 bulky specimens (including large culms, rhizomes, branch complements, and culm cross-sections); 3,000 fluid-stored specimens (mostly leaves); 1,300 floral dissection mounts; 250 dry fruit and seed specimens; 16,000 photographic slides; 600 black and white photo negatives; and 2,000 anatomical slides of bamboo serial sections, cross-sections, longitudinal sections and epidermal scrapes.

The Department is located within easy reach of many other important reference collections in the Washington area, in-cluding the Smithsonian Orchid Collection maintained in the Smithsonian Gardens Greenhouses, the National Arboretum, and the United States Botanic Garden, where large living collections of plant species and horticultural varieties are maintained.

Phanerogamic Collection

Many of the plant groups represented in the U.S. National Herbarium rank among the finest and/or largest in the world. The flowering plant families of Acanthaceae, Asteraceae, Bromeliaceae, Gesneriaceae, Melastomataceae, and Poaceae have especially benefited from a long history of departmental specialist research and study. Active world-class research is also underway in the Araliaceae, Commelinaceae, Euphorbiaceae, Malvaceae, Onagraceae, Passifloraceae, Sapindaceae, Vitaceae, and Zingiberales. Contact: Rusty Russell

Cryptogamic Collection

The cryptogamic collections all rank as premier collections, totaling over three-quarters of a million specimens. The li-chen herbarium is one of the largest and best curated collections in the world, containing over 250,000 specimens. The col-lection is especially rich in type material with 2,500 type specimens currently registered. The emphasis of the collection is North American lichens, especially the Parmeliaceae. The lichen collection also contains associated research materials, in-cluding: microscope slides; chemical extracts; chemical identification plates; and SEM photographs and negatives. The col-lection of bryophytes (250,000 specimens)

and the ferns and fern allies (275,000 specimens) also rate as particularly significant, both in terms of size and scientific/historic value. Contact: Greg McKee

Algal Collection

The Algal Collection of the U.S. National Herbarium is comprised of marine, estuarine, freshwater, terrestrial (including cave), and airborne algae. The collections of algae have increased dramatically over the past two decades and represent an important resource for the study of tropical and subtropical marine taxa. Numbering over 200,000 accessioned and invento-ried specimens, it includes herbarium specimens (150,000), microslides (8,300), liquid preserved material (15,000), and bulky material (10,900). Among the collections are 4,700 type specimens. The collection recently acquired an additional 101,000 specimens, featuring crustose coralline algae. Also contained in this collection, but maintained at MSC, is the complete Francis Drouet collection (52,000 specimens) comprised mainly, but not exclusively, cyanobacteria. The non articulated coralline algae (22,000), as well as a separate diatom collection (37,000) of freshwater and marine specimens of both recent and fossil origin are also housed at MSC. The collections include algae specimens from worldwide geographical regions, with major holdings from: Gulf of California, Pacific Mexico, southern and central California and the Channel Islands, the Galapagos Islands, Aldabra Atoll, and the Caribbean (especially Florida, Bahamas, Belize, and Panama). Contact: Barrett Brooks

National Fungus Collection (http://www.ars.usda.gov/is/np/systematics/usfungu.htm)

Mycological specimens are maintained separately with the National Fungus Collections a branch of the U.S. Depart-ment of Agriculture, located in Beltsville, Maryland. All the collection and publication information for types has been data-based.

Botanical Art and Image Collection (http://botany.si.edu/botart/)

The Department maintains a Botanical Art Collection that serves to document the plant species discovered and de-scribed by Smithsonian botanists. The Collection includes over 5,500 works including 22 Margaret Mee paintings, 50 Freder-ick A. Walpole drawings and paintings, and 311 watercolors by M.E. Eaton from the four-volume work "The Cactaceae", by Britton and Rose. Nearly 2,700 pen and ink drawings, 550 watercolors, and 150 other graphic media are also represented in the collection. The plant images library has over 21,000 photographic images of plant species and their habitats. Contact: Alice Tangerini

Facilities

The Department has a microtechnique laboratory, equipped for anatomy and cytology, that is staffed and maintained for use by researchers and visiting scientists. The Department has a Digital Imaging Studio equipped with scanners and medium-format digital cameras for high-resolution imaging of specimens, especially type collections. The Department maintains a scientific illustration facility and full-time in-residence staff scientific illustrator. At MSC are departmental molecular laboratories (associated with but separate from the Laboratories of Analytical Biology) that allow modern studies using genetic markers and isozymes, including DNA barcoding surveys. A large modern greenhouse complex at MSC with over 7,000 sq. ft. of growing area houses a diversity of living research plants, including rich collections of Commelinaceae, Zingiberales, and blooming corms of the titan arum, Amorphophallus titanum. The greenhouse facility is available for use by staff and associates in cultivating and studying research plants.

Fieldwork

Throughout its history, the Department of Botany has maintained an active field research program in the American tropics but has also undertaken numerous collecting trips on the North American continent and in the Old World tropics. Currently the Department is actively engaged in a multinational effort to produce a flora of the Guianas region, which involves fieldwork and preparation of a written flora. The Department is an Editorial Center for the Flora of China Project. Other areas of concerted fieldwork include Mexico, the Andes, the Caribbean, Pa-

cific Islands, East Africa (including Kenya), and across Asia. It is often possible to arrange to receive genetic resources, anatomical, cytological, or other materials from these expeditions.

Collaborative fieldwork can be arranged with a number of tropical institutions, such as the Smithsonian Tropical Re-search Institute in Panama, the Organization for Tropical Studies in Costa Rica, and the National Tropical Botanical Garden in Hawaii. Research in marine botany, with emphasis on studies of systematics and functional morphology of selected plants, can be undertaken at the Smithsonian Marine Station at Fort Pierce, Florida, and through the Caribbean Coral Reef Ecosystems Program (CCRE) at Carrie Bow Cay, Belize.

Publications

The Smithsonian Contributions to Botany is an externally peer-reviewed periodical produced by the Department. The journal provides a vehicle for disseminating the results of the scientific research at the U.S. National Herbarium, such as longer taxonomic papers, checklists, floras, and monographs. The Index Nominum Genericorum, a listing of generic names in all plant groups, housed and produced in the Department, is corrected and updated on a continual basis. An inventory and online images of type specimens has been prepared under the auspices of the Type Specimen Register and serves as a con-venient source of information concerning collection locality, bibliographic citation, and relevant field data. The Plant Con-servation Unit generates and compiles data on endangered and threatened plant species and their habitats. It produces a monthly Biological Conservation Newsletter as well as other publications on plant conservation. The Plant Press, the quarterly newsletter from the Department of Botany and the U.S. National Herbarium, provides information about the activities of the Department including articles about staff research and travel, visitors, new publications, and plant conservation highlights.

Education and Outreach

Graduate studies are available in conjunction with local universities especially George Washington University, Duke University, and the University of Maryland. Through cooperative arrangements with many universities, staff members act both formally and informally as advisors to graduate students and occasionally teach courses in plant systematics. Specimens are made available to students for thesis work through loans to their academic advisors. Students are also encouraged to visit the U.S. National Herbarium, to use the collections and facilities onsite, and to seek advice and help from Department staff members.

Since 2001, the Department has hosted the Smithsonian Botanical Symposium, which brings together the national and international plant systematics community to address a botanical topic of current significance. The presentation of the José Cuatrecasas Medal for Excellence in Tropical Botany, an honor bestowed on a botanist and scholar of international stature who has contributed significantly to advancing the field of tropical botany, takes place during the annual symposium.

Library

The Botany Branch Library was established in the winter of 1965-1966 and in 2002 the Botany and Smithsonian Horticulture Libraries were combined into one unit housed in the Department. The combined library holdings total over 60,000 volumes and 300 journal subscriptions. The Botany Library includes one of the outstanding resources for the family Poaceae, the Hitchcock Chase Agrostological Library. The John A. Stevenson Mycological Library, probably the most complete collection of its kind in the United States, is housed with the National Fungus Collections in Beltsville, Maryland, but remains part of the Smithsonian library holdings. The Botany Library, including the John Donnell Smith Botanical Library and the E. Yale Dawson Phycological Library, is especially rich in original editions of classical botanical works. Much of the Department's fine collection of rare books is now separately housed in the Cullman Library. The Botany Library also contains many archival materials including field books, field notes, and/or specimen lists made by Smithsonian botanists and colleagues who collected plant specimens for the U.S. National Herbarium. The Department also has large reprint collections, including the Richard H. Eyde collection rich in titles on plant anatomy and morphology.

The Horticulture Branch Library was established in 1984 as a research support resource for the Horticulture Services Division (now Smithsonian Gardens), which is responsible for the management of the gardens, grounds, greenhouses, and interior plantscaping at the Smithsonian. The Horticulture Library evolved from a small office

collection that was begun in the early 1970s. Since that time, this collection has been enhanced by the donation of several large gifts. An acquisition in 1984 of more than 150 American titles on landscape design dating from the 19th- and early 20th-centuries became the foundation of a growing collection on the subject.

The Historia Plantarum Collection, the personal library of Alain Touwaide comprised of monographs, journals, and mi-crofilms documenting the history of botany with a particular focus on Old World and medicinal plants, is currently housed in the Department. It represents an exemplary resource for understanding the history of botany and the transmission of plant knowledge from antiquity to the present time.

Programs and Partnerships

Biological Diversity of the Guiana Shield (http://botany.si.edu/BDG/index.html)

The Biological Diversity of the Guiana Shield Program (BDG) is a field-oriented program initiated in 1983. The goal of the BDG is to study, document, and preserve the biological diversity of the Guiana Shield area of northeastern South Ameri-ca. Among BDG's accomplishments is a feasibility study to determine the extent of existing plant and animal collections for use by the government of Guyana in establishing parks and reserves, as well as lists of all known plants in the Kaieteur Na-tional Park (Guyana), the "Checklist of the Plants of the Guianas", and checklists of birds, mammals, fish, and herpetofauna for use by the Government of Guyana, UNESCO, and conservation groups seeking to enlarge the park area. BDG has completed a plant survey for Iwokrama International Rainforest Reserve (Guyana) for use in their conservation efforts. In June 1992, the BDG inaugurated the Centre for the Study of Biological Diversity on the campus of the University of Guyana, as a repository for collections and an educational facility for training the next generation of Guyanese systematists. Contact: Vicki Funk

Plant Conservation Unit

The Plant Conservation Unit promotes and coordinates activities and research that focus on plant conservation and endangered plant species. To document and understand the changes and decline in plant biodiversity, the Unit gathers and maintains data on the survival prospects of plant taxa. Information is shared with the international botanical, conservation and development communities. The Unit manages an information service by responding to requests from a variety of sources and providing information on world plant conservation, threatened species, habitats, and literature. Contact: Gary Krupnick

United States Botanic Garden (http://www.usbg.gov/)

The Department of Botany has established a formal collaboration with the United States Botanic Garden (USBG), bringing together these two institutions that had their common historical nineteenth century beginnings in the National Insti-tute for the Promotion of Science (1841) and the living and preserved collections resulting from the around-the-world Wilkes Exploring Expedition of 1838-1842. Located only several blocks from each other at the base of Capitol Hill, today the USBG is a free-standing institution under the administration of the Architect of the Capitol. The research, field exploration, training, and conservation components provided by the Department in combination with the horticultural and public display elements at the USBG form a highly significant botanical consortium in the Washington area with joint projects on research, botanical exhibition, environmental education and conservation. Significant collaborations between the two parties include the Smithsonian Botanical Symposium, an annual orchid show, and the Botanical Partners on the Mall Lecture Series, a quarterly event presented at the United States Botanic Garden. Contact: W. John Kress

RESEARCH STAFF

ACEVEDO, Pedro, Curator, Botany. B.A. (1977) University of Puerto Rico; Ph.D. (1989) City University of New York. Research specialties: Systematics or Neotropical Sapindaceae, especially Paullinieae; floristics of the Caribbean Islands (Greater Antilles); taxonomy of climbing plants.

ADEY, Walter H., Research Scientist and Curator. B.S. (1955) Massachusetts Institute of Technology; Ph.D. (1963) University of Michigan. Research specialties: Algal ecology, systematics and biogeography; water quality control and bioenergy; microcosm modeling of aquatic systems; Holocene geology as related to coastal ecosystems.

DORR, Laurence J., Associate Curator, Botany. B.A. (1976) Washington University; M.A. (1980) University of North Carolina; Ph.D. (1983) University of Texas. Research specialties: Systematics of Malvaceae including Sterculiaceae and Tiliaceae; tropical African and Malagasy Ericaceae; flora of the northern Andes; botanical history and bibliography.

FADEN, Robert B., Associate Curator, Botany. B.A. (1962) City College of New York; M.S. (1964) University of Michigan; Ph.D. (1975) Washington University. Research specialties: Systematics of Commelinaceae (worldwide); systematic anatomy; African floristics and biogeography; reproductive biology of angiosperms; pteridophytes.

FUNK, Vicki A., Senior Research Botanist and Head, Biological Diversity of the Guianas (BDG) Program. B.S. (1969), M.S. (1975) Murray State University; Ph.D. (1980) Ohio State University. Research specialties: Systematics of the Compositae, theoretical cladistics and biogeography, and methods for estimating biodiversity.
KRESS, W. John, Curator, Botany. B.A. (1975) Harvard University; Ph.D. (1981) Duke University. Research specialties: Systematics of tropical monocots, especially gingers, bananas, and heliconias (Zingiberales); pollination biology, molecular variation, and phylogenetic relationships; Asian botany; DNA barcoding; conservation biology; using museum collections and data for assessing conservation priorities.

PETERSON, Paul M., Curator of Grasses. B.A. (1977) Humboldt State University; M.S. (1984) University of Nevada, Las Vegas; Ph.D. (1988) Washington State University. Research specialties: Systematics and floristics of New World grasses; phylogeny of the grass family.

WAGNER, Warren L., Curator and Chair of Botany. B.A. (1973), M.S. (1977) University of New Mexico; Ph.D. (1981) Washington University. Research specialties: Pacific Basin angiosperm floristics, systematics, phylogeny and biogeography; systematics and evolution of Oenothera (Onagraceae); phylogeny of Caryophyllaceae.

WEN, Jun, Associate Curator. B.S. (1984) Central China Agricultural University; Ph.D. (1991) Ohio State University. Research specialties: Systematics of flowering plants, especially Araliaceae; biogeography of the Northern Hemisphere; biogeography of Asia; economic botany.

WURDACK, Kenneth, Assistant Curator. B.S. (1990) University of Maryland; M.S. (1994), Ph.D. (2002) University of North Carolina. Research specialties: Systematics and evolution of Euphorbiaceae and Malpighiales; molecular and genome evolution.

ZIMMER, Elizabeth Anne, Curator, Botany. B.A. (1973) Cornell University; Ph.D. (1981) University of California, Berkeley. Research specialties: Molecular systematics of flowering plants; development of molecular markers across a range of species divergence.

AFFILIATED RESEARCH STAFF

FEUILLET, Christian, Research Associate, Botany. B.A. (1978) Sorbonne University of Paris; M.S. (1979), Ph.D. (1981) Sorbonne Uni-versity; ORSTOM botanist (1981-1995). Research specialties: Floristics of the Guianas, taxonomy, phylogeny, and biogeography of Passi-floraceae, Gesneriaceae, Aristolochiaceae, and Boraginaceae.

NORRIS, James N., Research Scientist Emeritus. B.A. (1968), M.A. (1971) San Francisco State University; Ph.D. (1975) University of California, Santa Barbara. Research specialties: Systematics and ecology of benthic marine algae, especially tropical and subtropical species.

PUTTOCK, Christopher, Research Associate. B.S. (1977) University of New South Wales; Ph.D. (1992) University of New South Wales. Research specialties: Marine algae; Asteraceae; Flora of the Delmarva region.

ROBINSON, Harold E., Curator, Botany. B.A. (1955) Ohio University; M.S. (1957) University of Tennessee; Ph.D. (1960) Duke Universi-ty. Research specialties: Taxonomy of Bryophyta, with emphasis on exotic forms and Neotropical species, taxonomy and anatomy of Compositae.

SKOG, Laurence E., Research Scientist Emeritus. B.A. (1965) University of Minnesota; M.S. (1968) University of Connecticut; Ph.D. (1972) Cornell University. Research specialties: Systematics of wild and cultivated Neotropical Gesneriaceae; Neotropical flora, especially flora of the Guianas.

SORENG, Robert, Research Associate. B.S. (1978) Oregon State University; M.S. (1980), Ph.D. (1986) New Mexico State University. Research specialties: Systematics, taxonomy and nomenclature of Poaceae, Pooideae, and Poa; phylogenetics, molecular systematics, bio-geography, breeding systems, morphology, worldwide focus.

DEPARTMENT OF ENTOMOLOGY (http://entomology.si.edu/)

The mission of the Department of Entomology is to describe and understand the phylogenetic and biological diversity of insects and other terrestrial arthropods through global field and laboratory research; to care for and improve the world's largest accessible and most comprehensive terrestrial arthropod collection; and to disseminate these discoveries through scholarly and popular publication, databases of systematic and collection information, training at the graduate and post-graduate level, lectures, teaching and consulting, outreach, and through museum exhibition. The Department consists of staff from three government agencies: the Smithsonian Institution; the U.S. Department of Agriculture, Plant Sciences Institute, Systematic Entomology Laboratory (SEL); and the U.S. Department of Defense, Walter Reed Army Institute of Research, Walter Reed Biosystematics Unit (WRBU). This combined community represents, by far, the greatest concentration of entomological expertise in the world.

Research

Research in the Department of Entomology is primarily collection-based and focuses on systematics in the broadest sense, including basic taxonomy, comparative morphology, and life history of insects, as well as evolutionary and population biology, phylogenetics, biogeography, biodiversity, ecology, behavior, and molecular genetic studies. Of particular current interest are studies on the Classes Insecta and Arachnida.

Collections

Entomology Collection Profile

- *Number of Specimens*: 33.3 million
- *Types*: 120,000

The U.S. National Entomological Collection at the National Museum of Natural History (NMNH) ranks as probably the largest accessible insect collection in the world with approximately 33 million specimens including over 120,000 primary types plus secondary types. With specimens from worldwide locations, the collections are second to none in coverage for the Nearctic and Neotropical regions. Specimens from the Old World are also well represented, especially from Sri Lanka, the Philippines, China, and Papua New Guinea. Although the bulk of the collection is kept dry, various groups-such as spiders, adult aquatics insects, and insect larvae- are stored in ethanol. The collections are typically arranged by taxon; lower categories (at least genus, species) are arranged alphabetically, and for select taxa, for example Lepidoptera, within each species they are further organized by country of origin. For some groups, collections are currently being housed off-site as part of the collaborative Off-Site Enhancement Program with other institutions (see mites, Coleoptera, Diptera below). All families have been recently profiled by storage unit (drawer, jar, slide box) as to their curatorial health. There is an ever expanding image library being built for many groups, especially for the primary type specimens. The collections are supplemented by the Entomological Illustration Archive, totaling over 5,000 illustrations created to support the research publications of Department entomologists and to be available to the external scientific and public communities.

Although the U.S. National Museum (USNM) was established in 1842, the first record of an insect collection stored in the museum does not appear until 1858. In the 1860's most of the Smithsonian's USNM insect collection was sent to collaborating specialists with the stipulation that the material could be reclaimed at any time. In the

early 1870's the USDA was made the official repository for the Smithsonian insect collection, and then in 1881 the combined insect collection was formally transferred to the Smithsonian where it resides today.

The collections include a very large ectoparasite collection, worldwide in coverage and with important medical and vet-erinary entomology components; the Centers for Disease Control (CDC) collections of Anoplura and Siphonaptera; the Car-riker collection of Mallophaga (containing 650 type specimens of Neotropical species); the K.C. Emerson collection of Mallophaga; the Jellison collection of ectoparasites; and projects sampling mammals in Panama, Venezuela, and Africa have produced large additions to the ectoparasite collections.

For detailed information about the Entomology collections, and individuals to contact for specific groups, visit our web site: http://www.entomology.si.edu/Collections.html.

Arachnid Collections - mites, ticks, spiders

Among the arachnid collections, the largest and most significant is the Acari (mite) Collection, currently housed at the USDA Beltsville Agricultural Research Center (BARC) in Maryland. It is the finest in existence for mites parasitizing humans, animals, and plants. The collection includes over 332,000 slides, 14,000 vials and 1,925 primary types. Some of the most important type components include: the collection of H.E. Ewing and I. M. Newell; nearly complete collection of E.W. Baker, C. E. Yunker and A.P. Jacot; important specimens of N. Banks; and type specimens representing all of the new spe-cies described by A. Fain from the Congo. The myriapod holdings rate second only to the Acarina, with special strength in New World specimens. The collection contains nearly all of the types of C.H. Bollman, R.V. Chamberlin, O.F. Cook, R.E. Crabill, R.L. Hoffman, H.F. Loomis, and J. McNeill. The Tick Collection (one million) was acquired by F.C. Bishopp and later combined with the collection of the Rocky Mountain Laboratory of the National Institutes of Health, Hamilton, MO, and contains 222 holotypes (26% of the know species in the world). Both the Tick and the Phytoseiid mite collections are housed off-site (Georgia Southern University and Florida Department of Agriculture in Gainesville, respectively) through cooperative Off-site Enhancement Program agreements. The Spider Collection counts over 200,000 specimens, mostly from the New World, and has over 300 types. Notable collectors include: N. Banks, R.V. Chamberlin, H. Exline, I. Fox, E.V. Key-serling, G. Marx, A. Petrunkevitch, and E. Simon. Contacts: David Furth and Floyd Shockley

Coleoptera Collections - beetles, weevils

The Coleoptera Collection, numbering about 12 million specimens including 26,000 types, includes adult and immature beetles and is the largest accessible beetle collection in the New World. The NMNH Coleoptera holdings include the historic T.L. Casey Collection, comprised of almost 117,000 specimens representing over 20,000 species, including 9,200 types. Other important material comes from the historic collections of G.H. Dieke and R. Korschefsky (Coccinellidae); F. Monros, D. Blake, I. Lopatin (Chrysomelidae); J.D. Sherman (aquatic Coleoptera); F.F. Tippman (Cerambycidae); O.L. Cartwright (Scarabaeidae and Cicindelinae); and P. Spangler (aquatic Coleoptera). SI and USDA-SEL staff have added significant, modern, well-curated specimens, including well over five million specimens collected from the canopy of Neotropical rain-forests by T. L. Erwin. The collection of beetle larvae and pupae, acquired through the efforts of A.G. Boving, is worldwide in representation and one of the largest in existence. Most Scarabaeidae are housed at the University of Nebraska, State Mu-seum through a cooperative Off-site Enhancement Program. In 2009 the S. L. Wood Bark Beetle collection of over 80,000 specimens, including about 1,200 primary types was added making the NMNH collection the best in the world for this group. Contacts: David Furth and Floyd Shockley

Diptera Collections - flies, mosquitoes (http://entomology.si.edu/Collections_Diptera.html)

The collections of Diptera rank among the most extensive in the world, with more than 8,059 drawers of pinned material, 8,538 boxes of slide-mounted specimens, 3238 jars of vials of specimens in alcohol and including about 20,500 primary types. Several large acquisitions, such as the collections of Charles P. Alexander (1.6 million crane flies), P. Arnaud (700,000), S.W. Bromley (35,000), A.L. Melander (250,000), John N. Belkin (92,000), and A.E. Pritchard (27,000), have greatly expanded coverage. Among the families particularly well represented are the Asilidae, Tachinidae, Cecidomyiidae, Culicidae, Ephydroidea, and Tipulidae. The Department

serves as the world center for mosquito research, hosting the Mos-quitoes of Southeast Asia study and the Medical Entomology Project who have described over 100 new species of mosqui-toes. The Mosquito Collection counts more than 300,000 specimens including 1,200 primary types located at the Museum Support Center (MSC) in Suitland, Maryland. The Lauxanoidea are at the California Department of Food and Agriculture under an Off-site Enhancement Program. Contacts: David Furth and Floyd Shockley

Hemiptera Collections - true bugs, cicadas, aphids, whiteflies, psyllids

The Hemiptera Collection (Heteroptera plus Homoptera) is the largest in the world and is located at the NMNH and at BARC (USDA). Although New World holdings predominate, the Old World holdings are rapidly expanding. The collection incorporates many important private collections including: A.C. Baker, H.G. Barber, C.K. Brian, T.D.A. Cockerell, C.J. Drake (including the H. Hacker, M.S. Pennington, C.E. Reed collections), A. Fitch, W.D. Funkhouser, F.W. Goding, H.M. Harris, F.C. Hottes, H.H. Knight, N.A. Kormilev, W.L. McAtee, T. Pergande, P.R. Uhler, R. A. Poisson, and, more recently, the J.T. Polhemus collection of aquatic and semi-aquatic Heteroptera, the J. Moldonado collection of Reduviidae, and the W. Ullrich collection. The Whitefly Collection (Aleyrodidae) is one of the world's best collections, with over 32,500 microscope slide-mounts representing more than 1,100 species, and an extensive collection of dry preserved material. The collection includes more than 300 primary types. The Psyllid Collection includes both pinned (more than 20,000) and slide-mounted (more than 5,000) specimens which include more than 300 primary types. The Aphidoidea Collection is one of the largest collections of aphidoids in the world. The collection contains more than 90,000 slides representing over 2,400 species. The subset Aphid Collection contains primary type material for 747 species which includes 1380 primary type slides. The Coccoidea Collection (scale insects) consists of over 146,000 slides and has more than 280 primary types as well as a large collection of unmounted dry material containing several million specimens. Contacts: David Furth and Floyd Shockley

Hymenoptera Collections - ants, bees, wasps

The Hymenoptera Collection consists of about 3 million specimens including pinned specimens stored in more than 7,000 drawers, approximately 700 jars of vials of larvae and adults in alcohol, and includes over 15,000 primary types. The collection represents about 15 percent of the total entomological collections, and is especially rich in Symphyta, aculeates, and entomophagous parasites from worldwide locations. Outstanding holdings include the W.H. Ashmead, C.F. Baker, P.D. Hurd, Jr., K.V. Krombein, W.M. Mann, M.R. Smith, and A.W. Stelfox collections. Currently the most actively researched groups are the ants and parasitica. Contacts: David Furth and Floyd Shockley

Isoptera, Orthoptera, Thysanoptera Collections – termites, grasshoppers & crickets, thrips

The Termite (Isoptera) Collection has 240,000 specimens and is the second largest in the world, including 1,150 of the known 2,000 species, and 943 types. The Grasshoppers, Katydids, Crickets (Orthoptera) have about 400,000 specimens – perhaps the 3rd largest collection in the world, about 3,000 species, and with 793 types. The Thrips (Thysanoptera) have 108,722 slides, probably 2nd largest collection in world, and 1,118 types. These collections are located at BARC in Mary-land. Contacts: David Furth and Floyd Shockley

Lepidoptera Collections - butterflies, moths

The Lepidoptera Collection has 2.9 million pinned and labeled specimens in 27,000+ drawers, , including about 25,000 primary types. There are about 3,000 alcohol jars with immature stages. The collection has the most complete representation of both larvae (123,000 specimens) and adults in the Western Hemisphere. Included are 131 slide cabinets containing about 100,000 microscope slides, mainly of moth genitalia. The collection is particularly rich in Nearctic and Neotropical species as well as Palearctic material for most families. The Microlepidoptera collection contains excellent coverage of Far Eastern species. Important holdings include: W. Barnes (450,000 pinned specimens), A. Blanchard (60,000), A.E. Brower (115,000), P. Dognin (50,000), D.C. Ferguson

(50,000), M. Gentili (12,000), S. Issiki (16,000), E. Jackh (55,000), F. M. Jones (10,000), A. Kawabe (22,000), S. Nicolay (100,000), J. Robert (40,000), and G. B. Small (25,000). Contacts: David Furth and Floyd Shockley

Other important Insecta order holdings include Trichoptera, Plecoptera, Neuroptera, Mecoptera, Odonata. The Collec-tion also includes the classes Chilopoda, Diplopoda, Arachnida, Symphyla, and Pauropoda. The Phthiraptera, Siphonaptera, Mantodea, Blattodea, Phasmatodea, Embioptera, Zoraptera, Psocoptera, and some Coleoptera families are temporarily deactived due to insufficient collection staffing. Contacts: David Furth and Floyd Shockley

Facilities

The Department of Entomology currently has the most modern insect collection facility in the world. Both dry and wet collections are housed in new, airtight, pest-proof, metal specimen cabinets, about half of which are on electric compactors. The collections are enhanced by specially constructed alcohol (wet collection) storage rooms and facilities for housing reprint libraries. Modern chemical storage facilities, equipment and supplies are stored in compactor systems, walk-in and reach-in freezers, critical point dryers, and ventilated sorting center all support state-of-the-art collections care. The Department has state-of-the-art digital photographic stations for use by staff, researchers and visitors. The Entomology Molecular Systematics Laboratory, a shared facility managed by WRBU at the Museum Support Center, is also available for research investigations, in addition to the facilities of the Smithsonian's Laboratory of Analytical Biology.

Fieldwork

Field studies are conducted in many parts of the United States, Mexico, Central and South America, the Asia-Pacific re-gion, and, to a lesser extent, in Europe, Africa, and Australia. Museum's entomologists currently participate in long-term biodiversity survey projects in Costa Rica (Arthropods of La Selva), Dominican Republic, Leaf Litter Arthropods of Mesoa-merica, Peru, Guyana, Papua New Guinea, the Great Smoky Mountains National Park, and Kenya, among others. Past and present major projects in Sri Lanka, Ecuador, Peru, Madagascar, and Papua New Guinea have yielded millions of specimens for research. A series of canopy-fogging projects in Central and South America, initiated in 1974, has produced nearly 9 mil-lion specimens.

Publications

The Department of Entomology produces dozens of scientific publications per year, including journal articles, mono-graphs, and books. Members of the Department traditionally serve as officers of the Entomological Society of Washington, which publishes the Proceedings of the Entomological Society of Washington and the Memoirs of the Entomological Society of Washington. Departmental staff also serve as editors of the Journal of the International Society of Hymenopterists, etc., as well as on editorial boards of other journals around the world. The Department produces a monthly newsletter, Ent News, and a quarterly Bug Dispatch that are available electronically online through the Department's website.

Education and Outreach

The Department of Entomology has a proven history of training postdoctoral researchers as well as graduate and undergraduate students with special partnerships through the Smithsonian-USDA-University of Maryland MCSE (Maryland Center for Systematic Entomology) program. Through a variety of other cooperative arrangements staff members act both formally and informally as advisors to graduate students and occasionally teach courses at universities both locally and abroad. Department members also advise and oversee a variety of interns and volunteers. Specimens are made available to students for thesis work through loans to their academic advisors and students and researchers are welcome to visit the ento-mology collections and facilities to conduct their investigations on-site. The Department sponsors an entomology-focused all day family festival, open to the general public called BugFest, and participates in other Museum family festivals. Members of the Department participate in Bioblitzes locally and elsewhere in the country.

Library

The Entomology Library contains over 23,000 volumes, including 120 journal subscriptions on insect systematics, ecology, behavior, and related areas. The collection is especially rich in the areas of taxonomy and anatomy of insects and related arthropods, especially arachnids. It is one of the best entomological libraries in North America.

Programs and Partnerships

Maryland Center for Systematic Entomology (MCSE) (http://www.mcse.umd.edu/)

Founded in 1981, the Maryland Center for Systematic Entomology (MCSE) is a consortium for research and training in the systematics of insects and allied groups. Graduate students are enrolled in the Department of Entomology, University of Maryland, with a Smithsonian or USDA-SEL scientist as co-advisor. Research focus includes tropical biology, ecology, evo-lutionary biology, behavior, molecular systematics, and systematic methods, in addition to the systematics and biogeography of virtually all the major groups of terrestrial arthropods. Contact: Ted Schultz

RESEARCH STAFF

BRADY, Sean Gary, Curator of Hymenoptera. B.A. (1990) California Polytechnic University, Pomona; M.A. (1993) California State University, Fullerton; Ph.D. (2002) University of California, Davis. Research specialties: Systematics, phylogenetics, and molecular evolution of aculeate Hymenoptera, especially bees and ants; phylogenetic methodology; social insect evolution.

CODDINGTON, Jonathan A., Senior Research Entomologist and Curator of Arachnida and Myriapoda. B.A. (1975) Yale; M.A. (1978), Ph.D. (1984) Harvard University. Research specialties: Systematics and behavior of spiders; species richness estimation; theory and design of biological inventories.

DAVIS, Donald R., Curator of Lepidoptera. B.A. (1956) University of Kansas; Ph.D. (1962) Cornell University. Research specialties: Systematics and phylogeny of the basal families of Lepidoptera including the superfamilies Tineoidea and Gracillarioidea; biology of leaf-mining and cave-dwelling moths.

DIKOW, Torsten, Research Entomologist and Curator of Diptera. M.S. (2002) Universitaet Rostock, Germany; Ph.D. (2007) Cornell Uni-versity. Research specialties: Phylogeny of asiloid flies (Apioceridae, Asilidae, Mydidae) and Diptera in general using morphological and molecular evidence; revisionary taxonomy applying cybertaxonomic tools; application of specimen occurrence data to biodiversity studies; theory and methods of phylogenetic analysis.

ERWIN, Terry L., Curator of Coleoptera. B.A. (1964), M.A. (1966) San Jose State College; Ph.D. (1969) University of Alberta. Research specialties: Research specialties: Systematics, natural history, and zoogeography of world ground beetles (Carabidae); biodiversity aspects of Neotropical forest canopy insects and their allies; conservation of tropical forests.

ROBBINS, Robert K., Curator of Lepidoptera. B.A. (1969) Brown University; Ph.D. (1978) Tufts University. Research specialties: Systematics of Lycaenidae, evolutionary biology of butterflies, patterns of butterfly diversity.

SCHULTZ, Ted R., Curator of Hymenoptera and Chair of Entomology. B.A. (1988) University of California, Berkeley; Ph.D. (1995) Cornell University. Research specialties: Evolution and systematics of ants, especially the fungus-growing ants (tribe Attini, subfamily Myrmicinae); historical ecology and evolution of the fungus-growing behavior; theory and method of phylogenetic analysis; quantitative methods for assessing ant biodiversity.

AFFILIATED RESEARCH STAFF

BROWN, John W., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1983) San Diego State University; Ph.D. (1988) University of California, Berkeley. Research specialties: Systematics and biogeography of the moth family Tortricidae (Insecta: Lepidoptera); biogeography of the peninsula of Baja California; conservation biology; and faunal inventories.

BUFFINGTON, Matthew, Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1997) University of California, Riverside; M.S. (2000) Texas A&M; Ph.D. (2005) University of California, Riverside. Research specialties: Systematics of parasitic Hymenoptera, specifically the Cynipoidea, Proctotrupoidea and Platygastroidea; molecular systematics; digital imaging techniques envolving small insects.

BURNS, John M., Curator of Lepidoptera Emeritus. A.B. (1954) Johns Hopkins University; M.A. (1957), Ph.D. (1961) University of California, Berkeley. Research specialties: Systematics and evolutionary biology of butterflies (chiefly skippers, Hesperiidae) at and around the species level, with special attention to genitalia, foodplants, and DNA barcodes; biological poetry.

CHAMORRO, Lourdes. Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1998) Ohio State University; Ph.D. (2009) University of Minnesota, St. Paul. Research specialties: Chrysomelidae, specifically Trichoptera.

FOLEY, Desmond, Adjunct Scientist, Walter Reed Biosystematics Unit. B.S. (1979) University of New England; M.S. (1984), Ph.D. (1997) University of Queensland. Research specialties: Molecular systematics, distribution modelling, biogeography, and spatial ecology of mosquitoes.

FLINT JR., Oliver S., Emeritus Research Entomologist. B.A. (1953), M.S. (1955) University of Massachusetts; Ph.D. (1960) Cornell Uni-versity. Research specialties: Taxonomy and biology of the Trichoptera and Megaloidea of the New World

FURTH, David George, Collections Manager. B.A. (1967) Miami University; M.S. (1969) Ohio State University; Ph.D. (1976) Cornell University. Research specialties: Systematics and biology of Leaf Beetles (Chrysomelidae), especially Flea Beetles (Alticinae).

GATES, Michael W., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1992) Hendrix College; M.S. (1995) Oklahoma State University; Ph.D. (2000) University of California, Riverside. Research specialties: Taxonomy and systematics of Chalcidoidea (Hymenoptera), especially Eurytomidae and Eulophidae; collecting techniques, rearing and diversity of Chalcidoidea; digital imaging and image databasing.

HENRY, Thomas J., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1971) Purdue University; M.S. (1980) Pennsylvania State University; Ph.D. (1995) University of Maryland. Research specialties: Systematics of Heteroptera (Hemiptera), especially Berytidae and Miridae.

KONSTANTINOV, Alexander S., Research Entomologist, Systematic Entomology Lab., ARS-USDA. M.A. (1981) Byelorussian State University; Ph.D. (1988) Zoological Institute, St. Petersburg. Research specialties: Systematics, comparative morphology, biogeography, and host plants relationships of leaf beetles (Chrysomelidae) with particular emphasis on flea beetles, worldwide.

KULA, Robert, Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1998) Peru State College; M.S. (2001) Texas A&M University; Ph.D. (2006) Kansas State University. Research specialties: Systematics of Ichneumonoidea, particularly parasitoids of cyclorrhaphous flies.

LINGAFELTER, Steven W., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1989), M.S. (1991) Midwestern State University; Ph.D. (1996) University of Kansas. Research specialties: Systematics and taxonomy of Cerambycidae and Curculionidae (longhorned wood boring beetles and weevils); bionomics of Silphidae (carrion beetles).

MATHIS, Wayne N., Curator of Diptera Emeritus. B.A. (1969) Brigham Young University; Ph.D. (1976) Oregon State University. Research specialties: Systematics, biology, and zoogeography of Canacidae, Tethrnidae, and Ephydroidea, with special emphasis on Ephydridae.

McKAMEY, Stuart H., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1985) University of California, Berkeley; M.S. (1989) North Carolina State University; Ph.D. (1994) University of Connecticut. Research specialties: Biosystematics of Auchenorrhyncha, principally Membracoidea (leafhoppers and treehoppers).

MILLER, Douglass R., Emeritus Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1964), M.S. (1965), Ph.D. (1969) University of California, Davis. Research specialties: Coccoidea.

MILLER, Gary, Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1980) Millersville State College; M.S. (1982) University of Tennessee, Knoxville; Ph.D.(1991) Auburn University. Research specialties: Systematics and taxonomy of the Aphidoidea.

MILLER, Scott E., Deputy Under Secretary for Collections and Interdisciplinary Support. B.A. (1981) University of California, Santa Barbara; Ph.D. (1986) Harvard University. Research specialties: Systematics of Lepidoptera (moths); biogeography of Pacific Basin, New Guinea, and Africa; plant-insect community ecology.

NICKLE, David A., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1970) Temple University; M.S. (1973), Ph.D. (1976) University of Florida. Research specialties: Biosystematics of Orthoptera, especially Tettigoniidae and Gryllotalpidae (katydids, mole crickets), and Isoptera (termites).

NORRBOM, Allen L., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1980) Drexel University; M.S. (1983), Ph.D. (1985) Pennsylvania State University. Research specialties: Systematics (taxonomy, nomenclature, identification) and natural history of true fruit flies (Insecta: Diptera: Tephritidae) and related families.

OCHOA, Ronald, Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.S. (1985); University of Costa Rica; M.S. (1989) CATIE, Costa Rica; Ph.D. (1996) Brigham Young University. Research specialties: Systematics of plant feeding mites (ACARI: Prostigmata), in particular the families Eriophyidae, Tarsonemidae, and Tenuipalpidae; research projects emphasize mite-host-plant relationships and provide tools for identifying economically important phytoparas.

POGUE, Michael G., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1974) University of Colorado; M.S. (1981) University of Wyoming; Ph.D. (1986) University of Minnesota. Research specialties: Systematics, phylogenetics, and biodiversity of Noctuidae (Lepidoptera); special interest in species of agricultural importance, worldwide.

RUEDA, Pollie M., Research Entomologist, Walter Reed Biosystematics Unit. B.S. (1976), M.S. (1980) University of the Philippines; Ph.D. (1984) North Carolina State University. Research specialties: Mosquito biosystematics (Culicidae, Diptera).

SCHEFFER, Sonya, Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1986) Oberlin College; MS (1990) University of Cincinnati; Ph.D. (1995) State University of New York, Stony Brook. Research specialties: Molecular systematics of plant-feeding insects, particularly agromyzid flies; host-use evolution and speciation.

SOLIS, M. Alma, Research Leader and Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1978), M.A. (1982) University of Texas, Austin; Ph.D. (1989) University of Maryland. Research specialties: Systematics of snout moths (Pyraloidea); Pyraloidea of Neotropical areas, particularly Costa Rica.

THOMPSON, F. Christian, Adjunct Scientist. B.A. (1966), Ph.D. (1969) University of Massachusetts. Research specialties: Systematics and zoogeography of Syrphidae and related groups; zoological nomenclature; biodiversity informatics.

THOMPSON, F. Christian, Research Associate. B.A. (1966), Ph.D. (1969) University of Massachusetts. Research specialties: Systematics and zoogeography of Syrphidae and related groups; zoological nomenclature; biodiversity informatics.

VANDENBERG, Natalia J., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1978), Ph.D. (1987) University of California, Berkeley. Research specialties: Taxonomy of larval and adult Coleoptera, especially systematics and zoogeography of Coccinellidae.

WILKERSON, Richard C., Research Entomologist, Walter Reed Biosystematics Unit. B.A. (1968) University of North Carolina; M.S. (1973), Ph.D. (1978) University of Florida. Research specialties: Mosquito systematics.

WOODLEY, Norman E., Research Entomologist, Systematic Entomology Lab., ARS-USDA. B.A. (1976) Washington State University; Ph.D. (1983) Harvard University. Research specialties: Taxonomy and phylogeny of Diptera, especially Brachycera, Orthorrhapa, and Oestroidea.

DEPARTMENT OF INVERTEBRATE ZOOLOGY (http://invertebrates.si.edu)

The Department of Invertebrate Zoology is dedicated to the study of invertebrate animals (exclusive of insects) and enhancing the scientific value of the National Collection to understand the natural environment.

Research

The Department of Invertebrate Zoology supports original research on all major invertebrate animal groups except in-sects. Research efforts focus on systematics, phylogeny, morphology, life histories, biogeography, ecology and genes to ge-nomics. Department scientists increasingly are focused on the nexus of species delimitation and population genetics. Research programs often are collections oriented and include a field component, which can be in terrestrial, freshwater and marine environments, including caves, but the major emphasis is on marine invertebrates. Sites near Smithsonian laboratories on the coasts of Florida, Belize, as well as Caribbean and Pacific Panama have been studied especially extensively. Currently there is a strong focus on southwestern Pacific and Indo-Pacific sites such as French Polynesia, Indonesia and Philippines, among others. Specimens are obtained by hand, SCUBA, ship-based trawls, dredges and plankton nets, as well as deep submersibles and underwater remotely operated vehicles. A plot of IZ specimen collection sites outlines all coasts and covers much of the globe. Current department scientists study invertebrates throughout the world, driven by distribution and knowledge gaps for their particular interests.

Collections

The 33.6 million specimens of the U.S. National Invertebrate Collection are organized into collections primarily by tra-ditional phyla, but also as plankton and meiofauna. Included are representatives from all currently recognized non-parasitic invertebrate phyla. The collections are housed on over 18 miles of shelving, in 16,500 drawers with a combined storage area of 2.3 acres, and 70 steel tanks. They include over 60,000 lots of types - specimens of the same species collected at the same time and place - or about 327,000 individual type specimens. Each year approximately 100,000 specimens are loaned to students and researchers around the world and about 15,000 new specimens are added to the collection. About 75% of the specimens in the collection are fluid-stored (alcohol) and 25% dry. The alcohol collections of the Department of Invertebrate Zoology are located in an off-site collection storage facility in the Museum Support Center, Maryland, about 10 miles from downtown Washington DC. The facility offers state-of the-art environmental controls, life safety systems, storage for collections, and labs for Museum and visiting scientists.

Invertebrate Collection Profile
- *Number of Specimens*: 33.9 million
- *Types*: 327,000

Incorporated into the general reference collections are significant holdings originating from federally funded program-matic studies, including more than 92,000 lots from the US Department of Commerce fishery surveys (NOAA/NMFS and its precursors); more than 192,000 lots from the US Department of the Interior from site surveys for oil and gas leases (BOEM, MMS and USGS), which include more than 76,000 lots of invertebrate collected from the Gulf of Mexico. Also included are more than 40,000 lots of polar invertebrates, the majority collected in conjunction with NSF's US Antarctic Program (USAP). The collections also feature specimens collected from surveys of hydrothermal vents.

Crustacea

The Crustacean collection is the world's largest, with more than 600,000 lots and about 25,250 lots of types. Of the ap-proximately 5,200 known genera of Crustacea, 4,800, or 91%, are represented in the collection. The crayfish collection is one of the most extensive in the world. Contact: Cheryl Bright

Mollusks

The mollusk collection holds more than 900,000 lots and over 13,800 types. Special strengths include gastropods and bivalves of North America; Indo-Pacific marine fauna; world-wide Cephalopoda; and Antarctic Ocean fauna. Spring snails in the US and Mexican deserts have been studied extensively to track current and past water-courses. Contact: Cheryl Bright

Worms

The worm collection totals over 92,000 lots and 9,350 lots of types. Those for annelids (especially oligochaetes, poly-chaetes, sipunculans, and vestimentiferans), nematodes and nemerteans are considered world class in size as well as in taxo-nomic and geographic coverage. Contact: Cheryl Bright

Other Invertebrates

The collections include over 100,000 lots of Cnidaria including 3,680 types; 70,000 lots of Porifera/Protozoa with 7,312 types; and 30,000 lots of Tunicates, with 305 types. Approximately 98% of the known echinoderm families are represented in the collections. Among important older collections are the freshwater sponges collected by N. Gist Gee; cnidarians obtained by the U.S. Fish Commission and studied by E. Deichmann, C.C. Nutting, T. Wayland Vaughan and A.E. Verrill; reef corals studied by J.W. Wells; crinoids monographed by A.H. Clark; Pacific asteroids studied by W.K. Fisher; and many echinoids reported by Th. Mortensen. Contact: Tim Coffer

Facilities

The Department of Invertebrate Zoology has a histology laboratory for traditional anatomical preparations as well as preparing specimens for scanning electron microscopy (SEM). In addition to warming trays and rotary microtomes, an auto-matic tissue processor and embedding center are available for use. Standard compound and dissecting microscopes are available for examining prepared specimens. Specialized equipment includes two ultramicrotomes (RMC and MT-2) for thin sectioning.

Field Work

Field studies are underway at marine sites on and near US coasts, and locations such as the Caribbean Sea, Gulf of Mexico, Philippines, Moorea, Hawaii, Panama, Mexico, Japan, and Belize, as well in terrestrial sites in western North America and Mexico.

Education and Outreach

The Department of Invertebrate Zoology participates in several cooperative graduate education programs including formal affiliations with George Washington University; University of Maruland, College Park; American University; George Mason University; University of Louisiana, Lafayette; and the Rosenstiel School of Marine and Atmospheric Sciences at the University of Miami. Department staff serve on graduate committees for a variety of Universities, from South Carolina to New South Wales in Australia.

Libraries

The invertebrate zoology library currently holds over 5,000 volumes and maintains 27 journal subscriptions, focusing on systematics and taxonomy; morphology, anatomy and physiology; ecology and distribution; genetics and evolution; and paleobiology of invertebrates. The Department of Invertebrate Zoology also houses a superb collection of invertebrate re-prints on mollusks, polychaete worms, crustaceans, nematodes, and nemerteans. The Wilson Copepod Library contains all known literature for copepods and branchiurans, and a comprehensive database with over 49,000 bibliographic entries (available online at: http://invertebrates.si.edu/copepod/index.htm). The Rathbun Library (Crustacea) has approximately 2,100 items,

including 6 journal subscriptions. The Mollusks collection incorporates the gift of the William Healy Dall Library and contains about 7,000 volumes and 56 journal subscriptions on recent and fossil malacology, including Bivalvia, Gastropoda and Cephalopoda. There are also comprehensive speciality libraries covering the Echinodermata, Cnidaria, Porifera and Annelida.

RESEARCH STAFF

CAIRNS, Stephen D., Research Zoologist, Curator of Cnidaria. B.A. (1971) University of New Orleans; M.S. (1973), Ph.D. (1976) University of Miami. Research specialties: Systematics, zoogeography, mineralogy, and phylogeny of Neogene to Recent Scleractinia, Octocorallia and Stylasteridae worldwide.

HARASEWYCH, M.G., Research Zoologist, Curator of Mollusks. B.A. (1972) Drexel University; M.S. (1978), Ph.D. (1982) University of Delaware. Research specialties: Systematics, molecular evolution, biogeography and population genetics of gastropod mollusks, worldwide; Deep-sea Mollusca; Cerion, Pleurotomariidae, Neogastropoda.

HERSHLER, Robert, Research Zoologist, Curator of Mollusks. B.A. (1975) State University of New York, Stony Brook; M.A. (1980), Ph.D. (1983) Johns Hopkins University. Research specialties: Systematics, phylogenetics, and biogeography of freshwater mollusks.

LEMAITRE, Rafael, Research Zoologist, Curator of Crustacea. B.A. (1977) Universidad J. Tadeo Lozano; M.S. (1981) Florida International University; Ph.D. (1986) University of Miami . Research specialties: Systematics, biology, and zoogeography of decapod crustaceans, especially hermit crabs, worldwide.

MEYER, Christopher, Research Zoologist, Curator of Mollusks. B.A. (1988) Colgate University; M.A. (1992) University of California, Berkeley; Ph.D. (1998) University of California, Berkeley. Research specialties: Marine speciation, diversification, biogeography and phy-logeography history, assembly and maintenance of tropical reef communities; DNA barcoding; phylogeny and systematics of Cypraeidae, Conus, and other diverse, reef-associated gastropod groups.

NORENBURG, Jon, Research Zoologist, Curator of Nemertea and Meiofauna and Chair of Invertebrate Zoology. B.A. (1973), M.S. (1976) Acadia University; Ph.D. (1983) Northeastern University. Research specialties: Morphological and molecular phylogeny, phylogeography, biogeography and functional anatomy of nemertean worms, worldwide; biology and zoogeography of soft-bodied marine interstitial fauna, worldwide.

OSBORN, Karen, Research Zoologist, Curator of Annelids and Peracarids. B.S. Zoology (1996) Andrews University, M.S. (1999) Western Washington University, Ph.D. (2007) University of California Berkeley. Research speciality: Evolutionary biology of deep, pelagic inver-tebrates, specifically Polychaeta and Peracarida.

PAWSON, David L., Senior Scientist, Curator of Echinoderms. B.A. (1960), M.S. (1961), Ph.D. (1964) Victoria University. Research specialties: Systematics and ecology of echinoderms, especially sea cucumbers and sea urchins, worldwide; reproductive biology; hybridi-zation.

PHILLIPS, Anna J., Research Zoologist, Curator of Leeches and Tapeworms. B.S. (2006) Appalachian State University, Ph.D. (2011) City University of New York. Research specialties: Biodiversity, phylogenetic relationships, and evolutionary history of parasitic worms, with emphasis on leeches and tapeworms.

RUETZLER, Klaus, Research Biologist and Curator of Sponges. Matura (1955) Realgymnasium, Vienna; Ph.D. (1963) University of Vi-enna. Research specialties: Systematics and biology of sponges; marine ecology, especially of Caribbean coral reefs and mangroves.

STRONG, Ellen, Research Zoologist, Curator of Mollusks. B.A. (1991) University of California, Berkeley; Ph.D. (2000) George Washing-ton University. Research specialties: Phylogeny and systematics of the Caenogastropoda based on morphological and molecular data; evo-lution of feeding biology in the Mollusca (Caenogastropoda; Bivalvia).

AFFILIATED RESEARCH STAFF

COLLINS, Allen Gilbert, Adjunct Scientist, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.A. (1987) Amherst College; Ph.D. (1999) University of California, Berkeley. Research specialties: Evolutionary history and systematics of cnidarians and sponges.

FAUCHALD, Kristian, Research Zoologist Emeritus, Curator of Worms. Cand. Mag. (1959) Cand. Real. (1961) University of Bergen; Ph.D. (1969) University of Southern California. Research specialties: Systematics, anatomy, morphology, biogeography and phylogeny of marine polychaete worms, worldwide.

KORNICKER, Louis S., Research Zoologist Emeritus, Curator of Crustacea (Ostracoda: Myodocopa). B.S. (1941) University of Alabama; M.A. (1954), Ph.D. (1957) Columbia University. Research specialties: Systematics, zoogeography, and ecology of ostracode crustaceans, worldwide.

NIZINSKI, Martha, Adjunct Scientist and Curator of Lobsters, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.S. (1983) West Virginia Wesleyan College; M.S. (1986) University of Maryland; Ph.D. (1998) College of William and Mary. Research specialties: Taxonomy, systematics and biodiversity of decapod crustaceans; biodiversity and community ecology of the invertebrate faunal assemblage associated with deepwater coral reefs off the southeastern US.

ROPER, Clyde, Research Zoologist Emeritus. B.A. (1959) Transylvania University, Lexington, KY; M.S (1962), Ph.D. (1966) Institute of Marine Sciences, University of Miami, Florida. Research specialties: Systematics and biology of cephalopods; giant squid, bioluminescence, deep sea squids.

VECCHIONE, Michael, Adjunct Scientist, Curator of Cephalopod and Pteropod Mollusks, and Systematics Zoologist and Director, National Marine Fisheries Service Systematics Laboratory. B.S. (1972) University of Miami; Ph.D. (1979) College of William and Mary. Research specialties: Systematics, development, biogeography, and ecology of cephalopods.

DEPARTMENT OF PALEOBIOLOGY (http://paleobiology.si.edu/)

The mission of the Department of Paleobiology is the discovery, description, and interpretation of the past history of life on Earth and its context within the surrounding environment. Research efforts of the Department are driven by important evolutionary and ecological questions that require the charting of the patterns and processes of past life. These endeavors are accomplished by active field work, examination of collections, archiving of resulting data, publication of research results, and sponsoring a variety of education and outreach activities.

Research

The Department of Paleobiology is a center for interdisciplinary research on the history of the Earth and its biota, and their interactions through time. Research programs in paleontology encompass the systematics of specific fossil animal and plant groups and their associations, the evolutionary processes underlying phylogenetic patterns, paleoecology, the responses of ecosystems to abiotic and biotic change, and the relationships of ecological

patterns to evolving lineages. Studies of envi-ronmental history emphasize the responses of shallow-water depositional systems to changing climates and rates of subsid-ence, reef dynamics, and the history of ocean basins.

Collections

The Department of Paleobiology has responsibility for the day-to-day curation of the National Collection of Fossils and Sediments. The Collection represents a microcosm of the Museum's biological departments and has a historic origin. Some of the specimens were collected even before the Powell and Hayden Surveys of the late 1800's.

Paleobiology Collection Profile

- *Number of Specimens*: 42.7 million
- *Types*: 297,000

The Collection counts more than 42 million fossils including over 290,000 type specimens, and 50,000 sediment sam-ples with representative material collected within and outside the United States and spans geologic time from the Precambri-an to the Recent. To facilitate access, accountability, and curation, the Collection is divided into four sub-collections: invertebrates, vertebrates, plant fossils, and sediment samples. There is a general organizational scheme used for most of the sub-collections. Published specimens are grouped by geologic age and taxon (e.g., Mesozoic Gastropoda Type, Paleozoic Anthozoa Type). Identified but unpublished specimens are stored either as a unit (e.g., Brachiopoda Biological Collection) or by geologic age and taxon (e.g., Mesozoic Gastropoda Biologic). Stratigraphic collections are organized by geologic age then locality. Although they contain a variety of taxa, some unique collections (e.g. Burgess Shale Types, Burgess Shale Biologics) are kept together as sub-collections. The collections also include outstanding archival documentation relating to collections and specimens such as illustrations, paintings, field notebooks, annotated maps, correspondence, photographs, specimen ledgers, and card files.

Each year, thousands of specimens are loaned to students and researchers around the world for scientific investigation as well as for exhibit. Specimens are added through staff collecting, donations from private individuals and education-al/public institutions, and transfers from other government agencies.

Invertebrate Paleontology

The collections include outstanding invertebrate paleontology collections, including the Trilobite Type Collection; Ha-zen Trilobite Collection; Cenozoic Marine Mollusk Type Collection; Burgess Shale Collection, totalling over 65,000 speci-mens and representing the largest collection of these fossils in the world; Echinodermata including the Springer Collection, donated by Frank Springer in 1911, is the largest repository of fossil crinoids in the world consisting of nearly 4,500 primary types, including 1,678 holotypes, mostly from Paleozoic sequences in North America and Europe as well as more than 100,000 secondary types derived from all parts of the world; Glass Mountain Collection (Brachiopoda); Green River Insect Collection; Foraminifera Collection which is the largest repository in the world of foraminiferal type specimens including over 16,000 primary types (holotypes and paratypes) and over 200,000 secondary types representing about 75% of all the type specimens of the American smaller foraminifera and 90% of the larger American Mesozoic and Cenozoic foraminifera and including the Cushman Collection of Foraminifera, willed to the Smithsonian by Dr. Joseph A Cushman, of approximately 150,000 mounted slides, 25,000 type slides and figured specimens; Solnhofen Collection; and the Micropaleontological Reference Center Collection housing more than 10,000 microfossil samples of foraminifera in specimen containers, as well as calcareous nannofossils, radiolarians and diatoms on slides. Contact: Dan Levin

Vertebrate Paleontology

Outstanding collections include the Hagerman Horse Collection; Teleoceras Collection; Marsh Dinosaur Collection; and Fossil Marine Mammal Collection. Vertebrate collections of fish, amphibians, and reptiles are arranged taxonomically; mammals are organized first by stage and then taxonomy. The first significant dinosaur fossils added to the museum's collections was the type specimen of the sauropod Dystrophaeus viaemalae, collected by J. S. Newberry and donated in 1859, and the Lower Jurassic dinosaur footprints from the Connecticut Valley, donated in 1861. The collections currently include over 1,500 catalogued specimens of dinosaurs, 30 of which are on display. The Marsh Collection, the largest single dinosaur collection at the Smithsonian, includes

some of the most important dinosaurs known to science including exhibit specimens of Allosaurus, Stegosaurus, Camptosaurus, Ceratosaurus, Triceratops, and Edmontosaurus. Contacts: Michael Brett-Surman and David Bohaska

Paleobotany

The paleobotany type collection, considered among the best collections of its kind in the world, is arranged by publica-tion date and author whereas the rest of the paleobotany collections are organized by stratigraphy, collector, or age. The fossil plant collections are complemented by two collections of modern cleared and stained leaf samples of flowering plants, preserved on more than 20,000 glass slides, the best of their kind for comparison with fossil material. Contact: Jon Wingerath

Sedimentology

The Sediment Collection includes a reference collection of over 50,000 sediment samples as well as representative ma-terial collected during historic cruises such as the Albatross and Coastal Survey Studies conducted in the late 1800's. In addi-tion, cores collected from coral reefs to study their Holocene history include cores from Galeta Reef, Panama, Nonsuch Bay, Antigua, Stocking Island, Bahamas, and Holandes Cay, Panama. Also included are surface samples from Cobbler's reef, Barbados, and stromatolite samples from both north Belize and Shark Bay, Australia. Contact: Kathy Hollis

Facilities

Laboratories of the Department include the Paleontology Preparation Lab, Sedimentology Lab, Acid Room, and several specialized preparation areas for invertebrates and fossil plants. These laboratories are well equipped for paleontological, sedimentological, and marine geological research. The Department maintains a darkroom, facilities for preparation of thin sections, petrographic equipment, X-ray apparatus, and several facilities for bulk maceration of matrix-bound fossil specimens ranging from arthropod cuticles to vertebrate bones.

Field Work

Active, on-going field research sites include the Western Interior of North America, and involves collections of paleo-botanical, vertebrate, and invertebrate fossils from Late Paleozoic to Neogene deposits. Departmental staff also have major field programs in Africa, including southern Africa, where Permian to Triassic strata are examined for biotic turnover, eastern Africa, particularly the Pliocene to Recent record of hominids and co-occurring mammals in Kenya and the adjacent region, and the Nile Delta in northeastern Africa, where the sedimentological and human record of Dynastic to Roman Egypt is pre-served. The Department also is actively involved in research of coral reefs at Carrie Bow Cay in Belize, as well as sites across the major oceans where sediment cores are examined for microfossil and physical material to detect major environmental and biological events during the past 100 million years.

Publications

The Smithsonian Contributions to Paleobiology is a monographic series dedicated to the publication of extensive systematic studies of fossil organisms. The Atoll Research Bulletin covers research on the biology, ecology, and environmental settings of present-day and fossil coral reefs. The Evolution of Terrestrial Ecosystems Newsletter informs colleagues of re-search, colloquia, and other events pertaining to the Evolution of Terrestrial Ecosystems consortium at the NMNH. The Fos-sil Record is the quarterly Department newsletter and includes narrative updates of departmental activities and research.

Education and Outreach

The Department of Paleobiology organizes and participates in a variety of public outreach programs, both formally and informally. The most popular educational program is the Paleobiology Training Program, which consists of classes plus field trips covering an introduction to geology and paleontology and an overview of current

departmental research. The FossiLab is a glass enclosed laboratory in the paleontology exhibits space where trained volunteers prepare fossils for scientific study, display, or storage, and speak with the public about their work. Through a variety of cooperative arrangements staff members act both formally and informally as advisors to graduate students and occasionally teach courses at universities both locally and nationally. Specimens are made available to students for thesis work through loans to their academic advisors and students and researchers are welcome to visit the collections and facilities to conduct their investigations on-site.

Libraries

The Department of Paleobiology maintains 7 libraries. For some, oversight is jointly shared with the Smithsonian Insti-tution Libraries (Kellogg, Vertebrate Paleontology, Cooper). For others (Todd, Paleobotany, Coral, Brachiopod) the respon-sibility for care and maintenance rests solely with Paleobiology staff. The libraries contain books of general interest to geology and paleontology, as well as volumes specific to the taxonomic focus. The Department houses a complete set of the Deep Sea Drilling Project-Ocean Drilling Program publications in the Micropaleontological Reference Center.

The Vertebrate Paleontology library collection holds over 1,800 volumes focusing on physical geography, stratigraphy and systematic paleontology and paleozoology of chordates and vertebrates of the Paleozoic, Mesozoic, Tertiary, and Qua-ternary periods. The Cooper Reading Room contains about 250 volumes on general geology, invertebrate paleobiology, his-torical geology, paleontology and other subjects.

The Remington Kellogg Library of Marine Mammalogy contains about 1,800 books and bound journals on all aspects of fossil and living marine mammals, including paleontology, morphology and phylogeny.

Programs and Partnerships

The Evolution of Terrestrial Ecosystems Program (http://www.mnh.si.edu/ete/)

The Evolution of Terrestrial Ecosystems Program (ETE) is an interdisciplinary program whose mission is to document and interpret the history of terrestrial ecosystems from 420 million years ago to the present and to synergize interactions be-tween paleoecologists and ecologists. ETE brings together scientists from around the world to study the patterns and causal process of animal and plant community assembly and disassembly over geological time and up to the present day. Infor-mation from the fossil and geological record provides a unique perspective on ecological change through comparisons of past ecosystems with those of today and helps us to understand how ecosystems could change in the future. Contacts: Anna K. Behrensmeyer and S. Kathleen Lyons

The Paleobiology Training Program (http://paleobiology.si.edu/join/ptp/paleoPTP.html)

The Paleobiology Training Program (PTP) is designed to give interested members of the public a 12-lecture introduction to geology, evolution, fossils, and the history of life. The course also includes two field trips. Graduates of the PTP can continue to volunteer for the Department, gaining more specialized knowledge relating to research, collections management, specimen conservation or other departmental activities. A fee of $200 per participant is charged to cover the cost of the course. Each participant receives a certificate of completion. Classes are offered from 2-4 p.m. on Tuesday afternoons, and held in the Department of Paleobiology at the National Museum of Natural History in Washington, DC. Class size is limited to 25 students. Contact: Thomas Jorstad

RESEARCH STAFF

BEHRENSMEYER, Anna K., Senior Research Paleobiologist and Curator of Vertebrate Paleontology. B.A. (1967) Washington University; M.A. (1968), Ph.D. (1973) Harvard University. Research specialties: Paleoecology of terrestrial environments, especially in the later Cenozoic of Africa and Pakistan, continental sedimentation, investigation of taphonomic processes affecting the fossil record, human paleoecology, evolution of terrestrial ecosystems.

CARRANO, Mathew T., Research Paleobiologist and Curator of Dinosauria. B.S. (1991) Brown University; M.S. (1995), Ph.D. (1998) University of Chicago. Research specialties: Large-scale evolutionary patterns within Dinosauria; systematics of basal Theropoda; vertebrate paleoecology of Mesozoic terrestrial ecosystems; the dinosaur fossil record.

DIMICHELE, William A., Research Paleobiologist and Curator of Paleobotany. B.A. (1974) Drexel University; M.S. (1976), Ph.D. (1979) University of Illinois. Research specialties: Paleoecology, morphology, and systematics of late Paleozoic plants, particularly the structure of late Paleozoic ecosystems and the relationship between long-term ecological and evolutionary patterns.

ERWIN, Douglas, Senior Scientist and Curator of Paleozoic Invertebrates. A.B. (1980) Colgate University; Ph.D. (1985) University of California, Santa Barbara. Research specialties: Macroevolution and evolutionary innovations, particularly the Cambrian metazoan radiation and post-extinction biotic recoveries; the Permian mass extinction; evolutionary history and systematics of Cambrian-Triassic gastropods.

HUBER, Brian T., Research Paleobiologist, Curator of Foraminifera, and Chair of Paleobiology. B.S. (1981) University of Akron; M.S. (1984), Ph.D. (1988) Ohio State University. Research specialties: Cretaceous climate and oceanography; biostratigraphy and paleobiogeog-raphy of Cretaceous and Paleogene foraminifera; evolution and extinction dynamics of Cretaceous and Paleogene planktonic foraminifera; Cretaceous strontium and light stable isotope stratigraphy.

HUNT, Eugene (Gene), Curator of Ostracoda. B.S. (1995) Duke University; M.S. (1999), Ph.D. (2003) University of Chicago. Research specialties: Deep-sea Ostracoda; macroevolution; quantitative approaches in paleontology.

LABANDEIRA, Conrad, Research Paleobiologist and Curator of Fossil Arthropods. B.A. (1980) California State University, Fresno; M.S. (1986) University of Wisconsin, Milwaukee; Ph.D. (1990) University of Chicago. Research specialties: Interactions between plants and insects in the fossil record; terrestrial fossil arthropods, particularly insects; evolution of insect mouthparts; fossil insect diversity.
PYENSON, Nicholas, Curator of Fossil Marine Mammals. B.S. (2002) Emory University; Ph.D. (2008) University of California, Berkeley. Research specialties: Marine mammals; marine tetrapods.

SUES, Hans-Dieter, Senior Research Geologist and Curator of Vertebrate Paleontology. Cand. geol. (1975), Johannes Gutenberg-Universität; M.S. (1977), University of Alberta; M.A. (1978), Ph.D. (1984), Harvard University. Research specialties: Phylogeny and evolutionary morphology of late Paleozoic and Mesozoic non-mammalian synapsids and reptiles (especially non-avian archosaurs); patterns and causes of early Mesozoic biotic changes.

WAGNER, Peter, Curator of Paleozoic Mollusca. B.S. (1986) University of Michigan; B.S. (1989), M.S. (1990) Michigan State University; Ph.D. (1995) University of Chicago. Research specialties: Systematics of Paleozoic molluscs; phylogenetic methodology; rates and trends of morphological evolution; abundance distributions.

WING, Scott L., Research Paleobiologist and Curator of Paleobotany. B.A. (1976), Ph.D. (1981) Yale University. Research specialties: Paleoecology; Cenozoic and Mesozoic paleoclimate; angiosperm history and systematics; fossil plants of the Rocky Mountain region; plant taphonomy.

AFFILIATED RESEARCH STAFF

BAMBACH, Richard, Research Associate. B.A. (1957) Johns Hopkins University; M.A. (1964) Yale University; Ph.D. (1969) Yale Uni-versity. Research specialties: Community paleoecology, diversity, and diversity change

through time; Paleozoic bivalva mollusks; paleoge-ography and paleobiogeography; interpretation of depositional environments; macroevolution.

BUZAS, Martin A., Senior Research Paleobiologist and Curator of Foraminifera Emeritus. B.A. (1958) University of Connecticut; M.S. (1960) Brown University; Ph.D. (1963) Yale University. Research specialties: Foraminifera; quantitative ecology-paleoecology; biogeog-raphy; evolution.

EMRY, Robert J., Curator Emeritus. B.A. (1966) Colorado State University; Ph. D. (1970) Columbia University. Research specialties: Tertiary Mammalia of North America and Central Asia; mammalian evolution and dispersal; biostratigraphy; stratigraphy of Tertiary con-tinental deposits of western North America.

FRENCH, Bevan M., Adjunct Scientist. A.B. (1958) Dartmouth College; M.S. (1960) California Institute of Technology; Ph.D. (1964) Johns Hopkins University. Research specialties: Geology of terrestrial meteorite craters: formation, identification, and geological and bio-logical effects; identification of unique impact-produced shock-wave effects in minerals and rocks; impact debris in the terrestrial sedimentary record and at major extinction boundries.

JACKSON, Jeremy, Research Associate. B.A (1965) George Washington Universisty; M.A. (1968) George Washington University; Ph.D. (1971) Yale University. Research specialties: Ecology and evolution of marine invertebrates; human impacts on tropical marine communities.

JOHNSON, Kirk. Sant Director. A.B. (1982) Amherst College; M.S. (1985) University of Pennsylvania; Ph.D. (1989) Yale University. Research specialties: Cretaceous paleogene; paleobotany, stratigraphy, geochemistry.

LYONS, Kate, Research Paleontologist. B.S. (1991) Wayland Baptist University; M.S. (1994) Texas Tech University; Ph.D. (2001) Uni-versity of Chicago. Research specialties: Species and community level responses to climate change; extinction risk; macroecological patterns across space and time; macroevolutionary dynamics of mammals; biases in the mammalian fossil record; latitudinal gradients in species richness.
MACINTYRE, Ian G., Research Geologist. B.S. (1957) Queen's University; Ph.D. (1967) McGill University. Research specialties: Car-bonate petrography; geological aspects of tropical coral-reef ecosystems; Holocene reef history in the western Atlantic and Eastern Pacific; shallow-water marine geology of the U.S. continental shelf; problems in submarine cementation.

POJETA, JR., John, Research Associate (U.S. Geological Survey, retired). B.S. (1957) Capital University; M.S. (1961), Ph.D. (1963) Uni-versity of Cincinnati. Research specialties: Lower Paleozoic pelecypods, and rostroconchs; biostratigraphy, systematics and phylogeny of Paleozoic chitons.

SANTIAGO-BLAY, Jorge, Research Associate. B.S. (1979) University of Puerto Rico; M.S. (1985) University of Puerto Rico; Ph.D. (1990) University of California, Berkeley. Research specialties: Fossil insects.

STANLEY, Jean-Daniel, Senior Scientist Emeritus. B.S. (1956) Cornell University; M.S. (1958) Brown University; D.S. (1961) Ecole Nationale Superieure du Petrole and Universite de Grenoble. Research specialties: Coastal and delta sedimentology and geoarchaeology; ancient cities submerged in the Mediterranean.

TOSCANO, Marguerite, Research Geologist. B.S. (1982) Long Island University; M.S. (1986), University of Delaware; Ph.D. (1996) Uni-versity of South Florida. Research specialties: Quaternary coastal stratigraphy (siliclastic and carbonate); multi-proxy reconstructions of late Quaternary sea-level change; Pleistocene and Holocene coral reef histories, geochronology, paleoclimate, and sea level interpretations.

TYLER, James C., Senior Scientist Emeritus. B.A. (1957) George Washington University; Ph.D. (1962) Stanford University. Research specialties: Systematic ichthyology, especially Tetraodontiformes; community ecology of coral reef fishes.

WALLER, Thomas R., Curator Emeritus. B.A. (1959), M.S. (1961) University of Wisconsin; Ph.D. (1966) Columbia University. Research specialties: Marine Bivalvia, particularly evolution throughout the Phanerozoic, morphology, shell ultrastructure, larval development, bio-geography, and biostratigraphy; monographic studies of living bivalves and their Mesozoic and Cenozoic fossil record.

DEPARTMENT OF VERTEBRATE ZOOLOGY (http://vertebrates.si.edu)

The mission of the Department of Vertebrate Zoology is to discover, describe and classify the world's species of vertebrates and interpret the evolutionary history of this high profile diversity to meet the needs of science and society.

Research

Research in the Department of Vertebrate Zoology is organized into four divisions: Amphibians and Reptiles, Birds, Fishes, and Mammals. Research studies extend across the spectrum of systematics, morphology, molecular biology, biogeography, life history, behavior, and ecology of fishes, amphibians, reptiles, birds, and mammals with strengths in phylogeny and revisionary studies within these groups. Geographical areas of particular research interest include North, Central and South America; Africa; and the Indo-Pacific region and adjoining areas in southern Asia.

Collections

Worldwide collections of preserved specimens and extensive osteological collections are the basis for monographic studies of vertebrate species and their higher taxa, and for related studies focused on the evolution and ecology of vertebrates. The vertebrate collections trace their origin to the two boxcars of specimens that Spencer Fullerton Baird, one of the first Secretaries of the Smithsonian, brought with him in 1850. Since that time, the Department of Vertebrate Zoology has grown with responsibility to maintain the foremost international collections of vertebrate animals, comprising the world's largest collections of fishes (approximately 6 million specimens), mammals (590,000 specimens), and amphibians and reptiles (570,000 specimens), plus the world's third largest collection of birds (600,000 specimens). The research value of each Division's holdings is amplified by many historically important series including 15,803 primary type specimens. Accordingly, the department is recognized internationally for the systematic and geographic comprehensiveness of its collections and for its influential, high profile research programs in systematic biology and associated fields.

Vertebrate Zoology Collection Profile

- *Number of Specimens*: 9.6 million
- *Primary Types*: 15,803

Division of Amphibians and Reptiles (http://vertebrates.si.edu/herps/)

Research in the division covers a wide spectrum of biological topics and geographic areas. Most research is collections based and emphasizes the evolution, biogeography and systematics of selected groups of frogs, lizards, snakes and turtles from North America, tropical America, Oceania and adjacent western Pacific Rim countries. Staff scientists in the Division use a variety of approaches, including general morphology, morphometry, and molecular techniques. Biodiversity surveys and monitoring population and community structure are regular features of the staff's fieldwork.

Amphibians & Reptiles

- *Specimen Count*: 570,000

- *Primary Types*: 2,278
- *Types*: 11,325

The Amphibian and Reptile Collection is the largest and among the most important in the world, numbering over 570,000 specimens organized alphabetically by taxonomy, and then numerically within a species. Each year about 2,000 new specimens are added to the collection and about 1,200 specimens are sent on loan to other researchers. The oldest documented specimen dates back to 1834. The collection is comprised of over 146,000 frogs, 250,000 salamanders, 350 caecilians, 800 crocodilians, 16 tuatara, 110,000 lizards, 450 amphisbaenids, 52,000 snakes, and 18,000 turtles. Of these, 3,800 are type specimens, with highest representation of North and Latin American taxa. The majority of specimens, 538,000, in the Amphibian and Reptile collection are wet collections - specimens stored in 70% ethanol. The division also maintains 13,200 dry collections, mostly skeletal material but also including flat skins. The glycerin-stored cleared and stained collection - specimens resulting from a process that transparently clears the specimen tissues leaving bone stained red and cartilage blue - counts about 4,100 specimens and mainly includes preparations of small specimens that would be damaged or deformed during the process of making traditional skeletal preparations. The Division has 7,700 formalin-stored specimens, primarily consisting of amphibian larvae, particularly tadpoles. The histological slide collection of 1,500 features microscope slides from Ernest Wever's research on amphibian and reptile ears but also includes important representative slides from aging and reproductive studies. The Division has a sound archive that includes both the original and archival copies of audiotapes, primarily of frog vocalizations, as vouchers of published works and species reference. Most tapes have been digitized and transferred to CDs. Images, including print and digital photographs as well as x-rays are also included in the Division's collections. Tissue samples, although not considered part of the permanent collections because they are typically consumed by the analysis, are routinely collected and a sizable number representing a variety of taxa are available for research and study.

Contacts: Jeremy Jacobs and Steve Gotte

Division of Birds (http://vertebrates.si.edu/birds/)

Birds

- *Specimen Count*: 600,000
- *Primary Types*: 3,968

Research in the Division of Birds is oriented toward the evolution, biogeography, and systematics of birds. Particular in-terests include functional anatomy, structural adaptation, phylogeny, distribution and systematics of neotropical birds, conservation biology of North American migrants, forensic ornithology, and paleontology and evolution of birds and of is-land avifaunas. Recent field sites include southeastern United States, Texas, California, Jamaica, Guyana, Peru, Paraguay, Uruguay, Korea, Burma and Gabon. In cooperation with the U.S. Air Force, specialized research is currently underway in microscopic feather identification applying forensic methodologies to determine species of birds from fragmentary evidence, especially in relation to bird strikes on aircraft.

The Division of Birds maintains the third largest bird collection in the world, with approximately 600,000 specimens including many historical specimens, such as a Charles Darwin specimen that may be the only one in a North American mu-seum - one of the few existing specimens to bear Darwin's original field label. There are also specimens collected by Alfred Russel Wallace, William Henry Hudson, and other notables. The National Collection, known in the ornithological literature by the acronym USNM (referring to the old name of United States National Museum), has representatives of about 80% of the approximately 9,600 known species in the world's avifauna. The first group of specimens originated from the private collection of Spencer Fullerton Baird, who collected in the Carlisle, Pennsylvania region in the early 1840's. Baird's collection also contained material from leading American naturalists of the early 1800's, such as J. J. Audubon, and J. K. Townsend. The bird collection served as the repository for many of the specimens from the U. S. Exploring Expedition and of the sur-veys in the 1800's to explore the western territories, railroad and telephone routes as well as international boundary surveys. Theodore Roosevelt collected birds as a young boy and also as a member of the Smithsonian African Expedition; his speci-mens are part of the USNM collection. A major portion of the bird collection came from the activities of the U.S. Biological Survey, which actively collected over much of North America from the 1890's to 1930's. The oldest known specimen in the Division was collected in Brazil in 1818.

While the majority of the specimens in the Bird Division consist of study skins (about 500,000), skeletal (59,800) and anatomical (ethanol-stored: 29,957) specimens are also maintained and these represent the largest and most diverse of these types of collections in the world. The skeletal collection includes representatives of over 5,100 different taxa. The fluid-stored collection has representatives of almost 4,200 different taxa as well as specialized subsets including a collection of fluid-preserved stomach contents, brains, syringes and a small cleared and stained collection. Additional collections include egg sets (33,012), nests (4,900), and mounted skins (ca. 2,200). The collection also includes approximately 18,000 frozen tissue samples. About 1,100 specimens are added to the collections each year and 35-50 loans of specimens sent to qualified researchers, students and exhibitions. Tissues frozen in liquid nitrogen have also been preserved and are stored at the Laboratories of Analytical Biology. The bird collection includes 3,968 primary type specimens. Information and specimen data for the type specimens is available through an electronic database - the USNM Birds Type Catalog. Approximately 69% of the main collection is computerized in an internal specimen data base. The geographic coverage of the bird collection is worldwide including major holdings from North America, Central America, the West Indies, northern South America, eastern Africa, and Southeast Asia. Regions that are insufficiently represented include southern South America, western Africa, Europe, northern Asia, New Zealand and Australia and New Guinea.
Contacts: Chris Milensky and Brian Schmidt

Division of Fishes (http://vertebrates.si.edu/fishes/)

Research in the Division of Fishes is directed primarily toward systematic revisions of species, genera, and families, and the interpretation of higher classification and biogeography. Staff research efforts are currently focused on the Caribbean and Indo-Pacific marine shore fishes, especially blennies and gobies; beloniform, scombroid, pleuronectiform fishes world wide; larval fish studies, ontogeny and reproductive morphology; and Southeast Asia, South American and African freshwater fishes, especially atherinoid characiforms and catfishes. Osteological, myological and other studies are being conducted as a basis for understanding the phylogeny and higher classification among a broad range of taxa.

Fishes

- *Specimen Count*: 6 million
- *Primary Types*: 6,349
- *Types*: 12,701

The Division of Fishes maintains the largest collection of fishes in the world with over 975,000 lots - specimens of the same species collected at the same time and place - totaling over 6 million individual specimens. The collection is arranged phylogenetically by family and then alphabetically by genus and species within each family. Over 50% of the collection has been computer catalogued and is accessible through an online searchable database. Specimens include adult fish as well as egg, larval and juvenile stages. For some taxa, especially those who progress through varied morphologies, preserved repre-sentatives of the complete series of life stages are available. The majority of specimens are stored in ethanol but the collection also includes dry skeletons (4,830) and specially prepared (cleared and stained) articulated skeletons (5,330) stored in glycerin as well as histology slides and otoliths. The collections include many rare and important fish species, including a Coelacanth, Latimeria chalumnae. About 24,800 or 78% of the almost 32,000 known fish species are represented in the collection, including 19,000 lots (about 94,500 specimens) of type specimens representing 8,500 nominal species; including 6,345 primary types making this the largest such collection in the world. The fish collections include specimens from many historical expeditions including marine fishes from the Wilkes Expedition (1838) and U.S. Bureau of Fisheries trawling expeditions conducted by the Blake, Albatross, Fish Hawk and other ships in the late 1800's and early 1900's as well as North American freshwater fishes collected during the Mississippi-Pacific Railroad and Mexican Boundary Surveys in the 1850's and by David Starr Jordan and his students and colleagues (1860 to 1920). The collection has the world's largest holdings of Indo-Pacific marine shore fishes and extensive coverage of Caribbean marine fishes as well as both North and South American freshwater fishes. In addition to the specimens, the collection includes illustrations and photographs (25,000 units) as well as radiographs (25,000) of fish. Contact: Jeffrey Williams

Division of Mammals (http://vertebrates.si.edu/mammals/)

Research in the Division of Mammals is primarily concerned with systematic revisions, distribution and ecology, natu-ral history, and functional anatomy. Staff research interests are concentrated on the mammals of Africa, Southeast Asia, and the Western Hemisphere. Studies of the systematics and ecology of marine mammals, especially whales and porpoises, of rodents, of bats, and of primates are being actively pursued.

Mammals

- *Specimen Count*: 590,000
- *Primary Types*: 3,208

With roughly 590,000 voucher specimens, the Division of Mammals maintains, by far, the world's largest - nearly twice the size of the next largest - and one of the most important collections of mammals. The standard preparation is the skin and skull of which there are over 350,000 specimens. Other major holdings include 28,000 skeletons, 100,000 fluid-stored specimens, and 3,000 tanned skins. The collection includes 3,208 primary type specimens and many historically important specimens. The collections include several special subsets, among these are mammalian brains (857 specimens), male genitalia (1,700 specimens), fluid-preserved hearts (373), cleared-and-stained specimens (400) as well as karyotype slides (2,000), hair slides and bacula. Frozen tissue samples of vouchered specimens number about 4,000 with an additional 3,000 samples without vouchers.

The oldest specimens originated from the activities of the U.S. Exploring Expedition, dating from 1838-1842, and the personal collection of Spencer Fullerton Baird. A significant portion of the collection's North American specimens resulted from the Biological Survey program, initiated by C. Hart Merriam and conducted by the U.S. Department of Agriculture, in the 1890s-1930s. The Mammal collection includes specimens from William L. Abbott who made large collections of mam-mals from Central and Southeast Asia. The Smithsonian African Expedition acquired many specimens from east Africa (1909-1911), some of which were collected by former President Theodore Roosevelt, and during the 1960s, large field pro-grams surveying mammals as disease vectors, such as the Smithsonian Venezuelan Project and the African Mammal Project, added more than 100,000 specimens to the collection.

Each year 1,500 specimens are loaned to qualified researchers. Data for over 546,000 specimens are electronically available through a searchable database. The taxonomic and geographic scope of the USNM mammal collection spans the globe, with especially strong representation from North America, Central America, northern South America, Africa, and Southeast Asia. Contacts: Darrin Lunde and Suzanne Peurach

Facilities

Specialized facilities including radiographic and light photography systems (both digital and film in each case), dark-room, digital imaging and histological facilities, and sound analysis equipment are available. A separate osteopreparatory and marine mammal necropsy laboratory is located at the Museum Support Center. These are supplemented by discipline specific libraries and archives of original illustrations, maps, and sound recordings.

Field Work

Staff in the Department of Vertebrate Zoology conduct field research on all continents with particular emphasis throughout the Americas, portions of Africa and Southeast Asia and adjoining regions and across many portions of the World Ocean. In recent years traditional forms of specimen preparation have been supplemented by photographic documentation of life coloration, more encompassing anatomical preparations, and preservation of materials for molecular studies.

Education and Outreach

Graduate Programs are available in conjunction with University of Maryland and George Washington University in-cluding formal affiliations through the Robert Weintraub Program in Systematics and Evolution (http://www.gwu.edu/~clade/). Through this program GWU faculty and graduate students work on a variety of organisms including bacteria, protists, angiosperms, cnidarians, mollusks, polychaete worms, arthropods, echinoderms, dinosaurs, fish, mammals and lizards.

Staffs in the Department of Vertebrate Zoology and affiliated agencies are also active as advisors to students throughout North America and in some countries in Central and South America and Europe. Students and re-

searchers are welcome to conduct scientific investigations using the collections and facilities within the Department and may borrow certain materials for loan through their academic advisors and institutions.

Libraries

The library holdings in Vertebrate Zoology are divided among the four divisional libraries with references focusing on systematics, taxonomy, anatomy and physiology, ecology and distribution, and evolution of their respective subject groups. The Birds collection has over 10,000 volumes, including approximately 100 journal subscriptions. The Fishes library has over 8,000 volumes, including 106 journal subscriptions on fish biology, and over 120,000 reprints of scientific literature on fish taxonomy and systematics. The Mammals collection contains about 4,500 volumes, including 40 journal subscriptions. The Amphibian and Reptile Library has approximately 3,500 volumes, maintains 35 journal subscriptions, and includes over 70,000 herpetological reprints making it the largest such collection in the world.

Programs and Partnerships

Genetics Program (http://www.mnh.si.edu/geneticslab/)

The Genetics Program, currently housed at the National Zoological Park, uses molecular genetic methods in support of studies in systematics, population and conservation genetics, and molecular ecology. Much of the research in this lab is directly applicable to concerns of conservation biology, and relevant to endangered species and biodiversity issues. The lab has specializations in the analysis of ancient DNA, often from extinct birds and mammals; the genetics of host vector parasite interactions; and DNA typing to determine identity and relatedness of individuals, often using sub-optimal materials such as scats or hair samples. Contact: Jesus Maldonado.

Marine Mammal Program (http://vertebrates.si.edu/mammals/mammals_mmp.html)

Established in 1972, the Marine Mammal Program, which focuses on whales, dolphins, porpoises, sea cows, seals, and sea lions, is a cooperative research program whose principal goal is to extract all biological data possible from stranded and incidentally taken animals. Through a thorough examination of stranded and incidentally taken animals, valuable data is gained on many aspects of the normal life history of cetaceans. Scientists routinely collect data and specimens that relate to stomach contents, relative organ weights, parasite burden, reproductive condition and stage of physical maturity. Staff members also take external morphometrics and photographs of the external pigmentation pattern. The collection of marine mammals is the largest in the world, consisting of more than 6,400 specimens of cetaceans, 3,100 specimens of pinnipeds and 380 specimens of sirenians. Most of these are represented by osteological material although the collection also includes fluid and frozen specimens. Contact: Charles W. Potter.

RESEARCH STAFF

BALDWIN, Carole C., Curator of Fishes. B.S. (1981) James Madison University; M.S. (1986) College of Charleston; Ph.D. (1992) College of William and Mary. Research specialties: Diversity and evolution of tropical marine and deep-sea fishes; marine conservation; public communication of marine science.

BRAUN, Michael J., Research Zoologist. B.A. (1977) Cornell University; Ph.D. (1983) Louisiana State University. Research specialties: Molecular phylogenetics, molecular evolutionary genetics, avian hybridization and speciation, biogeography of Neotropical birds, conservation genetics.

CARLETON, Michael D., Curator of Mammals. B.A. (1966) University of Massachusetts; Ph.D. (1979) University of Michigan. Research specialties: Systematics and evolution of muroid rodents.

DE QUEIROZ, Kevin, Research Zoologist. B.S. (1978) University of California, Los Angeles; M.S. (1985) San Diego State University; Ph.D. (1989) University of California, Berkeley. Research specialties: Systematics and evolutionary biology of amphibians and reptiles; principles and methods of systematic biology.

GRAVES, Gary R., Curator of Birds. B.A. (1976) University of Arkansas, Little Rock; M.S. (1980) Louisiana State University; Ph.D. (1983) Florida State University. Research specialties: Evolution, biogeography, and ecology of Neotropical birds, especially Andean taxa.

HELGEN, Kristofer M., Curator of Mammals. B.A. (2001) Harvard University; Ph.D. (2007) University of Adelaide. Research specialties: Systematics, biogeography, anatomy, and conservation of terrestrial mammals worldwide, especially Australia.

JAMES, Helen F., Curator of Birds. B.A. (1977) University of Arkansas; D.Phil. (2000) Oxford University. Research specialties: Systematics, evolutionary morphology, and fossil record of birds; island biogeography and paleoecology; ecological effects of humans in island and marine ecosystems.

JOHNSON, G. David, Curator of Fishes. B.S. (1967) University of Texas, Austin; Ph.D. (1977) Scripps Institution of Oceanography. Re-search specialties: Systematics, comparative anatomy, ontogeny, phylogeny, and early life history of fishes, particularly acanthomorphs.

MALDONADO, Jesus, Research Zoologist. B.S. (1983); M.S. (1985) Shippensburg University; Ph.D. (2001) University of California, Los Angeles. Research specialties: Systematics and evolution of mammals, conservation genetics, molecular ecology.

PARENTI, Lynne R., Curator of Fishes. B.A. (1975) State University of New York, Stony Brook; Ph.D. (1980) City University of New York. Research specialties: Phylogenetic systematics and biogeography of tropical freshwater and coastal marine fishes, especially atheri-nomorphs and gobioids; comparative biogeography theory and methods; reproductive and nerve characters in fish systematics.

THORINGTON, JR., Richard W., Curator of Mammals. B.A. (1959) Princeton University; M.A. (1963), Ph.D. (1964) Harvard University. Research specialties: Systematics, ecology, and anatomy of squirrels and New World monkeys; studies of form and function; allometry and morphometrics.

VARI, Richard P., Curator of Fishes and Chair of Vertebrate Zoology. B.A. (1971) New York University; Ph.D. (1976) City University of New York. Research specialties: Systematics, evolution, and zoogeography of South American and African characiforms and some South American and Asian siluriforms.

AFFILIATED RESEARCH STAFF

CHESSER, Robert Terry, Adjunct Scientist, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. (1982) Georgia State Uni-versity; Ph.D. (1995) Louisiana State University. Research specialties: North American birds; seasonal distribution of South American austral migrant birds; biogeography and systematics of birds; modern molecular and cladistic techniques for reconstruction of phylogeny, character evolution, and biogeographic history.

COLLETTE, Bruce B., Adjunct Scientist, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.S. (1956), Ph.D. (1960) Cornell University. Research specialties: Systematics, evolution, zoogeography, anatomy, and biology of marine fishes, especially Scombroidei (mackerels and tunas), Xiphioidei (billfishes), Beloniformes (needlefishes and halfbeaks), and Batrachoididae (toadfishes).

DOVE, Carla, Research Scientist. B.S. (1986) University of Montana; M.S. (1994), Ph.D (1998) George Mason University. Research spe-cialties: Forensic ornithology; researches microscopic variation in downy feather structures and identifies unknown feather samples retrieved from aircraft engines, wildlife cases, prey remains, and anthropological artifacts.

EMMONS, Louise, Adjunct Scientist. B.A. (1965) Sarah Lawrence College; Ph.D. (1975) Cornell University. Research specialties: Tropical rainforest mammals, especially rodents; Neotropical forest and southern savanna mammals.

FOSTER, Mercedes S., Adjunct Scientist, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. (1963), M.A. (1965) University of California, Berkeley; Ph.D. (1974) University of South Florida. Research special-

ties: Evolution, ecology, and behavior of birds; tropical ecology; biodiversity methods; frugivorous birds, fruit nutrition, and seed dispersal.

GARDNER, Alfred L., Adjunct Scientist, Biological Resources Division, Patuxent Wildlife Research Center, U.S. Geological Survey. B.S. (1962), M.S. (1965) University of Arizona, Tucson; Ph.D. (1970) Louisiana State University, Baton Rouge. Research specialties: Systematics and nomenclature of mammals of the Western Hemisphere.

HEYER, W. Ronald, Curator of Amphibians and Reptiles. B.A. (1963) Pacific Lutheran University; M.A. (1965), Ph.D. (1968) University of Southern California. Research specialties: Systematics, evolution, and biogeography of Neotropical amphibians.

McDIARMID, Roy W., Adjunct Scientist, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. (1961), M.S. (1966), Ph.D. (1969) University of Southern California. Research specialties: Natural history and evolution of amphibians and reptiles, especially Neo-tropical forms; morphology and evolution of amphibian eggs and larvae (tadpoles); standard methods for inventory and monitoring species; world snake diversity; bibliographic history of herpetology.

MEAD, James G., Curator of Mammals Emeritus. B.A. (1965) Yale College; M.A. (1972) University of Texas; Ph.D. (1972) University of Chicago. Research specialties: Evolution and interrelationship of cetaceans; functional anatomy, distribution, and biology of cetaceans in the western and northern Atlantic.

MUNROE, Thomas, Adjunct Scientist, Systematics Laboratory, National Marine Fisheries Service, Department of Commerce. B.A. (1973), M.S. (1976) Southeastern Massachusetts University; Ph.D. (1987) College of William and Mary, Virginia Institue of Marine Science. Research specialties: Systematics, evolution, biogeography, and biology of marine fishes, especially Pleuronectiformes.

OLSON, Storrs L., Curator of Birds Emeritus. B.A. (1966), M.S. (1968) Florida State University; Sc.D. (1972) Johns Hopkins University. Research specialties: Paleontology and systematics of birds, with emphasis on island avifaunas, evolution of seabirds, and neotropical bio-geography.
SPRINGER, Victor G., Senior Scientist Emeritus. B.A. (1948) Emory University; M.S. (1954) University of Miami; Ph.D. (1957) Univer-sity of Texas. Research specialties: Systematics, zoogeography, anatomy,of tropical marine fishes.

WEITZMAN, Stanley H., Curator of Fishes Emeritus. B.A. (1951), M.A. (1953) University of California, Berkeley; Ph.D. (1960) Stanford University. Research specialties: Systematics, anatomy and phylogeny of South American characiform fishes.

WILSON, Don E., Curator of Mammals Emeritus. B.S. (1965) University of Arizona; M.S. (1967), Ph.D. (1970) University of New Mexi-co. Research specialties: Evolutionary biology of mammals, especially bats; mammal species of the world.

WOODMAN, Neal, Research Zoologist and Curator of Mammals, Patuxent Wildlife Research Center, U.S. Geological Survey. B.A. (1980) Earlham College; M.S. (1982) University of Iowa; M.Phil. (1986), Ph.D. (1992) University of Kansas. Research specialties: Taxonomy, systematics, biogeography, morphology, and phylogenetics of mammals, especially the Soricidae; tropical mammal communities.

ZUG, George R., Curator of Amphibians and Reptiles Emeritus. B.A. (1960) Albright College; M.S. (1963) University of Florida; Ph.D. (1968) University of Michigan. Research specialties: Evolution and systematics of amphibians and reptiles, with emphasis on South Pacific species; biology and systematics of turtles.

THEME III: Study of Human Diversity and Culture Change

Our anthropologists seek to understand humanity in all of its complexity, within a framework of broad cultural, social, linguistic, and biological theories, from the emergence of the human species to the present. They communicate their findings widely, and their insights address the problems of the modern world and promote cross-

cultural understanding and dialogue. Research themes include: 1) human-environmental interactions, encompassing the emergence of agriculture and domestication, and the study of human impacts on the environment to advance understanding of how humans have shaped the planet in recent times; 2) human origins, adaptations and radiations into new environments, and 3) human cultural diversity, cultural contact, and globalization and its impacts on the transformation and loss of cultural and linguistic diversity.

DEPARTMENT OF ANTHROPOLOGY (http://anthropology.si.edu)

The mission of the Department of Anthropology is to study the biological and cultural diversity of humankind around the globe. Staff record, study, collect and preserve artifacts representative of world societies and disseminate that knowledge widely through publications, exhibits, lectures, teaching, and by providing opportunities for research and study within the department.

Research

Research in the Department of Anthropology encompasses the entire range of human development, from the earliest traces of our distant ancestors, more than five million years ago, to today's complex societies. Our researchers explore the effects of humans on the environment as well as the impacts of the environment on humans—learning how our responses may have shaped our evolution. Our archaeologists seek the origins of domestication and agriculture, they trace environmental change in marine environments through 9,000 year-old oyster shells, they chart the arrivals of the first humans on the North American continent, they recreate the changing environment of Ghengis Khan's Mongolia using agent-based computer modeling, they tease out the connections between seventeenth century Basque whalers and the indigenous people of Quebec. Our ethnologists work with indigenous communities, with the impact of borderlands and migration on language survival, on the critical loss of knowledge that accompanies the death of each endangered language. Our physical anthropologists study historic period populations, engage in cutting-edge forensic work and seek clues to help modern populations deal with real-time issues like osteoporosis by dexa-scanning the bones of the Chesapeake Bay's earliest settlers.

Collections

The Department of Anthropology preserves diverse collections relating to world cultures and the history of anthropolog-ical study, and makes them accessible for a wide variety of research, education, and enrichment activities. The Anthropology collections are comprised of three main collections units: Archaeology, Ethnology and Physical Anthropology Collections; National Anthropological Archives; and Human Studies Film Archives.

Anthropology Collection Profile

- *Number of Objects*: 2.5 million

Anthropology Collections - Archaeology

The archaeology collections consist of more than 2 million objects derived primarily from Smithsonian-sponsored ex-cavations. From the mid-19th century survey of Mississippian mound sites to the massive mid-20th century River Basin Surveys Program to the current Paleo-Indian research program, much of this work has focused on North America. There are, however, significant collections from other world areas, including artifacts from the first excavations at many locations in Central and South America and rare materials from the Old World Paleolithic and Mesolithic.

Among the significant archaeology collections are the Division of Mound Explorations by Cyrus Thomas in the Eastern United States (1800s); the River Basin Survey collections (1946-1969) that include prehistoric and historical materials from the Missouri River Basin and WPA survey's from the Southeastern United States; as well as the southwest archaeological materials excavated by Neil Judd from Chaco Canyon. Contact: David Rosenthal

Anthropology Collections - Ethnology

The ethnology collections are comprised of over 200,000 objects representing 19th and 20th century cultures from around the globe. Exploring expedition collections document periods of early contact worldwide, while the Bureau of American Ethnology materials represent the results of large-scale, systematic collecting as an integral part of in-depth research in Native American communities by scholars such as John Wesley Powell, James Stevenson, Jesse Fewkes, and James Mooney. The collections include Japanese material collected by Matthew Perry in the 1850s and several thousand items from the Pacific islands assembled by the U.S. Exploring Expedition, 1838-42. The collection is particularly strong in materials from North America, but there are also significant collections from Asia, Africa, the Caribbean, Central America, Mexico, Ocean-ia, and South America. Contact: Felicia Pickering

Anthropology Collections - Physical Anthropology

The physical anthropology collections, which are primarily osteological, are used for studies in biological anthropology, with nearly 33,000 individuals representing populations throughout the world. The majority of the material was recovered during archaeological investigations and represents over a millennium of human experience. The department has been one of the major repositories for federally sponsored archaeological investigations in the United States and the largest portion of the archaeological series comes from North America (approximately 45%). The balance of the collection is from South America (20%), Asia (15%), Africa (10%), and Europe (5%). The most extensive South American samples come from Peru, Argentina and Ecuador. Representative Asian groups include Mongolia, Northern China, and Siberia. There are also samples from Japan and the Pacific Island regions. The African continent is mainly represented by small population groups from various countries, with the exception of an extensive collection of Egyptian skeletons from the Lisht and Kharga oases. Among the sample groups from Europe, the collection of skulls from Bavarian charnel houses is the largest along with an anatomical skull series from Berlin. There are also small representative samples from France, England, and Greece.
The collection includes one of the premier anatomical research collections, the Robert J. Terry collection, consisting of more than 1,700 complete human skeletons from known individuals assembled by Robert J. Terry between 1921 and 1946. Because of the completeness of the information and excellent preservation, it continues to be a fundamental resource for research on bone pathology, skeletal biology, and forensic anthropology. Another important anatomical collection in the Physical Anthropology Division was assembled by Dr. George Huntington (1861-1927) for his research in skeletal anatomy at the College of Physicians and Surgeons in New York. The collection represents over 3,600 individuals of known age, sex, nationality, and cause of death. The collection consists of European immigrants and New York City residents who died in boroughs of the city between the years of 1892-1920. In addition to human skeletal collections, the Department houses over 3,000 face molds and busts made from living or dead individuals representing ethnic groups from around the world. Many of the living masks are of well-known Native Americans who lived in the late 1800s and early 1900s; human paleoanthropology fossil casts, some of which are quite valuable because they are the only remaining representations of specimens that no longer exist; a number of human and animal mummies from various regions of the world; a small collection of wet tissue specimens and a fairly large collection of hair samples from populations throughout the world. Contact: David Hunt

National Anthropological Archives (http://www.nmnh.si.edu/naa/)

The National Anthropological Archives collects and preserves historical and contemporary anthropological materials that document the world's cultures and the history of the discipline. Its collections represent the four fields of anthropology - ethnology, linguistics, archaeology, and physical anthropology - and include manuscripts, field notes, correspondence, pho-tographs, maps, sound recordings, film and video created by Smithsonian anthropologists and other preeminent scholars. The collections include the Smithsonian's earliest attempts to document North American Indian cultures and the research reports and records of the Bureau of American Ethnology (1879-1964), the U.S. National Museum's Division of Ethnology, its Division of Physical Anthropology, and River Basin Survey archaeology.

The NAA also maintains the records of the Smithsonian's Department of Anthropology and of dozens of professional organizations, such as the American Anthropological Association, the American Ethnological Society, and the Society for American Archaeology. Among the earliest ethnographic collections are the diaries of John Wesley Powell, which recount his exploration of the Colorado and study of the region's Indians, and the pictographic histories of Plains Indians collected by U.S. military officers and BAE ethnographers. Other significant manuscript collections include the ethnographic and linguis-tic research of Franz Boas, Frances Densmore, Albert S. Gatschet, John Peabody Harrington, and J.N.B. Hewitt, as well as the expedition logs, photographs, and film record produced on Matthew Stirling's explorations in New Guinea (1926-29). The Smithsonian's broad collection policy and support of anthropological research for over 150 years have made the NAA and HSFA unparalleled resources for scholars interested in the cultures of North America, Latin America, Oceania, Africa, Asia and Europe. The NAA is the successor to the Archives of the Bureau of American Ethnology. In 1965, it joined the collec-tions of the Department of Anthropology and in 1968 was renamed the National Anthropological Archives. Although North American materials remain one of the collection's strengths, for the past 40 years the NAA has collected and preserved an-thropological materials that document cultures from around the world.
All told, the archives curates 9,000 linear feet of manuscripts (about 17 million pages); 400,000 ethnological and ar-chaeological photographs (including some of the earliest images of indigenous people worldwide); 21,000 works of native art (mainly North American, Asian, and Oceanic); and 3,700 sound recordings. Contacts: Gina Rappaport and Adam Minakowski

Human Studies Film Archives

The Human Studies Film Archives was established in 1981 to collect, preserve, and make available for research use an-thropological film and video records. The collection includes historic and contemporary, edited and unedited, silent and sound, and black- and-white and color film and video documents from around the world. The growing collection totals al-most 34,000 holdings including 15,000 rolls of original preserved film, 5,500 rolls of reference film, 3,100 5-inch sound tapes, 5,670 7-inch sound tapes, 608 snn tapes, 868 cassette tapes and 3,200 videocassettes representing over 8 million feet. These records were created by a diverse group of people including anthropologists, archaeologists, Peace Corps volunteers, missionaries, teachers, commercial and independent film-makers, and travelers. Supplementary materials such as annotations, sound recordings, field notes, photographs, and dissertations, accompany many of the film projects. An active preservation program ensures that the Film Archives' archival moving image records are not lost due to neglect and deterioration. Contacts: Pam Wintle and Mark White

Facilities

The Department of Anthropology maintains well-equipped conservation laboratories, a collection processing laboratory, a section for scientific illustration, and a public information outreach office. The Department has advanced x-ray equipment including a Siemens Somatom CT scanner. The CT scanner is used extensively to study objects in a nondestructive and noninvasive manner. Recently studied objects and specimens include human skeletal remains, mummies, ethnographic objects, forensic objects, and archaeological items. The CT scanner is available to other departments and organizations within the Smithsonian and collaborations related to scanner use include institutions worldwide. Fieldwork equipment includes Ashtec/Magellan GPS (Global Positioning System), Topcom electronic total station, and Geonics electromagnetic equipment. Use of the CT scanner and surveying equipment may be offered to researchers and advanced students when available.

Fieldwork

Department of Anthropology scientific staff members conduct extensive field research throughout the world including archaeological, ethnological, linguistic, and physical anthropological research in Argentina, Saudi Arabia, Bahrain, Brazil, Canada, China, Cuba, Denmark, Ecuador, Egypt, England, Greenland, Greece, Indonesia,

Iran, Israel, Jordan, Kenya, Korea, Kuwait, Labrador, Mali, Burma (Myanmar), Mexico, Mongolia, Pakistan, Polynesia, Peru, Syria, Tanzania and Tonga, as well as in various parts of the United States, including California's Channel Islands and the Chesapeake Bay

Publications

Smithsonian Contributions to Anthropology, the encyclopedic Handbook of North American Indians, Anthro-Notes (a periodical for teachers and anthropologists), the Arctic Studies Newsletter and Contribution to Circumpolar Anthropology.

Education and Outreach

Anthropology Department staff engage in outreach and education with community-based archaeology programs for at-risk indigenous students in Labrador, in working with Mayan cooperatives in Mexico, in providing forensic expertise to federal, state and local law enforcement agencies, in hosting interns and fellows, in giving public lectures, and in working with Native American tribes in various parts of North America. Each summer the Department also hosts the Summer Institute in Museum Anthropology (SIMA), a research training program for anthropology graduate students to gain hands on experience and learn broader and more effective uses of museum collections in anthropological research.

Libraries

The Anthropology Library, officially known as the John Wesley Powell Library of Anthropology (http://www.sil.si.edu/libraries/anth-hp.htm), consists of approximately 85,000 volumes, including more than 400 serials, a large number of microfilm, and smaller collections of CDs, audiocassettes, etc. The core of the collection is the library of the Bureau of American Ethnology (BAE) established by Congress in 1879 within the Smithsonian to conduct "anthropologic researches among the North American Indians". In 1965, when the BAE was abolished, its library was joined with those of the NMNH Anthropology divisions.

The coverage of today's library collection is broad, including all four sub-fields of American anthropology, and is re-search-oriented with an emphasis on material culture. Holdings are especially strong in Native American culture, history, and linguistics for all of North America and the Arctic Rim, with additional materials focusing on indigenous cultural develop-ment in Central and South America. The history of anthropology, especially during its early years in the United States, is also well represented. The last several decades have seen significant growth in Asian cultural history. A diverse body of literature supports research in physical anthropology, especially in skeletal biology, paleopathology, forensics, human origins, and hu-man variation and biocultural adaptation. In addition, the Anthropology Library has research materials on the Near East, Oceania, Africa and the New World diaspora.

Programs and Partnerships

Program in Human Ecology and Archaeobiology (http://anthropology.si.edu/archaeobio/)

The Program in Human Ecology and Archaeobiology examines the biological and ecological impact of human exploitation on plants and animals, and the reciprocal impact of this relationship on the course of human cultural evolution. The program targets periods of human history beginning with early attempts to domesticate plants and animals, and explores the ecological and cultural implications of the development and intensification of agricultural economies up through the emergence of early urban societies. The geographical focus of the program is global, with special emphases in North, Central, and South America, Western Asia, and Europe. Contact: Torben Rick

Arctic Studies Center (http://www.mnh.si.edu/arctic/)

The Arctic Studies Center (ASC) was organized in 1988 to establish programs in Arctic and Subarctic anthropology, ar-chaeology, and biology. The ASC explores cultures, history and environments of the northern part

of the globe, and conducts research throughout the circumpolar region. ASC anthropologists specialize in archaeology, ethnology, ethnohistory and aspects of human-environmental interactions from the Ice Age to modern times. The ASC also investigates modern processes of culture contact and transformation from the perspectives of history, contemporary affairs, demography, geography and ecology. Contact: William W. Fitzhugh

Arctic Studies Center - Alaska Office (http://www.mnh.si.edu/arctic/html/alaska.htm)

In 1993 a branch office of the Arctic Studies Program was opened at the Anchorage Museum of History and Art in An-chorage, Alaska. The NMNH cares for many thousands of items that represent the cultural heritage of Alaska's diverse Native peoples, including clothing, tools, basketry, carvings and ceremonial art. The Alaska Office was opened to make these resources more accessible to Alaskan scholars, artists, educators, students and the general public. In addition to exhibitions and field studies, the Alaska office works with the University of Alaska and with Alaskan museums and culture centers to offer lectures, workshops and courses in cultural research and museum skills. Contact: Aron L. Crowell

Asian Cultural History Program

Since 1985, the Asian Cultural History Program has carried out research on the cultural and ecological history of Asia's diverse peoples and has worked to preserve and make more accessible existing Smithsonian resources for the study and ap-preciation of Asian heritage. This program has been funded entirely through corporate and private donations, and its projects carried out in collaboration with Asian counterpart institutions. Contact: Paul M. Taylor

Human Origins Program (http://humanorigins.si.edu/)

The Human Origins Program was established in 1985 to investigate the evolution, paleoecology, and behavior of early humans. The program is based on field excavation of hominin sites in Africa and Asia, and seeks to test the effects of ancient environmental variation on hominin activities and geographic distribution. Through international collaboration, data on paleontological and archaeological sites worldwide are brought together to better understand the ecological factors involved in human evolution. An excellent collection of hominid fossil casts and Paleolithic artifacts are maintained for study. Contact: Richard Potts

Paleo-Indian Program (http://anthropology.si.edu/paleoindian/)

The PaleoIndian/Paleoecology Program investigates the arrival, dispersal and development of the earliest human groups in the Americas within the context of global and local environmental change. Established in 1972, the program is multi-disciplinary in scope, involving teams of scholars from institutions around the world. Internships, field training, and public programs are integral components of the research program. Current projects focus on the Rocky Mountains, northwestern Alaska, and northern Spain. The Paleo-Indian collections represent one of the premier education and research collections of Paleo-Indian artifacts, archival records and comparative study casts in North America. The collection includes approximately 10,000 objects of Paleo-Indian stone tools (those roughly older than 10,000 years), mainly from North America, used by ice age hunters. The tools include drills, scrapers, gravers, projectile points and atlatl from the Clovis and Folsom Period. Amid the most interesting and famous, the collection includes a cast set of pre-Clovis tools from the Miles Point and Jefferson Island sites from the eastern shore of the Chesapeake Bay. Contact: Dennis J. Stanford

Repatriation Office (http://anthropology.si.edu/repatriation/)

The Repatriation Office was established in 1991 in response to the National Museum of the American Indian Act. This legislation mandates that the Smithsonian inventory its Native American and Hawaiian collections for human remains, in-cluding certain categories of objects, and return them to culturally affiliated groups. Staff members document the physical remains and objects in order to assess their origin, identity and affiliation, and provide recommendations for action. An amendment to the NMAI Act in 1996 broadened the repatriation mandate to include sacred objects and objects of cultural patrimony (as defined in the Native American Graves Protection and Repatriation Act passed in 1990). Much of the Native American material now held by the museum was col-

lected as a part of archaeological excavations or anthropological expeditions around the U.S. Remains and objects were also transferred to the Smithsonian from other institutions, including the former U.S. Army Medical Museum. A small number of human remains were collected by private individuals, and large numbers of ethnographic objects were acquired from Native people throughout the 19th and 20th centuries by private collectors and Smithsonian anthropologists. To date, over 5,400 sets of remains have been offered for repatriation, and of these 3,652 have been repatriated. Contact: William T. Billeck

RESEARCH STAFF

ARNOLDI, Mary Jo, Curator, African Art and Ethnology and Chair of Anthropology. B.F.A. (1970) Bowling Green State University; M.A. (1975) Michigan State University; Ph.D. (1983) Indiana University. Research specialties: African ethnography with emphasis on visual, material, and performing arts; post-colonial public culture, museum history and museology.

BELL, Joshua A., Curator, Globalization. B.A. (1992) Brown University; M.Phil (1998), D.Phil (2006) Oxford University. Research spe-cialties: shifting local and global network of relationships between persons, artifacts and the environment; materiality, transforming political economies and ecologies, cultural and intellectual property, indigenous knowledge systems, history and the role of objects.

BISHOP, Ronald, Curator, Mexican and Central American Archaeology. B.A. (1965) San Francisco State University; Ph.D. (1975) Southern Illinois University. Research specialties: Archaeology of Meso- and Central America; ancient materials characterization; exchange systems; quantitative methods.

FITZHUGH, William W., Curator, North American Archaeology; Head, Arctic Studies Center. B.A. (1964) Dartmouth College; M.A. (1967), Ph.D. (1970) Harvard University. Research specialties: Archeology and ethnology of northern Canada and United States, circumpolar regions, and Mongolia; Arctic material culture; Arctic social science policy; cultural ecology of the North; ethnographic and prehistoric maritime adaptations; culture and climatology.

ISAAC, Gwyneira, Curator, North American Indigenous Culture. BFA (1990) University of Michigan; M.Phil (1995) Oxford University; Ph.D. (2000) Oxford University. Research specialties: Anthropology, Zuni and Southwest Pueblos, knowledge systems, material culture, photography.

KAEPPLER, Adrienne L., Curator, Oceanic Ethnology. B.A. (1959), M.A. (1961), Ph.D. (1967) University of Hawaii. Research specialties: Social anthropology, material culture, art, ethnohistory, ethnoscience of Polynesia and Micronesia, and aesthetics and systems of knowledge.

KRUPNIK, Igor I., Curator, Circumpolar Ethnology. M.A. (1973) University of Moscow; Ph.D. (1977) Moscow Institute of Ethnography; Ph.D. (1990) Institute of Ecology and Morphology, Moscow. Research specialties: Arctic ethnology, indigenous knowledge, social systems, modern cultures; Arctic environment and climate change; cultural heritage and heritage preservation; history of Arctic/North Pacific ethnological research.

MERRILL, William L., Curator, North American Ethnology. B.A. (1972) University of North Carolina; M.A. (1975), Ph.D. (1981) Uni-versity of Michigan. Research specialties: Ethnology with an emphasis on world view, religion, ethnobiology and ethnohistory of North American Indians, particularly Indian groups of western North America and the relationships between material and nonmaterial aspects of culture.

OWSLEY, Douglas W., Curator, Physical Anthropology. B.A. (1973) University of Wyoming; M.A. (1975), Ph.D. (1978) University of Tennessee. Research specialties: Skeletal biology; forensic anthropology; historic populations in North America; North American Plains Indians; Polynesia.

PEREZ BAEZ, Gabriela, Research Anthropologist, Linguistics. BFA (1997) SUNY; M.A. (2005) SUNY; Ph.D. (2009) University of Buf-falo. Research specialties: Zapotec languages, Mesoamerican languages, language documentation, lexicography, semantics, language maintenance, language endangerment.

PIPERNO, Dolores R., Senior Scientist and Curator, South American Archaeology. B.A. (1971) Rutgers University; M.A. (1979), Ph.D. (1983) Temple University. Research specialties: Tropical archaeology, archaeobotany, and paleoecology; agricultural origins; prehistoric human ecology.

POTTS, Richard, Peter Buck Chair of Human Origins. B.A. (1975) Temple University; Ph.D. (1982) Harvard University. Research special-ties: Paleoecology and evolution of early hominids; excavation and analysis of hominid sites (late Miocene through Pleistocene).

RICK, Torben, Curator, North American Archaeology. B.A. (1997) University of California, Santa Barbara; M.S. (1999) University of Oregon; Ph.D. (2004) University of Oregon. Research specialties: Interactions of ancient people with coastal and terrestrial ecosystems.

ROGERS, J. Daniel, Curator, North American Archaeology. B.A. (1976); M.A. (1982) University of Oklahoma; Ph.D. (1987) University of Chicago. Research specialties: Great Plains, Southeastern U.S., Mexico, Mongolia archaeology and ethnohistory, development of empires, culture contact.

SMITH, Bruce D., Curator, North American Archaeology; Senior Scientist, Archaeobiology Program. B.A. (1968), M.A. (1971), Ph.D. (1973) University of Michigan. Research specialties: Origins of agriculture; plant and animal domestication; archaeology of North America; and the development of ranked societies.

STANFORD, Dennis J., Curator, Paleo-Indian Archaeology. B.A. (1965) University of Wyoming; Ph.D. (1972) University of New Mexico. Research specialties: Paleo-Indian paleo-ecology and New World origins, circumpolar Paleolithic archaeology.

TAYLOR, Paul Michael, Curator, Asian, Near Eastern, European Ethnology and Head, Asian Cultural History Program. B.A. (1975) Uni-versity of California; M.Phil. (1977), Ph.D. (1980) Yale University. Research specialties: Cultural anthropology and linguistics of Southeast Asia; ethnobiology; kinship and social organization; art and material culture; ecological anthropology; ethnography and languages of Indonesia, especially Maluku and Irian Jaya; digital museums.

UBELAKER, Douglas H., Senior Scientist and Curator, Physical Anthropology. B.A. (1968), Ph.D. (1973) University of Kansas. Research specialties: New World human skeletal biology; and forensic anthropology.

ZEDER, Melinda A., Senior Scientist and Head, Archaeobiology Program. A.B. (1975), M.A. (1978), Ph.D. (1985) University of Michigan. Research specialties: Animal domestication; origins of food production, environmental impact of early agro-pastoral economies in the Near East, subsistence resources in emerging complex societies, Near Eastern archaeology, zooarchaeology.

AFFILIATED RESEARCH STAFF

ARCHAMBAULT, Joallyn, Head, American Indian Program. B.A. (1970), M.A. (1971), Ph.D. (1984) University of California, Berkeley . Research specialties: North American Indian ethnology with emphasis on the Plains and the Southwest; art and material culture; political clientelism; ethnic group relations; museological history of exhibits as relates to American Indians.

BILLECK, William, Program Manager, Repatriation Office. B.A. (1976) Queens College; M.S. (1980) University of Wisconsin, Milwaukee; Ph.D. (1993) University of Missouri . Research specialties: Repatriation, North American Archaeology, Historic Archaeology, Glass Trade Bead Studies.

BLACKMAN, James, Curator, Archaeology. B.A. (1965), M.S. (1971) Miami University; Ph.D. (1975) Ohio State University. Research specialties: Archaeological materials characterization; chemical characterization by INAA; exchange systems; production technology and organization, Old World, Middle East, Spanish Colonial Americas

CROWELL, Aron, Alaska Director, Arctic Studies Center. M.A. (1988) George Washington University; Ph.D. (1994) University of Cali-fornia, Berkeley. Research specialties: Arctic archaeology and anthropology, museum anthropology.

FROHLICH, Bruno, Statistician Emeritus, Physical Anthropology. B.A. (1973) University of Copenhagen; M.S. (1976), Ph.D. (1979) Uni-versity of Connecticut. Research specialties: Middle East, Central Asia, Sub-Arctic, New England; Skeletal biology, forensic sciences and medicine, remote sensing, medical imaging (CT), GIS, GPS, surveying, non-destructive analytical methods.

GODDARD, Ives, Senior Linguist Emeritus. A.B. (1963) Harvard College; Ph.D. (1969) Harvard University. Research specialties: Lin-guistics and North America; general linguistics including descriptive, historical, and theoretical; textual analysis, discourse, philology; Algonquian linguistics and ethnohistory.

GREENE, Candace S., Ethnologist. B.A. (1971) University of Texas; M.A. (1976) Brown University, Ph.D. (1985) University of Oklaho-ma. Research specialties: Native North American art, material culture, and ethnology, especially Plains Indian drawings; museum anthro-pology; issues in collection-based research.

HOMIAK, John P., Head, Anthropology Collections & Archives Program. B.A. (1969) Franklin and Marshall College; M.A. (1975) U.S. International University; Ph.D. (1985) Brandeis University. Research specialties: Caribbean ethnology, diaspora studies, Rastafari, visual anthropology and ethnographic film.

HUNT, David R., Physical Anthropology Collections Manager. B.A. (1980) University of Illinois; M.A. (1983), Ph.D. (1989) University of Tennessee, Knoxville. Research specialties: Human variation, skeletal biology, forensic anthropology, human mummies of the world.

LORING, Stephen, Arctic Archaeologist. B.A. (1973) Goddard College; M.A. (1984), Ph.D. (1991) University of Massachusetts, Amherst. Research specialties: Arctic and sub-Arctic ethnohistory and archaeology; Labrador; public policy in the circumpolar north; repatriation philosophy, community archaeology, indigenous property rights.

POBINER, Briana, Research Scientist and Education Specialist. B.A. (1997) Bryn Mawr College; M.A. (2002) Rutgers University; Ph.D. (2007) Rutgers University. Research specialties: Hominin-Carnivore Interactions.

TOCHERI, Matthew, Research Scientist and Data Management Technician. H.B.A. (1999) Lakehead University; M.A. (2003), Ph.D. (2007) Arizona State University. Research specialties: Paleoanthropology, functional morphology, skeletal growth and development: statistical analysis.

WALSH, Jane M., Museum Specialist Emeritus, MesoAmerican Archaeology. B.A. (1968), M.A. (1971) University of the Americas; Ph.D. (1993) Catholic University of America. Research specialties: Mesoamerican archaeology and ethnohistory, in particular the contact period in the central Valley of Mexico; 19th century Mexican archaeological and ethnographic collections; U.S. Exploring Expedition collection.

NATIONAL PORTRAIT GALLERY

Kim Sajet, Director

The National Portrait Gallery tells the stories of America through the individuals who have built our national culture. The Portrait Gallery's collection of more than 20,000 paintings, drawings, photographs, and works of sculpture is one of the finest in the world and features likenesses that are valued for both their subjects and the artists who created them. Through the visual arts, the performing arts and new media, the Portrait Gallery portrays poets and presidents, visionaries and villains, actors and activists who speak our history. It is where the arts keep us in the company of remarkable Americans.

Facilities

The National Portrait Gallery, which opened to the public in 1968, is housed in one of Washington's oldest public buildings, a National Historic Landmark that was begun in 1836 for the U.S. Patent Office. One of the nation's best examples of Greek Revival architecture, the building has recently undergone an extensive renovation that showcases its most dramatic architectural features, including skylights, a curving double staircase, porticos, and vaulted galleries illuminated by natural light. The enclosed Robert and Arlene Kogod Courtyard, with its distinctive glass canopy designed by the architectural firm of Foster + Partners, provides a light-filled, 28,000-square-foot space for the museums' café, public programs and special events. The Portrait Gallery shares this building with the Smithsonian American Art Museum; the two museums and their associated facilities are collectively known as the Donald W. Reynolds Center for American Art and Portraiture. Staff offices and research facilities, including the library and the Archives of American Art, are located in the Victor Building, one block north.

Since the museum's grand reopening in 2006, our exhibitions are seen in refurbished spaces, including some that once held the museum's offices. In addition to displays from its permanent collection, the Portrait Gallery mounts temporary exhibitions, including portraits and other works of art and historical documents that are borrowed from outside sources. Generally, these exhibitions take one of three forms: thematic exhibitions on a wide range of historical subjects, surveys of portraiture by American artists, including photographers, and iconographic studies dealing with the life portraits of a given individual. The Portrait Gallery also organizes smaller exhibitions that recognize anniversaries of important events or special contemporary interests. Symposia, lectures, and publications are important elements of the museum's program.

Resources

As a national resource center for biography and portraiture, the Portrait Gallery offers a wide range of services to the researcher in addition to the special expertise of its curatorial and research staff. The extensive permanent collection comprises portraits in all media including painting, sculpture, drawing, prints, photographs and video. Objects not on view may be seen by appointment. Special collections include portraits of the presidents of the United States, the Frederick Hill Meserve collection of Civil War–era portrait negatives from Mathew Brady's studio; the Time magazine cover art collection; the Saint-Mémin collection of more than seven hundred portrait engravings; the Ruth Bowman and Harry Kahn Twentieth-Century American Self-Portrait collection; and a collection of Jo Davidson portrait sculptures of early twentieth-century Americans.

The Center for Electronic Research and Outreach Services (CEROS) administers reference and online programs for the National Portrait Gallery. Services to researchers include the NPG Collections Information System; the NPG Web site (www.npg.si.edu) which features collections, exhibitions, programs, and a portrait search menu; and the Catalog of American Portraits, a national portrait archive maintaining images and data for nearly 200,000 portraits in public and private collections. Extensive biographical files on prominent Americans are kept by the Office of the Historian. Eighteenth- and early nineteenth-century research materials, relating particularly to Maryland and Pennsylvania during the lifetime of Charles Willson Peale and his family, have been collected by

the staff of the Peale Family Papers. The curatorial files are rich in materials pertinent to portraits in the permanent and study collections. The library contains 160,000 volumes, principally on American art, history, and biography, along with more than a thousand periodicals. It offers selected electronic resources, and houses an extensive collection of clippings and pamphlets pertaining to American art and art institutions.

The Education Department is engaged in developing innovative programs in museum education as part of its efforts to introduce important Americans in the National Portrait Gallery collection – along with their significant contributions to American society – to visitors of all ages. The department works toward improving communication techniques used by volunteer docents and gallery educators, and provide teachers with effective object-based learning strategies and curriculum aids through specialized workshops.

RESEARCH STAFF

BARBER, James G., Historian. B.A. (1973) Saint Francis University, PA; M.A. (1977) Virginia Polytechnic Institute and State Univesity. Research specialties: Portraiture of the Jacksonian and Civil War eras; Original cover art in the TIME magazine cover art collection.

CARAGOL, Taína, Curator of Latino Art and History, B.A. (1996) University of Puerto Rico; M.A. (2001), Middlebury College; Ph.D.(2013) The Graduate Center, City University of New York. Research specialties: Latin American, Latino and Caribbean art; the history of institutional commitment to Latino and Latin American art in the U.S.; Diaspora and exile in Latino and Latin American art; Latina feminisms; Nuyorican art; art and social movements in the 20th and 21st century.

CARR, Carolyn K., Curator Emerita. B.A. Smith College; M.A. Oberlin College; Ph.D. (1978) Case Western Reserve University. Research specialties: Late nineteenth and late twentieth century American art and photography, Latin American art.

FORTUNE, Brandon Brame, Curator, Department of Painting and Sculpture. B.A. (1976) Agnes Scott College; M.A. (1979), Ph.D. (1987) University of North Carolina. Research specialties: Contemporary portraiture; Theory and practice of American and British portraiture, 1750-1820; American portraitists 1880-1900; American women artists 1880-1900; Portraiture and science.

HART, Sidney, Senior Historian and Editor, Peale Family Papers. B.A. (1964) Long Island University; M.A. (1969), Ph.D. (1973) Clark University. Research specialties: American political history; the American presidency; American Revolution and the War of 1812; Charles Willson Peale and American cultural and political history of the late 18th and early 19th century.

HENDERSON, Amy, Historian. B.A. (1969), M.A. (1971) University of Wisconsin, Milwaukee; Thomas Jefferson fellow (1971-1975) University of Virginia. Research specialties: Celebrity culture, history of Hollywood, Broadway, radio and television.

REAVES, Wendy Wick, Curator of Prints and Drawings. B.A. (1972) University of Pennsylvania; M.A. (1977) University of Delaware. Research specialties: American graphic art, particularly portrait prints and drawings; self-portraiture; caricature, cartoon, and humor in art; posters, illustration and printed ephemera; American popular culture; the history of fame.

SHUMARD, Ann, Curator of Photographs. B.A. (1976) Scripps College. Research specialties: History of American portrait photography, with an emphasis on nineteenth and early twentieth-century portraiture; African American history and portraiture during the antebellum period, particularly the work of daguerreotypist Augustus Washington.

WARD, David C., Historian and Deputy Editor, Peale Family Papers. B.A. (1974) University of Rochester; M.A. (1975) University of Warwick; M.A. (1976), M.Phil. (1979), Yale University. Research specialties: American nineteenth century social, cultural and art history; documentary editing; Charles Willson Peale and his times; also in modernism (both literary and artistic).

AFFILIATED RESEARCH STAFF

SULLIVAN, Martin E., Director. B.A. (1965) Siena College; M.A. (1970), Ph.D. (1974) University of Notre Dame. Research specialties: Colonial North America in the Atlantic World; Native American history and culture; twentieth-century social and labor history; cultural and intellectual property claims.

MILES, Ellen G., Curator Emerita, Department of Painting and Sculpture. B.A. (1964) Bryn Mawr College; M. Phil. (1970), Ph.D. (1976) Yale University. Research specialties: American portraiture to 1865; portraits of George Washington; profile portraits and silhouettes; artists' techniques; theory and practice of portraiture.

NATIONAL POSTAL MUSEUM

Allen Kane, Director

In the summer of 1993, the National Postal Museum opened in the historic City Post Office Building, located next to Union Station. The Museum was created with the cooperation of the United States Postal Service and houses over 6.0 million objects, making this one of the largest collection of its kind.

The systematized movement of written communication is thousands of years old. The message and the medium are intrinsically connected to our need for interpersonal communication and the national necessity to mark territorial boundaries. Mail provides citizens and their government with mutual access. Postal monies have provided the capital that encouraged transportation routes and road maintenance. Mail boosts morale in the military and makes the goods of the world accessible to all. It transports the national culture, promotes capitalism, migration, community and identity formation, and provided a communication link encouraging the formation of like citizenry long before the existence of the World Wide Web. Mail contracts supplied financial fodder for transportation growth and demonstrated the usefulness of mail as a medium of connection, be it for individuals, businesses or government.

America's postal history can be defined through the use of objects as small as stamps and as large as the nation's first Highway Post Office bus. It is expressed in heartrending letters from soldiers on foreign battlefields and through the explosion of direct mail marketing. America's postal history is the story of the people who made the service work and those who use it.

Museum Assets

The NPM website has a section dedicated to research which includes papers from the annual Winton M. Blount Postal History Symposia and Sundman lectures, finding guides, industry white papers and information on the six annual scholarships offered by the museum (http://www.postalmuseum.si.edu/research/index.html).

The Museum has the best scientific philatelic research laboratory in the world, open to all researchers. The instruments include a VSC-6000 (Video Spectral Comparator), a 1200x Leica Microscope, an electronic micrometer, an X-Ray Fluorescence Spectrometer and a Fourier Transform Infrared Spectrometer. These instruments allow for a non-destructive scientific analysis of objects.

The National Postal Museum Library is one of the largest and most important research facilities for the study of philately and the history of postal operations in the world. The library contains extensive runs of major American philatelic journals and major subject-oriented journals published worldwide. The collection of monographs on philately and postal history is nearly complete, with emphasis on materials in the English language and those of special importance.

Although the National Postal Museum Library focuses mainly on philately and postal operations in the United States, the collections are international in scope. In particular, Russia, Peru, The UPU, Great Britain, Germany and France are well represented. With more than 5,000 books, 6,000 serial titles, manuscript files, photographs and many auction catalogues, the collection also includes major archival holdings, including files from the United States Post Office, the Highway Post Office, the Aerial Mail Service, the Railway Mail Service, and the Panama Canal Zone Post Office. The major archival collections include the Post Office Department files of the Third Assistant Postmaster General, including original letters sent to various post office officials and replies discussing stamp issues and related postal subjects.

RESEARCH STAFF

GANZ, Cheryl R., Chief Curator of Philately. B.A.E. (1972) School of the Art Institute of Chicago; M.A. (1995) Roosevelt University; Ph.D. (2005) University of Illinois, Chicago. Research specialties: Stamps and general philately; air mail; zeppelin mail; social and cultural history; world's fairs; 1930s.

LERA, Thomas, Winton M. Blount Chair in Research. B.S. (1969) University of Illinois; M.S. (1971) University of Pennsylvania. Research specialties: Philatelic and Postal Operations.

PIAZZA, Daniel, Curator of Philately. B.A. (1998) Wagner College M.A. (2004) Syracuse University. Research specialties: early American history to 1815; postage stamps and postal history.

POPE, Nancy A., Historian and Curator of Postal History. B.A. (1979) University of Oregon; M.A. (1985) George Washington University. Research specialties: U.S. postal history; labor history and technology; delivery and transportation history; westward expansion; pony express; rural delivery and letter writing.

AFFILIATED RESEARCH STAFF

HEIDELBAUGH, Lynn R., Museum Specialist. B.A. (1996) Bryn Mawr College; M.A. (2001) George Washington University. Research specialties: U.S. postal operations history; business history; tourism and tourist industry history.

NATIONAL ZOOLOGICAL PARK

Dennis W. Kelly, Director

The National Zoological Park's (NZP) urban campus occupies 163 acres in Washington, D.C.'s Rock Creek Park. The Rock Creek campus includes a free public zoo involving a collection of more than 380 species (2,200 specimens) of vertebrates and invertebrates, and a large collection of native and exotic plants. NZP's rural campus near Front Royal, Virginia consists of 3,200 acres of pastures, forests and meadows in the Blue Ridge Mountains. This off-exhibit facility is dedicated to breeding endangered species, conservation research, training and education, and is NZP's hub for a wide range of regional, national, and international conservation programs.

Smithsonian Conservation Biology Institute: In January 2009, the Undersecretary for Science approved the National Zoo's Conservation and Science Directorate to be renamed the Smithsonian Conservation Biology Institute (SCBI) at the National Zoo. The SCBI creates an organizational umbrella under which scientists at NZP's Rock Creek and Front Royal facilities will conduct research within six Centers of Scientific Excellence: (1) Migratory Bird Center; (2) Conservation Ecology Center; (3) Center for Conservation & Evolutionary Genetics; (4) Center for Species Survival; (5) Center for Biodiversity Education and Sustainability; and (6) Animal Care Sciences. The creation of SCBI recognizes the Smithsonian Institution's leadership in the field of conservation biology, and will be an important vehicle for positioning the Institution among the nation's leaders in conducting research that aids in the survival or recovery of species and their habitats, and ensures the health and well being of animals in captivity and the wild.

The Institute has scientists based at Front Royal, VA, Washington, D.C., and at field sites around the world. Facilities available to students and visiting researchers include two veterinary hospitals; a veterinary pathology lab, nutrition labs, GIS and radiotelemetry capabilities, a molecular genetics lab, reproductive physiology labs, libraries, conference facilities, and, in Front Royal , housing for visiting researchers and students. The National Zoological Park also has field sites in California, Hawaii, Thailand, Malaysia, Cambodia, China, Gabon, southeastern Brazil, Peru, Sri Lanka, northern Myanmar, and the eastern Mojave Desert. Research affiliation with NZP entitles researchers access to other Smithsonian Institution staff, facilities and resources in an enormous range of disciplines.

SCBI is one of the world's leading centers for integrating multiple approaches to conservation (e.g., long-term field studies; captive studies; and capacity building, including on-going/long-term professional collaborations; environmental education; a suite of conservation-based training courses; and development of conservation policies based on on-the-ground information and experience). The facility at Front Royal has a large array of fenced paddocks and indoor holding facilities accommodate large ungulates, carnivores, small mammals, and birds. These facilities allow for well-designed studies on captive animals to enhance field studies and conservation efforts. A modern veterinary hospital houses the **Department of Conservation Medicine**. The department's veterinary staff provides integrated veterinary care for animals housed at SCBI, including techniques such as: field anesthesia, equid/hoofstock anesthesia, small mammal/avian/reptile anesthesia, blood collection and biologic sampling, sample preparation and transfer, infectious disease prevention, surgery, endoscopy, radiology (i.e., x-rays, CT, ultrasound, MRI), zoonosis, international field projects and capacity building work (i.e., Africa, Asia). Additionally, the veterinary team trains zoo and wildlife species professionals and conducts field-based wildlife health and conservation studies worldwide.

The veterinary hospital is also home to state-of-the-art reproductive physiology laboratories that conduct research and training in wildlife endocrinology, gamete biology and embryology. Facilities in Washington, DC include exceptionally well-equipped Nutrition and Molecular Genetics laboratories.

SCBI is an integral partner in the Smithsonian Integrated Biodiversity Genomics (IBG) initiative, which aims to transform our understanding of the patterns of biological diversity and the processes underlying diversification. These projects use the newest tools of genomics, data accessibility, and social networking to promote broader public and societal engagement in the exploration of the links between genetic variation, biological diversity, and the healthy functioning of a sustainable world.

The facilities in Virginia and the District of Columbia serve as the hub for a broad array of regional, national, and international programs which have been organized into six Centers of Excellence.

Center for Conservation Education and Sustainability – CCES studies and conserves biodiversity by implementing academic and professional conservation-related training programs worldwide and conducting research and monitoring activities to integrate biodiversity conservation into sustainable development. CCES goals are to provide capacity building to the next generation of conservation professionals; to provide business and industry with science-based solutions for minimizing their impact on biodiversity; and to develop innovative and strategic conservation partnerships that result in conservation solutions.

Migratory Bird Center – MBC conducts research on the biology of Neotropical songbirds and wetland birds, the role of disease in bird population declines, environmental challenges facing urban and suburban birds, and trains professionals in environmental coffee certification throughout Latin America. The SMBC is dedicated to fostering greater understanding, appreciation, and protection of birds and the grand phenomenon of bird migration.

Conservation Ecology Center – CEC is committed to sustaining animals and plants in the wild by supporting conservation scientists focusing their attention on questions that are not based on zoo collection animals. CEC works at the cutting edge of conservation science, focusing on the biology of extinction, overabundant species, nutritional ecology, endangered landscapes, and processes to measure conservation effectiveness. This work includes species from marine turtles to tigers, and ecosystems from Asian tall grass to oak forests at SCBI, where our scientists develop land- use plans as models of sustainability for our own communities.

Center for Species Survival – CSS manages mammal and bird species in the collection at SCBI and conducts research in reproductive physiology, endocrinology, cryobiology, embryo biology, animal behavior, wildlife toxicology, and assisted reproduction. The mission of the CSS is leadership in the study, propagation, and research-oriented management of rare wildlife species to create knowledge that is applied to ensuring self-sustaining populations in zoos and nature.

Center for Conservation and Evolutionary Genetics – CCEG specializes in genetic management of wild and captive populations, non-invasive DNA, ancient DNA, systematics, disease diagnosis, genetic services to the zoo community, and application of genetics to animal behavior and ecology. It creatively applies genetic theory and methods to gain knowledge about the evolutionary and life histories of animals, to understand the importance of genetic variation to their survival, and to identify the methods needed to sustain them in captivity and the wild.

Animal Care Sciences - This center includes the departments of Animal Health, Nutrition, Pathology and Animal Programs:

The **Animal Health** department's medical care program includes quarantine screening, regular physical examinations, preventative medicine and dentistry, intensive care and a complete surgical program. Animal Health staff maintains a wide network of local, national and international specialist consultants.

Training opportunities include preceptorships, open to senior veterinary students, and residencies of varying durations for veterinarians and students from the US and abroad. Veterinary staff also conducts formal training courses at local universities and overseas zoos and give many presentations and lectures to professional and lay audiences. The veterinary research program consists primarily of applied clinical studies that result in improved medical and surgical care of collection animals. Current research areas include the physiological evaluation of restraint and anesthesia in exotic species; drug pharmacokinetics; evaluations of new ultrasonography, laparoscopy, and endoscopy procedures in exotic animals; and radiological evaluation of diseases in exotics.

The nutrition science program involves evaluating and modifying animal diets for adequate nutrition, implementing quality-assurance measures to ensure adequate food handling, storage and diet preparation, conducting laboratory analyses of feedstuffs for nutritional evaluation and offering nutritional advice. **The Department of Nu-**

trition Science is responsible for getting the right food to the right animals at the right time both at the Zoo's Rock Creek campus in Washington, D.C. and the facilities in Front Royal, Virginia. The staff operates out of a 4,750 square-foot commissary at the General Services Building and from the SCBI research building, both at the Rock Creek campus. The Department also includes the Milk repository – the largest collection of exotic animal milks in the world. By implementing innovative approaches and practices, we enable animals to live healthier lives, we serve as a role model and resource for zoos worldwide, and we educate the public about all aspects of zoo and wildlife nutrition. Worldwide, the Department of Nutrition Science is recognized as a global leader in applied animal nutrition.

Training opportunities include internships, open to undergraduates with a minimum of two years of completed relevant course work, and residencies of varying durations for post-graduate students. Staff provides lectures to local universities related to animal nutrition, nutrition management and nutrition program logistics. The Department currently has several areas of research interest: (1) milk composition and lactation physiology as we expand the utility of the milk repository collection, (2) applied clinical nutrition to address current challenges within nutrition management of species maintained in zoo collections worldwide, and (3) the use of sustainable practices while managing habitats for agriculture production and wildlife value.

Staff of the **Department of Pathology** not only determine the causes of death and elucidate disease processes occur-ring in the NZP's collection, but also conduct basic and applied research on disease etiology and management in captive and wild animals. Facilities and resources include a full-service laboratory, a necropsy suite, a computerized pathology data bank and an extensive archive of frozen and fixed tissues, color transparencies and glass slides illustrating pathological conditions of wildlife and zoo animals. Staff affiliations with the pathology departments at Uniformed Services University of the Health Sciences and the Armed Forces Institute of Pathology afford opportunities for collaborative research and postdoctoral programs. The Department also houses the National Elephant Herpesvirus Laboratory testing captive elephants nationwide for EEHV.

Currently, major research at the **Department of Pathology** includes viral diseases of elephants and primates, mycobacterial (TB) diseases of ungulates, marsupials and birds, storage diseases, renal disease of reptiles, incidence of neoplasia in exotic felids, and nutritional diseases of bats.

Curators and staff of the **Department of Animal Programs** manage the living collections, develop and maintain exhibits, and conduct and coordinate collections-based research. Research emphases include: improving exotic animal husbandry, propagating and managing small populations, developing exsitu conservation programs (including reintroduction programs) and conducting life history studies. The clinical animal behavior program involves evaluating and modifying animal husbandry for adequate stimulation of individual animals' mental and physical well-being, implementing quality-assurance measures to ensure adequate animal enrichment and training safety, conducting analyses of individual animal behavior and offering advice on animal enrichment, husbandry training and behavior studies to zoos and professionals around the world.

In recent years, the curatorial staff has conducted field studies and training programs in China, Central and South America, the Caribbean, Madagascar, and Southeast Asia. Pre- and postdoctoral students often collaborate in these studies. Training opportunities in applied animal behavior include internships on both NZP campuses, open to undergraduates with a minimum of two years of completed relevant course work, and residencies of varying durations for post-graduate students. Staff provides lectures to local universities related to animal behavior, applied animal behavior management and behavior enrichment/training program logistics.

Institutional Animal Care and Use Committee Proposal Review

The National Zoological Park has a standing Institutional Animal Care and Use Committee. Review for animal welfare concerns and approval of any animal procedures by this committee must occur before a fellowship can begin. Applicants who wish to conduct research at the National Zoological Park must discuss their research with proposed advisors to clarify any potential issues with Institutional Animal Care and Use process.

RESEARCH STAFF

ALONSO, Alfonso, Conservation Biologist, Center for Conservation Education and Sustainability, Smithsonian Conservation Biology Institute. B.S. (1988) Universidad Nacional Autonoma de Mexico; M.S. (1991), Ph.D. (1996) University of Florida. Research specialties: Applying conservation biology principles in oil, gas, and mineral development projects; developing management plans for ex-situ and in-situ biodiversity conservation.

BALLOU, Jonathan D., Population Manager. B.A. (1977) University of Virginia; M.S. (1985) George Washington University; Ph.D. (1995) University of Maryland. Research specialties: Conservation biology; population biology; population genetics.

BROWN, Janine L., Reproductive Physiologist, Department of Reproductive Sciences, Center for Species Survival. B.S. (1977) North Dakota State University; M.S. (1980), Ph.D. (1984) Washington State University. Research specialties: Comparative reproductive endocrinology; pituitary and testicular function; reproductive cyclicity and seasonality; comparative reproduction and welfare of wildlife species (e.g., elephants, felids, tapirs and rhinos), noninvasive hormone monitoring.

CHRISTEN, Catherine A., Academic and Professional Training Specialist, Center for Conservation Education and Sustainability, Smithsonian Conservation Biology Institute. A.B. (1983) Harvard/Radcliffe Colleges; M.A. (1990), Ph.D. (1995) Johns Hopkins University. Research specialties: Environmental history, especially history of conservation biology and conservation training, of Smithsonian science (STRI, NZP), and of GIS/remote sensing; Latin American history; oral history, farmland and sustainability.

COMIZZOLI, Pierre, Reproductive Physiologist. D.V.M. (1994) Veterinary School of Maisons-Alfort; M.Sc (1997) University of Paris VI; Ph.D. (2000) University of Tours. Research specialties: Reproductive physiology and biotechnologies in Ungulates and Carnivores (domestic and wild).

CROSIER, Adrienne, Cheetah Biologist, Department of Reproductive Sciences. B.S. (1996); Ph.D. (2001) North Carolina State University. Research specialties: Understanding basic and comparative wildlife reproductive physiology and implementation of assisted reproductive technologies.

DALLMEIER, Francisco, Director, Center for Conservation Education and Sustainability, Smithsonian Conservation Biology Institute, NZP. B.A. (1977) Central University of Venezuela; M.S. (1984), Ph.D. (1986) Colorado State University. Research specialties: Integrating Biodiversity Conservation into Sustainable Development; Developing of Biodiversity Monitoring Plans for Adaptive Management.

DEICHMANN, Jessica, Conservation Biologist, Center for Conservation Education and Sustainability, Smithsonian Conservation Biology Institute. B.S. (2002) Colorado State University; Ph.D. (2009) Louisiana State University. Research specialties: Tropical herpetology; Assessment of conservation of Amazonian biodiversity, research in tropical ecology and amphibian biology.

DERRICKSON, Scott R., Deputy Director, Smithsonian Conservation Biology Institute (SCBI). B.A. (1970) Gettysburg College; M.S. (1975), Ph.D. (1977) University of Minnesota. Research specialties: Avian behavioral ecology and mating systems; avian communication; captive breeding and reintroduction.

FLEISCHER, Robert C., Head, Center for Conservation and Evolutionary Genetics. B.A. (1978) University of California, Santa Barbara; Ph.D. (1983) University of Kansas. Research specialties: Evolutionary biology, conservation biology, population genetics, behavioral ecology, ornithology, mammalogy, malaria parasites.

GREENBERG, Russell, Head, Smithsonian Migratory Bird Center. B.A. (1976), Ph.D. (1981) University of California, Berkeley. Research specialties: Ecology and conservation of migratory birds, behavioral basis of habitat selection, tropical conservation.

HAGEDORN, Mary M., Research Associate, Department of Reproductive Sciences. B.S. (1975) Jackson College; M.S. (1976) Tufts University; Ph.D. (1983) Scripps Institute of Oceanography, University of California. Research specialties: Development of teleosts including the cryobiology of fish embryos; biodiversity of electric fish.

LEIMGRUBER, Peter, Research Biologist. Dipl. rer. nat. (1992) Christian Albrechts University; Ph.D. (1998) University of Oklahoma. Research specialties: Application of satellite remote sensing and Geographic Information

Systems to the conservation of species, communities and ecosystems; special focus on landscape ecology of large endangered mammalian species.

MALDONADO, Jesus, Research Zoologist. B.S. (1983), M.S. (1985) Shippensburg University; Ph.D. (2001) University of California, Los Angeles. Research specialties: Systematics and evolution of mammals, conservation genetics, molecular ecology.

MARRA, Peter P., Terrestrial Animal Ecologist. B.S. (1985) Southern Connecticut State University; M.S. (1989) Louisiana State University; Ph.D. (1998) Dartmouth College. Research specialties: Population and behavioral ecology of migratory birds; causes and consequences of habitat selection by birds.

MASLANKA, Mike, Head, Department of Nutrition Science. B.S. (1993) Virginia Polytechnic Institute and State University; M.S. (1996) University of Minnesota. Research specialties: comparative nutrition of zoo and wildlife species, habitat management for wildlife and forage production, lactation physiology and milk composition.

McSHEA, William, Ecology Researcher. B.A. (1977) Bucknell University; M.S. (1981) University of New Hampshire; Ph.D. (1985) State University of New York, Binghamton. Research specialties: Wildlife management, ecology of non-game animals, surveys of mammals and birds, conservation of deer, citizen science-pollinator and invasive plant surveys, temperate forest dynamics, forest tree demographics, forest seed production, conservation in Southeast Asia and China; Surveys of large mammals in Asia; warm season grass restoration.

MONFORT, Steven L., Director, Smithsonian Conservation Biology Institute. B.A. (1980) University of California, San Diego; D.V.M. (1986), M.S. (1987) University of California, Davis; Ph.D. (1993) George Mason University. Research specialties: Reproductive physiology and endocrinology of wildlife species; endangered species conservation and propagation; comparative reproduction physiological ecology, zoo veterinary medicine and anesthesia, environmental education.

MURPHY, James B., Research Associate & NZP Curator of Herpetology. B.S. (1965) Xavier University; D.Sc. (1989) University of Colorado. Research specialties: Zoo history, behavioral ecology of amphibians and reptiles, history of herpetological illustrations and literature.

PHILLIPS, Tameka, Research Specialist. B.A. (1999) University of Illinois at Urbana-Champaign; M.S. (2001), Ph.D. (2010) University of Florida. Research specialties: Reproductive biology, gamete research, and cryobiology.

POWER, Michael, Research Nutritionist. B.S. (1978) University of California, San Diego; M.A. (1983), Ph.D. (1991) University of California, Berkeley. Research specialties: Energetics and nutrition of primates and small mammals; lactation.

PUKAZENTHI, Budhan, Ungulate Biologist, Department of Reproductive Sciences. B.V.Sc. (1987) Madras Veterinary College, India; M.S. (1992), Ph.D. (1996) University of Maryland. Research specialties: Ungulate reproduction and conservation; gamete biology (sperm, eggs and embryos); cryobiology; assisted reproduction in endangered species, in situ conservation and training.

RALLS, Katherine, Senior Research Zoologist. B.A. (1960) Stanford University; M.A. (1962) Radcliffe College; Ph.D. (1965) Harvard University. Research specialties: Behavior, ecology, genetics, and conservation of mammals.

RICE, Robert, Geographer, Policy Researcher. B.A. (1974) University of North Carolina; M.A. (1982) University of Michigan; Ph.D. (1990) University of California, Berkeley. Research specialties: Environmental and social consequences of land use change with emphasis on Mesoamerica.

SEIDENSTICKER, John, Head, Conservation Ecology Center. B.A. (1966), M.S. (1968) University of Montana; Ph.D. (1973) University of Idaho. Research specialties: Behavioral ecology of carnivores; wildlife management; conservation biology; landscape ecology and conservation; measuring effectiveness of conservation practice.

SIEGAL-WILLOTT, Jessica, Supervisory Veterinary Medical Officer. B.S. (1997) College of Agriculture and Life Sciences, Cornell University; D.V.M. (2002), College of Veterinary Medicine, Cornell University; Diplomate A.C.Z.M. (2007). Research specialties: Clinical medicine and associated disciplines as they relate to zoological, wildlife, and aquatic animals.

SILLETT, Scott, Research Wildlife Biologist. B.A. (1989) University of Arizona; M.S. (1992) Louisiana State University; Ph.D. (2000) Dartmouth College. Research specialties: Avian ecology, population biology, animal behavior, life history of migratory birds, ecological impacts of climate change.

SONGSASEN, Nucharin, Research Biologist, Department of Reproductive Sciences. D.V.M. (1988), Kasetsart University, M.Sc. (1993), Ph.D. (1997) University of Guelph. Research specialties: Gamete biology, Reproductive physiology, cryobiology, assisted reproduction, canid conservation.

TEIXEIRA, Kristina J., Ecologist. B.A. (2002) Wheaton College; Ph.D. (2007) University of New Mexico. Research specialties: Forest ecosystem ecology.

THOMPSON, Jonathan, Landscape Ecologist. B.S. (1999) University of Massachusetts; M.S. (2004), Ph.D. (2008) Oregon State University. Research specialties: forest modeling; spatial simulations; forest carbon dynamics; remote sensing; spatial statistics; forest policy; scenario studies; climate effects on vegetation; forest management; coupled human-natural systems; land use land cover change.

WILDT, David E., Head, Center for Species Survival. B.A. (1972) Illinois State University; M.S. (1973), Ph.D. (1975) Michigan State University. Research specialties: Reproduction and endocrinology of wildlife species; small population breeding, management and conservation.

AFFILIATED RESEARCH STAFF

AGUIRRE, Alonso, Research Associate, Executive Director. M.V.Z. Universidad Autónoma del Estado de México; D.V.M., M.S., Ph.D. Colorado State University. Research specialties: Wildlife medicine, anesthesia & management; wildlife epidemiology, conservation medicine, ecohealth, one health.

AITKEN-PALMER, Copper, Head, Department of Conservation Medicine, SCBI. M.S. (2003) Kansas State University College of Veterinary Medicine; D.V.M. (2003) Kansas State University; Ph.D. (2010) University of Maryland. Research specialties: Giant panda reproductive physiology, giant panda health and comparative medicine, red panda health and reproduction, zoo and wildlife medicine.

DINDO, Marietta, Research Associate. B.S. (2002) Emory University; Ph.D. (2009) University of St Andrews. Research specialties: Social learning, cognition, and social development in non-human primates.

DITTUS, Wolfgang P.J., Research Associate. B.A. (1965); M.S. (1968) McGill University; Ph.D. (1974) University of Maryland. Research specialties: Behavior, ecology, population biology and epidemiology of wild primates in Sri Lanka.

DORSEY, Candice, Research Associate. B.A (2000)St. Mary's College of Maryland; M.S. 2002 American University; Ph.D. (2008) George Mason University. Research specialties: Wildlife endocrinology Wildlife diseases Reproductive sciences.

ELLIS, Susie, Research Associate. B.A. (1983) San Diego State University (1980); M.A. (1983), Ph.D. University of California, Davis. Research specialties: Conservation biology, rhino ecology and conservation, behavior.

FERNANDO, Prithiviraj, Research Associate. M.B.B.S. (1990) North Colombo Medical College, Sri Lanka; Ph.D. (1998) University of Oregon. Research specialties: Conservation genetics, Ecology & Conservation. Asian elephant behavior, ecology, and conservation; mitigation of human-elephant conflict.

FREEMAN, Elizabeth Watson, Research Associate. B.S. (1992) Vanderbilt University; M.S. (2000) Virginia Commonwealth University; Ph.D. (2005) George Mason University. Research specialties: Investigating the roles of hormones and pheromones in mediating reproductive behavior and mating success in endangered species.

GOERITZ, Frank, Research Associate. D.V.M (1992) Humboldt University Berlin; Ph.D. (1996) Free University Berlin. Research specialties: Reproduction management in zoo and wild animals; Wildlife medicine.

GRAND, Theodore I., Research Associate, Department of Conservation Biology. B.A. (1959) Brown University; Ph.D. (1964) University of California, Berkeley. Research specialties: Musculoskeletal growth; anatomy and evolution of locomotor behavior; biomechanics of sports activity.

HALLAGER, Sara, Biologist, Animal Programs. B.S. (1989) University of Maryland. Research specialties: Kori bustard captive management, Conservation of ratites.

HAYWARD, Gary, Research Associate, Ph.D. (1972) University of Otago, New Zealand. Research specialties: Herpesviruses of Humans, primates and elephants. Pathogenesis and genomics.

HERMES, Robert, Research Associate. D.V.M. (1995), Dr (1998) Freie Universität Berlin. Research specialties: Wildlife reproduction medicine.

HILDEBRANT, Thomas Bernd, Research Associate. D.V.M. (1992) Humboldt University Berlin; Ph.D. (1993) Free University Berlin. Research specialties: Assisted Reproduction Technologies in non-domestic species like AI, embryo transfer, sperm preservation etc; development of the artificial insemination in elephants.

HOLT, William, Research Associate. Ph.D (1979) Royal Veterinary College London. Research specialties: Reproductive biology in wild species; sperm function, assessment and preservation. Oviductal function in mammals and the interactions between the oviduct and spermatozoa.

KERSEY, David, Research Associate. B.S. (1999) Washington State University; Ph.D. (2009) George Mason University. Research specialties: Comparative mammalian reproductive and adrenal physiology; giant panda endocrinology; ovarian steroidogenesis.

KILPATRICK, A. Marmaduke, Research Associate. B.S. (1995), B.A. (1995) University of California; M.S. (1997) Massachusetts Institute of Technology; Ph.D. (2003) University of Wisconsin, Madison. Research specialties: Ecology of infectious diseases, West Nile virus, avian influenza, avian malaria.

LATIMER, Erin, Elephant Herpes Laboratory Manager. B.S. (1986) Virginia Polytechnic Institute and State University; M.S. (1988) University of Wisconsin-Madison. Research specialties: research and diagnostics of Elephant Endotheliotropic Herpesvirus.

LEONARD, Jennifer, Research Associate. B.S. (1996); Ph.D. (2002) University of California, Los Angeles. Research specialties: Conservation genetics, ancient DNA, phylogenetics; evolution and phylogeography of wolves and coyotes.

MARCHANT, Anne, Research Associate. M.A., Ph.D. (1990), University of California, Berkeley. Research specialties: Conservation Education; Applications of Information Technology to Conservation; Undergraduate Education; Scholarship of Teaching.

McDONALD, M. Victoria, Research Associate. B.A. (1975) Wake Forest University; M.S. (1977) Virginia Polytechnic Institute and State University; Ph.D. (1986) University of Florida. Research specialties: Vocal communication and behavioral ecology of birds; long-term population study of Kentucky Warblers; Eastern Bluebird nestbox selection and intra-specific interactions with Tree Swallows; Purple Martin mate selection survivorship.

METTKE-HOFMANN, Claudia, Research Associate. Pre-diploma (1986), Diploma (1990), Ph.D. (1993) Free University of Berlin. Research specialties: Cognitive ecology in birds; conservation; animal welfare.

MORTON, Eugene S., Scientist Emeritus. B.S. (1962) Denison University, Granville, Ohio; M.S. (1968), Ph.D. (1970) Yale University. Research specialties: Behavioral ecology and evolution of behavior with a focus on tropical birds, mating systems, and vocal communication.

NEWBY, John, Research Associate. B.Sc. (1971) Aberdeen University, Scotland. Research specialties: Conservation biology, especially of deserts and aridlands; Wildlife inventory and monitoring of endangered species; Establishment and management of protected areas.

PARSONS, E. Christien, Research Associate. B.A. (1991), M.A. (1995) Oxford University; Ph.D. (1996) University of Hong Kong. Research specialties: Marine mammal biology and conservation; Public attitudes to endangered species; Marine pollution; Marine conservation policy.

PASTORINI, Jennifer, Research Associate. M.Sc. (1995), Ph.D. (2000) University of Zürich. Research specialties: Conservation research in elephants; Populations genetics and phylogenetics in primates.

PETERS, Alan, Curator of Invertebrates and Education in Animal Programs. B.S. (1980) University of North Carolina; M.A.T. (1984) George Washington University. Research specialties: invertebrate animal husbandry; education program development and volunteer training; Cephalopoda behavior and culture; visitor experience.

RAPPOLE, John H., Scientist Emeritus. B.A. (1968) Colgate University; M.S. (1972), Ph.D. (1976) University of Minnesota. Research specialties: Ecology and evolution of migrant birds; Inventory, systematics, and Biogeography of Burmese sub-Himalayan avifauna; Migrant birds and pathogens (e.g., WNV, HPAI H5N1); Post-breeding movements of birds; Tropical flock dynamics; Rapid range change.

REISS, Diana, Research Associate. B.A. (1971) Temple University; Ph.D. (1983) Temple University. Research specialties: Cetacean Behavior, Communication, and Cognition; Elephant Cognition, Animal Communication and Cognition; Evolution of Intelligence.

REITSMA, Robert, Research Technician. B.S. (1980) Calvin College; M.S. (1999) George Mason University. Research specialties: Urban bird ecology; Migratory bird habitat use.

RENNER, Swen C., Research Associate. M.Sc. (2000) University of Stuttgart-Hohenheim & Musuem Koenig; Ph.D. (2004) University of Goettingen. Research specialties: Biodiversity research in the tropics of SE Asia and the Neotropis with emphasis on birds; Biogeography of birds in the Himalayas and SE Asia.

ROBERTS, John, Veterinary Pathologist, Animal Care Sciences, National Zoological Park, robertsjf@si.edu.

ROBERTS, Miles S., Scientist Emeritus. B.S. (1972), M.S. (1981) University of Maryland. Research specialties: Mammalian behavior and captive population management and husbandry.

ROLLINS-SMITH, Louise, Research Associate. B.A. (1969) Hamline University; M.S. (1972), Ph.D. (1977) University of Minnesota. Research specialties: Microbiology and Immunology; Amphibian Immunology; Host immune defenses against the chytrid fungus, Batrachochytrium dendrobatidis.

RUDRAN, Rasananayagam, Scientist Emeritus. B.Sc. (1966) University of Ceylon; M.Sc. (1970) University of Colombo, Sri Lanka; Ph.D. (1976) University of Maryland. Research specialties: Primate ecology and behavior; tropical wildlife conservation and management.

RYDER, Thomas Brandt, Research Associate. Ph.D. (2008) University of Missouri, St. Louis. Research specialties: evolutionary biologist with interests that span molecular, behavioral and population ecology.

SANTYMIRE, Rachel Moreland, Research Associate. B.S. (1996), M.S. (1996) Clemson University; Ph.D. (2006) George Mason University. Research specialties: Reproductive physiology; Endocrinology; Stress physiology; Spermatology.

SZYKMAN, Micaela, Research Associate. B.A. (1993) Amherst College; Ph.D. (2001) Michigan State University. Research specialties: Behavioral ecology of social carnivores; non-invasive hormone monitoring and reintroduction biology of African wild dogs.

TATE, James, Research Associate. B.S. (1962) Northern Illinois University; M.S. (1964) University of the Pacific; Ph.D. (1969) University of Nebraska. Research specialties: The role of science in advising public policy; Landscape ecology; Management of biological communities; Ecology of cavity-nesting birds.

THOMPSON, Katerina, Research Associate. B.S. (1982), M.S. (1985) Virginia Polytechnic Institute; Ph.D. (1992) University of Maryland. Research specialties: Behavioral ecology; female reproductive strategies; evolution of play behavior; age-specific strategies and behavioral development.

VICK, Mandi, Research Associate. B.A. (1999) Rollins College; Ph.D. (2006) University of Kentucky. Research specialties: Reproductive and Metabolic Physiology; Endocrinology.

VITAZKOVA, Sylvia, Research Associate. B.A. (1995) Cornell University; M.A. (1997), Ph.D. (2005) Columbia University. Research specialties: zoonotic disease transmission, Alouatta pigra, Belize.

WANG, Sonam Wangyel, Research Associate. B.S. (1998) University of Wales; M.S. (2004), Ph.D. Cornell University; M.P.A. (2011) Harvard University. Research specialties: Large cats (especially tigers and leopards), their prey and people.

WELDON, Paul, Research Associate. B.A. (1975) Western Connecticut State University, Danbury; Ph.D. (1982) University of Tennessee. Research specialties: Vertebrate natural products and chemical ecology; vertebrate defenses against ectoparasites.

WEMMER, Christen M., Scientist Emeritus. B.A. (1965), M.A. (1967) San Francisco State College; Ph.D. (1972) University of Maryland. Research specialties: Conservation biology; mammalian ecology and behavior; reproductive ecology of ungulates; large mammal conservation in the Third World; integration of protected area management with local communities; environmental education.

SMITHSONIAN AMERICAN ART MUSEUM

Elizabeth Broun, The Margaret and Terry Stent Director

The Smithsonian American Art Museum, the nation's first collection of American art, is an unparalleled record of the American experience. The collection captures the aspirations, character and imagination of the American people throughout three centuries. Its emphasis on research, publications, exhibitions and public programs reflects its mission to promote the understanding and appreciation of American art. In addition to welcoming visitors to its historic landmark building in Washington, D.C., the Smithsonian American Art Museum serves a broad national public through electronic outreach, traveling exhibitions and educational materials.

Resources and Facilities

The Smithsonian American Art Museum is the home to one of the largest and most inclusive collections of American art in the world. Its artworks reveal America's rich artistic and cultural history from the colonial period to today. More than 7,000 artists are represented in the collection, including major masters such as John Singleton Copley, Gilbert Stuart, Winslow Homer, John Singer Sargent, Childe Hassam, Mary Cassatt, Georgia O'Keeffe, Edward Hopper, Joseph Cornell, Jacob Lawrence, Helen Frankenthaler, Christo and Jeanne-Claude, David Hockney, Jenny Holzer, Lee Friedlander, Roy Lichtenstein, Nam June Paik, Irving Penn, Martin Puryear, Robert Rauschenberg, and Bill Viola. In recent years, the museum has strengthened its commitment to contemporary art, and in particular media arts and Latino art, through curatorial appointments, endowments, awards, acquisitions and commissions. The museum has been a leader in identifying and collecting significant aspects of American visual culture, including photography, modern folk art and African American art. The museum has the largest collection of New Deal art and the finest collections of contemporary craft, American impressionist paintings and masterpieces from the Gilded Age. Recent exhibitions organized by the Museum include: "The Civil War and American Art," African American Art: Harlem Renaissance, Civil Rights Era, and Beyond," "Nam June Paik: Global Visionary," "Annie Leibovitz: Pilgrimage," "The Art of Video Games," and "The Great American Hall of Wonders."

The museum's main building, a National Historic Landmark located in the heart of Washington's downtown cultural district, has been meticulously renovated with expanded permanent-collection galleries and innovative public spaces. The Luce Foundation Center for American Art, a study center and visible art storage facility, displays approximately 3,000 artworks from the museum's permanent collection in a three-story skylight space. The museum shares the building with the Smithsonian's National Portrait Gallery; both museums share the Nan Tucker McEvoy Auditorium, the Lunder Conservation Center—state-of-the-art labs with glass walls that allow the public permanent behind-the-scenes views of the preservation work of the museums—and the Robert and Arlene Kogod Courtyard, a public gathering space designed by the world-renowned architectural firm Foster + Partners. Free public wireless Internet access (Wi-Fi) is available throughout the museum's main building. The Museum's office and research functions operate out of the nearby Victor Building at 750 Ninth Street NW.

The Renwick Gallery, a branch of the Smithsonian American Art Museum, features one of the finest collections of American craft in the United States. Its collections, exhibition program and publications highlight the best craft objects and decorative arts from the 19th century to the present. The Renwick Gallery is located in a Second Empire-style, National Historic Landmark building designed by architect James Renwick Jr. in 1859 and completed in 1874. It became the home of the museum's craft and decorative arts program in 1972.Complementing the Renwick's exhibition and acquisition programs are symposia, lectures and fellowships for scholarly research in the modern craft movement. A major renovation of the Renwick Gallery is in the design phase. The renovation, which will begin in 2014, will include a completed renewed infrastructure, enhanced historic features and other upgrades to the National Historic Landmark building. Recent exhibitions organized by the Renwick include: "40 under 40: Craft Futures," and "Something of Splendor: Decorative Arts from the White House."

The Smithsonian American Art Museum, combining its own facilities with those available in and around the Washington area, constitutes an unparalleled center for the study of American art. Its extensive collections of art are supplemented by specialized research resources that include the Inventory of American Paintings, a comput-

er listing of more than 400,000 works in public and private collections done by artists active in America by 1914; the Inventory of American Sculpture, a database providing information on more than 91,000 sculptures in public and private collections throughout the country, including outdoor monuments surveyed through the Save Outdoor Sculpture! Program; The Pre-1877 Art Exhibition Catalogue Index of nearly 137,000 artworks shown in over 1,000 exhibitions in the United States and Canada through the centennial year; and the Photograph Archives, with nearly a half million photographs, negatives and slides. Scholars have access to a specialized branch library of more than 180,000 volumes and clipping files numbering upward of one million items, the Graphic Arts Study Center containing more than 28,500 works on paper (prints, drawings, watercolors and photographs), the Joseph Cornell Study Center of source materials and studio effects, the Nam June Paik Archive, and the Smithsonian's Archives of American Art, with its vast holdings of more than sixteen million items.

Research Opportunities

A major advantage of study at the Smithsonian American Art Museum is the opportunity to work within a community of scholars actively engaged in research on history, conservation and criticism of American art and related topics. The research programs of the Smithsonian American Art Museum are considered an essential part of its operation. The professional staff is concerned with exhibitions and educational programs as well as collections research and other curatorial duties. Facilities are provided for visiting scholars on all levels and for interns in museum training. Pre- and post-doctoral scholars are in residence each year. A regular series of lunchtime seminars, public lectures and symposia provides a forum for the exchange of ideas among area scholars. Publication opportunities are available through the Museum's peer-reviewed journal American Art and through exhibition and collection-related catalogues and books. The Patricia and Phillip Frost Essay Award is presented annually to the author of the most distinguished contribution to American Art, and is made possible by the generous contribution of the Patricia and Phillip Frost Endowment. The annual Terra Foundation for American Art International Essay Prize recognizes excellent scholarship by a non-U.S. scholar in the field of historical American art; the winning manuscript is translated and published in American Art. The Charles C. Eldredge Prize is awarded annually for outstanding scholarship in the field of American art and is supported by the Museum's support group, the American Art Forum.

RESEARCH STAFF

BELL, Nicholas R, Curator, Renwick Gallery. B.A. (2005) Simon Fraser University; M.A. (2008) University of Delaware. Research specialties: American Craft, Decorative Arts in America 18th-21st centuries, Material Culture.

HARVEY, Eleanor Jones, Chief Curator. B.A. (1983) University of Virginia; M.A. (1985), M.Phil. (1987), Ph.D. (1998) Yale University. Research specialties: American Art; 19th century landscape painting; 20th century landscape art; Civil War and Reconstruction era art; Texas and Southwestern Regionalism.

MECKLENBURG, Virginia M., Senior Curator. B.A. (1968), M.A. (1970) University of Texas; Ph.D. (1983) University of Maryland. Research specialties: Twentieth-century American art: Ashcan art; New Deal and abstract art of the 1930s; art of the 1960s and 1970s.

MOSER, Joann G., Senior Curator of Graphic Arts. B.A. (1969) Smith College; M.A. (1972), Ph.D. (1976) University of Wisconsin. Research specialties: Twentieth-century American prints and drawings; the history of the monotype in America; twentieth-century American art.

RAMOS, E. Carmen, Curator for Latino Art. B.A. (1988) New York University; M.A. (1995) University of Chicago. Research specialties: modern art of Latin America, American Latino artists, African American Art.

TRUETTNER, William H., Senior Curator. B.A. (1957) Williams College; M.A. (1959) University of Michigan. Research specialties: Eighteenth- and nineteenth-century American painting; George Catlin; art of the American West.

AFFILIATED RESEARCH STAFF

BROUN, Elizabeth, Margaret and Terry Stent Director. B.A. (1968), M.A. (1970), Ph.D. (1976) University of Kansas. Research specialties: Late nineteenth-century American art; graphic arts; contemporary art.

GURNEY, George, Deputy Chief Curator. B.A. (1962) Brown University; M.A. (1965) University of Pennsylvania; Ph.D. (1978) University of Delaware. Research specialties: American sculpture.

HENNESSEY, Christine, Chief, Research and Scholars Center. B.A.E. (1974) Oklahoma State University; M.A. (1982), M.L.S. (1986) University of Maryland. Research specialties: Librarian, Art research databases and documentation standards; reference sources for American painting and sculpture.

HOSTETLER, Lisa, McEvoy Family Curator for Photography. B.A. New York University (1992); M.A. (1995), Ph.D. (2004), Princeton University. Research specialties: contemporary photography, mid-20th-century street photography and Abstract Expressionism, post-World War II American photography, and the history of color photography in America.

INGALLS, Helen B., Objects Conservator. B.A. (1975) Emory University; M.A. and Certificate of Advanced Study in Conservation (1984) State University College at Buffalo. Research specialties: Conservation of American Folk art; contemporary crafts; nineteenth-and twentieth-century American sculpture; preventive conservation of acrylic urethane outdoor sculpture.

KERR-ALLISON, Amber, Painting Conservator. B.A. (2000) Virginia Commonweath University; M.S. (2008) University of Delaware. Research specialties: Paintings Conservation; Preventive Conservation; Materials and Techniques of Henry Ossawa Tanner (American, 1859-1937.

LEMMEY, Karen, Curator of Sculpture. B.A. (1995) Columbia University, N.Y; Ph.D. (2005) CUNY Graduate Center. Research specialties: American sculpture.

MAYNOR, Catherine I., Paper Conservator. B.A. (1978) University of Toronto; M.A. and Certificate of Advanced Study (1983) Cooperstown Graduate Programs. Research specialties: History of artists' materials, techniques; conservation materials and methods.

SHOCKEY, Hugh, Objects Conservator. B.A. (1996) Rhodes College; M.S. (2002) University of Delaware. Research specialties: Innovative treatment methods for traditional and modern sculptural materials; including CO2 snow ablation and aqueous and solvent gel technologies; treatment of composites, modern materials, and traditional sculpture materials; exhibits, case design, and mountmaking.

UMBERGER, Leslie, Curator of Folk and Self-taught Art. B.A. (1990) The School of the Art Institute of Chicago; M.A. (1998) The University of Colorado, Boulder. Research specialties: the work of folk, self-taught, vernacular, and autonomous artists and art environment builders

SMITHSONIAN ASTROPHYSICAL OBSERVATORY

Charles Alcock, Director

The Smithsonian Astrophysical Observatory (SAO) was established in 1890 as a research unit of the Smithsonian Institution concentrating on studies of solar radiance. Sixty-five years later, SAO assumed responsibility for establishing an optical network for tracking the first artificial satellites. From this pioneering effort, the size and scope of SAO grew with the international space program to include major research in virtually all branches of astrophysics, as well as in areas of earth and planetary sciences.

Since 1955, when its headquarters moved to Cambridge, Massachusetts, SAO has pursued such research in close collaboration with the Harvard College Observatory (HCO) and the Harvard University Department of Astronomy, with many staff members holding joint appointments. On July 1, 1973, the Smithsonian Institution and Harvard University formalized their collaboration as the Harvard-Smithsonian Center for Astrophysics (CfA) to coordinate the related research activities of the two observatories under a single director. Today the observatories retain their separate identities, each responsible to its parent organization; however, the joint venture draws on the coordinated strengths of the two organizations and the combined staffs in six research divisions: Atomic and Molecular Physics; High Energy Astrophysics; Optical and Infrared Astronomy; Radio and Geoastronomy; Solar, Stellar, and Planetary Sciences; and Theoretical Astrophysics. In addition, the CfA has a Science Education Department.

Facilities

Observational facilities include the multipurpose Fred Lawrence Whipple Observatory (FLWO) on Mt. Hopkins in Arizona and the Submillimeter Array Telescope (SMA) on Mauna Kea, Hawaii, the latter a collaboration with the Academia Sinica's Institute of Astronomy and Astrophysics of Taiwan. The major instrument on Mt. Hopkins is the 6.5-m-diameter optical telescope of the MMT Observatory, a facility operated jointly with the University of Arizona. SAO scientists have developed and deployed a suite of advanced wide-field imagers and spectrographs for the MMT including the Hectospec/Hectochelle fiber-fed optical spectrographs, the Megacam imager, and MMIRS, an infrared spectrograph and imager. VERITAS, the Very Energetic Radiation Imaging Telescope Array System, is a new major ground-based gamma-ray observatory at FLWO with an array of four 12m optical reflectors for gamma-ray astronomy in the GeV - TeV energy range. Also located at the FLWO are: the Peters Automated Infrared Imaging Telescope (PAIRITEL), a 1.3-m infrared telescope (formerly the northern 2MASS telescope, now operated by SAO); a 1.2-m imaging optical/infrared telescope, and the 1.5-m Tillinghast spectroscopic telescope. FLWO is also home to HAT, the Hungarian Automated Telescope, a completely automated set of small aperture telescopes that search for transiting extra-solar planets; four HAT-Net telescopes are at FLWO and two are at the SMA site in Hawaii, and are operated by Princeton University.

In addition to these SAO-operated facilities, the Center for Astrophysics has a 20% share of the twin 6.5-m Magellan telescopes in Chile, operated by a five-institution consortium headed by the Observatories of the Carnegie Institution of Washington. A set of f/5 wide-field optics, identical to those at the MMT, have been installed at the Magellan Clay Telescope. These new Magellan optics allow the operation of Megacam and MMIRS in the Southern Hemisphere. Not least, SAO/CfA is involved in the development of both the 25-m Giant Magellan Telescope, with its partners in the Magellan consortium and others, and the Large Synoptic Survey Telescope.

Special laboratories are maintained for the development of telescope instrumentation; for the spectroscopy of atoms and molecules; and for the petrologic and mineralogic studies of meteorites and lunar samples. A 1.2-m radio telescope on the roof of the Observatory in Cambridge is used for the study of molecular clouds and the structure of the Milky Way through the spectral lines of CO and other molecules.

SAO instrumentation is also operating in space. The Chandra X-ray Observatory, the third of the National Aeronautics and Space Administration's (NASA) Great Observatories, carries the SAO-designed High Resolution Mirror Assembly X-ray telescope and the SAO-designed and -built High Resolution Camera (HRC). Chandra, which SAO operates for NASA, is used to study X-rays from high-energy regions of the Universe. The Spitzer

Space Telescope uses SAO's Infrared Array Camera (IRAC) as its 3-to-10 micron camera for the study of both the very deep, early universe and the formation of stars and planets locally (Currently the 3-to-5 micron camera is the only functional instrument on Spitzer.) The SAO-designed and -built X-Ray Telescope (XRT) is a high-resolution grazing-incidence telescope on board the Japanese Hinode satellite, which is designed to observe the generation, transport, and emergence of solar magnetic fields in the sun. An SAO instrument is also onboard NASA's Solar Dynamics Observatory (SDO).

Numerous facilities serving the general scientific community are located at the CfA in Cambridge. The Institute for Theoretical Atomic, Molecular and Optical Physics, established in 1988 to attract and encourage talented graduate students to enter this field, emphasizes theoretical study of fundamental questions in atomic and molecular physics, hosts many visitors, both long- and short-term, and conducts conferences and workshops. The Center for X-ray Technology, established in 2003 as a collaborative effort with other institutions, promotes the development of detectors and optics leading to space telescope applications, including X-ray interferometers. The Institute for Theory and Computation (ITC), also hosted by the CfA, is dedicated to research in high-end astrophysical computing. The ITC consists of members of the Harvard Department of Astronomy, Smithsonian astrophysicists, postdoctoral researchers, graduate students, and associates at other institutions.

Other services at SAO include the Minor Planet Center, which disseminates information on astronomical discoveries worldwide. The United States' gateway for SIMBAD, an international astronomical computer database, is also located at the Cambridge site, as is Harvard's extensive collection of astronomical photographic plates, the largest in the world. In addition, SAO conceived, developed, and now operates the Astrophysics Data System (ADS), funded by NASA. This service includes on-line access to more than 4.2 million abstracts of articles in the fields of astronomy, astrophysics, space instrumentation, and space physics. Full-text on-line journals are also available. The HITRAN database of molecular parameters for transmission through and emission from planetary atmospheres is maintained at SAO for more than 5000 users worldwide. SAO participates in the National Virtual Observatory (NVO) and the International Virtual Observatory (IVOA) collaborations, whose aims are to implement improved connectivity between the various astronomical data archives in the world.

SAO, on behalf of NASA, serves as the site of both the Chandra X-ray Observatory Science Center (CXC) and the Chandra Operations and Control Center, the latter of which conducts Chandra flight operations on an around-the-clock basis. The CXC develops and oversees the General Observer program for this mission, as well as calibrates, manages, and distributes data received from Chandra.

The CfA's library, which includes the SAO collection as well as that of HCO, is available to the staff and to visitors. Located near the center of a community of universities, government agencies, and corporate scientific enterprises, SAO investigators enjoy access to a variety of facilities and counsel, and they may avail themselves of opportunities to pursue academic interests within the community. Smithsonian staff and their Harvard colleagues at the CfA publish more than 500 papers each year in internationally known journals.

OFFICE OF THE DIRECTOR

RESEARCH STAFF

ALCOCK, Charles Roger, Director, Harvard-Smithsonian Center for Astrophysics; Professor of Astronomy, Harvard University. B.Sc. (1972) Auckland University, New Zealand; Ph.D. (1977) California Institute of Technology. Research specialties: Large astronomical surveys; outer solar system; cosmic dark matter; astronomical data mining; virtual observatory technologies.

BRICKHOUSE, Nancy Susan, Astrophysicist; Senior Science Advisor, Harvard-Smithsonian Center for Astrophysics. B.S. (1977) University of North Carolina; Ph.D. (1984) University of Wisconsin. Research specialties: Plasma physics; solar and stellar coronae; plasma emission line spectroscopy; ultraviolet and X-ray spectroscopy of astrophysical sources; laboratory astrophysics.

Research Programs

The scientific objectives of the CfA are intentionally flexible so that response to new research opportunities can be prompt and effective. By design, the research programs reflect the strongest areas of the two observatories and concentrate in fields where the contribution to national goals and scientific excellence can best be realized. These broad objectives are pursued by the six major divisions as follows:

ATOMIC AND MOLECULAR PHYSICS

Quantitative information about atomic and molecular processes required for interpreting astronomical observations is obtained from combinations of laboratory and theoretical studies. Laboratory research includes millimeter-wave through ultraviolet spectroscopy (millimeter-wave spectroscopy of molecules including anions that have recently been detected in space, long carbon chains and rings), and stored light experiments in quantum optics. Fundamental precision measurements to test time-reversal symmetry-violating phenomena and applications of new magnetic resonance imaging techniques using spin-polarized noble gases are pursued. Tests of general relativity and the underlying equivalence principle use laboratory experimental techniques as well as radio observations of solar-system objects, spacecraft, and quasars and measurements of the round-trip timing of laser pulses sent to the moon. The application of the laser frequency comb to astrophysical measurements is being developed. The development of precise laser-based distance measurement techniques supports both the equivalence principle work and future space missions. Measurements of trace gases (primarily atmospheric pollutants) and other atmospheric constituents are made from satellite-based spectrometers operating in the ultraviolet, visible, and infrared.

Theoretical research with applications to astrophysics includes calculations of atomic and molecular structure, cross-sections for recombination and molecular collisional processes, photoionization, photodissociation, charge transfer, and the interactions between matter and anti-matter. These studies are used in the Atomic and Molecular Physics (AMP) division to explain the characteristics of X rays stemming from interactions of comets with the flux of ions and electrons streaming from the Sun (the solar wind), to examine the distributions of energetic atoms in atmospheres of the terrestrial planets, to develop new radiative transfer tools for the modeling of planetary atmospheres, and to measure and model photochemistry and pollution in the Earth’s atmosphere. AMP is a worldwide center for the development and archiving of fundamental spectroscopic parameters of molecular gases. The AMP division's HITRAN project maintains a database of molecular properties used worldwide for research on planetary atmospheres in the solar system and in extrasolar planetary systems. The Institute for Theoretical Atomic, Molecular and Optical Physics, funded primarily by the National Science Foundation and situated in the AMP division, has been in existence for twenty-five years. The main goals of the Institute are to educate both students and postdoctoral fellows in theoretical AMO Physics, to maintain a world-class visitor program, and to organize and support workshops in forefront areas of AMO Physics research.

RESEARCH STAFF

BABB, James F., Physicist. A.B. (1982) Oberlin College; M.S. (1986), Ph.D. (1988) New York University. Research specialties: Applications of atomic and molecular physics to astrophysics and atmospheric physics; molecular structure; long-range forces.

CHANCE, Kelly V., Senior Physicist; Associate Director, Atomic and Molecular Physics Division, Harvard-Smithsonian Center for Astrophysics. B.S. (1970) University of Hawaii; A.M. (1972), Ph.D. (1977) Harvard University. Research specialties: Molecular spectroscopy, structure, and dynamics and their application to atmospheric studies; laboratory spectroscopy and satellite-based measurements of the Earth's atmosphere, particularly of atmospheric pollutants and greenhouse gases; atmospheric composition and radiative transfer.

DALGARNO, Alexander, Senior Physicist; Phillips Professor of Astronomy, Harvard University. B.Sc. (1947), B.S. Advanced Studies (1948), Ph.D. (1951) University College, London; D.Sc. (1982) Queen's University of Belfast; D.Sc. (2000) York University, Canada. Research specialties: Theoretical atomic and molecular physics; ultracold gases; chemical physics; interstellar medium; astrophysical plasmas; early universe; atmospheric physics.

KHARCHENKO, Vasili A., Physicist. M.Sc. (1974) Politechnic Institute (Leningrad); Ph.D. (1978), D.Sc. (1988) Ioffe Physico-Technical Institute (St. Petersburg). Research specialties: Atmospheric physics; atomic collision theory.

LIU, Xiong, Research Scientist, Smithsonian Astrophysical Observatory. B.S. (1995) Nankai University; M.A. (1998) Research Center for Eco-environmental Sciences, Chinese Academy of Sciences; M.S. (2002) University of Alabama in Huntsville; Ph.D. (2002) University of Alabama in Huntsville. Research specialties: Remote sensing of atmospheric trace gases, aerosols, and clouds; Atmospheric radiative transfer modeling and instrument calibration; Tropospheric chemistry studies integrating satellite measurements, chemical transport models, and in situ observations.

McCARTHY, Michael C., Senior Physicist. B.Sc. (1986) University of Alaska; Ph.D. (1992) Massachusetts Institute of Technology. Research specialties: Astrochemistry; laboratory astrophysics of reactive molecules; microwave and laser spectroscopy.

PHILLIPS, David Forrest, Physicist. B.S. (1988) California Institute of Technology; Ph.D. (1996) Harvard University. Research specialties: Development and applications of atomic clocks; precise tests of fundamental physical laws; quantum optics.

PHILLIPS, James D., Physicist. B.S. (1975) University of Michigan; Ph.D (1983) Stanford University. Research specialties: Laboratory and space-based experiments on gravity; space-based astronomical optical instruments; measuring glacier motion with laser ranging.

REASENBERG, Robert D., Physicist. B.S. (1963) Polytechnic University (Brooklyn); Ph.D. (1970) Brown University. Research specialties: Tests of general relativity, especially laboratory and space-based experiments to test the equivalence principle; solar-system dynamics and solar-system-based tests of general relativity; terrestrial and celestial applications of laser distance measurement.

ROTHMAN, Laurence S., Senior Physicist. B.S. (1961) Massachusetts Institute of Technology; A.M. (1964), Ph.D. (1971) Boston University. Research specialties: Molecular spectroscopy; HITRAN (high-resolution transmission) database compilation.

SADEGHPOUR, Hossein R., ITAMP Director. B.S. (1981), M.S. (1983), Ph.D. (1990) Louisiana State University. Research specialties: Atomic and molecular collisions and spectroscopy; formation and collision of cold antihydrogen and protonic atoms, quantum mechanical interference effects; rydberg collisions; absorption and scattering of light for astrophysical applications, recombination and reionization, and two-photon processes, coherent control and manipulation on the nanoscale, coherent light interaction with nanotubes, ultracold collision of dipolar systems.

WALSWORTH, Ronald L., Senior Physicist. B.S. (1984) Duke University; Ph.D. (1991) Harvard University. Research specialties: Development of atomic clocks and precision measurement tools; precise tests of fundamental physical laws; bioimaging and brain science; searches for extrasolar planets.

WANG, Huiqun, Physicist. B.S. (1997) University of Science and Technology, China; Ph.D. (2004) California Institute of Technology. Research specialties: Martian atmospheric chemistry and meteorology; planetary science; chemical transport models; General Circulation Models.

AFFILIATED RESEARCH STAFF

MARTIN, Randall V., Research Associate, Smithsonian Astrophysical Observatory. B.A. (1996) Cornell University; M.Sc. (1998) Oxford University; M.S. (2001), Ph.D. (2002) Harvard University. Research specialties: atmospheric chemistry; satellite remote sensing; global modelling of atmospheric composition.

ZHANG, Peng, Research Associate, Harvard College Observatory. B.A. (1996) Zhengzhou University; M.S. (1999) Peking University; Ph.D. (2005) Emory Univeristy. Research specialties: Electronic structure theory and molecular dynamics.

HIGH ENERGY ASTROPHYSICS

Research in the High Energy Astrophysics Division focuses on astronomical objects and processes that emit energy as X-rays, which include most classes of astronomical objects including planets, all types of stars, stellar black holes, neutron stars, supernova remnants, supermassive black holes, galaxies, and galaxy clusters. Observations are made from spacecraft, notably the Earth-orbiting Chandra X-ray Observatory, one of NASA's "Great Observatories." The Division's scientific studies are directed at a broad range of topics including cosmology; the structure, interactions, and evolution of astronomical objects; and the processes which generate X-ray radiation. In support of their scientific studies, members of the division use telescopes at all major observatories covering all available wavelengths. Novel X-ray optics and detectors are developed primarily through the CfA's Center for X-ray Technology, recently awarded a major grant from the Gordon and Betty Moore Foundation. In addition, the Division operates the NASA Astrophysics Data system, the premier digital library in astrophysics with thirteen mirror sites at major international astronomical facilities. Staff members participate in planning and developing major new missions, notably the International X-ray Observatory, and currently operate the Chandra X-ray Center and conduct Chandra flight operations. In solar physics, the Division participated in the development of an X-ray telescope for the Japanese Hinode mission and now operates a data center for analyzing the Hinode data. In addition, the solar researchers are major participants in the Atmospheric Imaging Assembly investigation on NASA's Solar.

Dynamics Observatory, launched in February 2010, and in the IRIS satellite to study the solar atmosphere. In support of its research and educational goals, the Division funds approximately 30 postdoctoral fellows, hosts 12 visiting scientists, runs an NSF summer intern program, now in its 17th year, and maintains extensive educational and public outreach activities.

RESEARCH STAFF

ACCOMAZZI, Alberto, Program Manager, Astrophysics Data System Project. Ph.D. (1988) University of Milan. Research specialties: Digital Libraries; Scientific Information Systems; Semantic Web Technologies; Natural Language Processing; Image Analysis and Classification.

ALDCROFT, Thomas L., Astrophysicist. B.S. (1987) California Institute of Technology; Ph.D. (1993) Stanford University. Research specialties: X-ray constraints on the intergalactic medium; quasar absorption line systems; quasar multiwavelength spectral energy distribution.

BOOKBINDER, Jay A., Astrophysicist. B.A. (1979) Harvard College; Ph.D. (1985) Harvard University. Research specialties: X-ray and radio astronomy; nonthermal activity in stellar atmospheres.

BURKE, Douglas, Astrophysicist. B.Sc. (1992), M.Sc. (1993) Imperial College of Science, Technology and Medicine (London); Ph.D. (1997) University of Durham. Research specialties: Galaxy clusters; observational cosmology; extragalactic astronomy; Astroinformatics; Semantic Web.

CHAPPELL, Jon H., Astrophysicist. B.S. (1972) University of Louisville; Ph.D. (1981) University of New Hampshire. Research specialties: Development of astrophysical X-ray detectors and data systems.

CHYLA, Roman, Information Scientist, Astrophysics Data System Project. M.A. (2003); Ph.D. (2012) Charles University, Prague. Research specialties: Digital Libraries; Scientific Information Systems; Semantic Web Technologies; Natural Language Processing.

DAVEY, Alisdair, Archive Astrophsicist. B.S. (1990), Ph.D. (1995) University College London. Research specialties: Large scale data distribution and archiving, automated feature and event detection, data mining, Virtual Observatories, Coronal Mass Ejections and Bright Points.

DAVID, Laurence P., Astrophysicist. B.A. (1980) Drexel University; M.A. (1983), Ph.D. (1985) Indiana University. Research specialties: Early-Type Galaxies; Groups of Galaxies; Clusters of Galaxies; Cosmology.
DELUCA, Edward E., Supervisory Astrophysicist. B.A. (1979), M.A. (1980) Wesleyan University; Ph.D. (1986) University of Colorado. Research specialties: Solar coronal physics; Astrophysical fluid dynamics; Solar physics; Magnetohydrodynamics; Dynamo theory.

DRAKE, Jeremy J., Astrophysicist. B.Sc. (1985) University of Newcastle-Upon-Tyne; D.Phil. (1989) Brasenose College, Oxford University. Research specialties: Star and planet formation; protoplanetary disks, stellar atmospheres; stellar magnetic activity; element abundances and stellar evolution; novae; extreme ultraviolet and X-ray astronomy.

EDGAR, Richard J., Research Astrophysicist. B.A. (1976) University of Colorado; M.S. (1983), Ph.D. (1985) University of Wisconsin. Research specialties: X-ray astronomy; spectroscopy; diffuse soft X-ray background; hot interstellar medium supernova remnants; nonequilibrium ionization solar wind, X-ray instrument calibration.

EDMONDS, Peter D., Astrophysicist. B.S. (1988), Ph.D. (1994) University of Sydney. Research specialties: Globular clusters; compact binaries, especially accreting systems; HST studies of globulars; optical identifications of X-ray sources; X-ray studies of compact binaries; millisecond pulsars; stellar pulsations.

ELVIS, Martin S., Astrophysicist. B.Sc. (1973) University of Bristol; M.Sc. (1974) University of Sussex; Ph.D. (1978) University of Leicester. Research specialties: Extragalactic X-ray astronomy, quasars, and active galactic nuclei; large scale multi-waveband surveys (X-ray, UV, ir, mm, and radio) esp. of continuum and lines in quasars; models for quasars, winds from quasars. Asteroids studies to enable human exploration.

EVANS, Ian N., Astrophysicist. B.Sc. (1982) University of Western Australia; Ph.D. (1987) Australian National University. Research specialties: Physics of active galactic nuclei, including the impact of nuclear activity on the host galaxy; HII region abundances and physics of the interstellar medium; image-processing algorithms.

EVANS, Nancy R., Astrophysicist. B.A. (1966) Wellesley College; M.Sc. (1969), Ph.D. (1974) University of Toronto. Research specialties: Cepheid masses and luminosities; binary stars (star formation); visual and ultraviolet observations of intermediate mass stars; X-ray observations of star clusters.

FABBIANO, Giuseppina, Senior Astrophysicist. Ph.D. (1973) University of Palermo. Research specialties: X-ray astronomy; normal galaxies; populations of X-ray sources in galaxies; silent supermassive black holes; multiwavelength astrophysics archives and data analysis in the Virtual Observatory.

FORMAN, Christine Jones, Astrophysicist. A.B. (1971) Radcliffe College; A.M. (1972), Ph.D. (1974) Harvard University. Research specialties: X-ray observations of hot gas in galaxies and clusters of galaxies to determine their mass, structure, and cosmological evolution.

FORMAN, William R., Astrophysicist. B.A. (1969) Haverford College; M.A. (1970), Ph.D. (1973) Harvard University. Research specialties: X-ray astronomy; high-energy astrophysics; hot gas in galaxies, galaxy groups, and clusters of galaxies; feedback from supermassive black holes in galaxies.

FRUSCIONE, Antonella, Astrophysicist. Laurea Doctoral Degree (1986) University of Milan; Degree of Advanced Studies (1987) University of Paris. Research specialties: Multiwavelength studies of active galactic nuclei; EUVE and X-ray astronomy; astronomical data analysis.

GAETZ, Terrance, Astrophysicist. S.B. (1977) Massachusetts Institute of Technology; M.S. (1980), Ph.D. (1985) Cornell University. Research specialties: X-ray astronomy; supernova remnants; shock physics (radiative and nonradiative); astrophysical gas dynamics; computational physics and astrophysics.

GARCIA, Michael R., Astrophysicist. B.A. (1978) Massachusetts Institute of Technology; Ph.D. (1987) Harvard University. Research specialties: multi-wavelength observations of black holes and neutron stars; X-ray binaries; X-ray instrumentation.

GOLUB, Leon, Senior Astrophysicist. B.S. (1967) City College of New York; Ph.D. (1972) Massachusetts Institute of Technology. Research specialties: High-resolution X-ray and extreme ultraviolet instrumentation; solar and stellar coronal plasma dynamics and dynamo theory.

GORENSTEIN, Paul, Senior Astrophysicist. B.E.P. (1957) Cornell University; Ph.D. (1962) Massachusetts Institute of Technology. Research specialties: X-ray astronomy; grazing incidence and diffractive X-ray telescopes; instrumentation for X-ray astronomy; supernova remnants; clusters of galaxies.

GRAESSLE, Dale E., Astrophysicist. B.S. (1981) University of Missouri, Columbia; Ph.D. (1989) University of Wisconsin. Research specialties: X-ray astronomy; high-energy astrophysics; AGN spectra; instrument calibration; synchrotron radiation.

GREEN, Paul J., Astrophysicist. B.A. (1981) Oberlin; Ph.D. (1992) University of Washington, Seattle. Research specialties: Extragalactic X-ray astronomy; quasars and AGN; quasar variability; X-ray survey multiwavelength followup; wide separation quasar pairs or lenses; quasar emission and absorption lines; galactic faint halo carbon stars; S stars.

HARRIS, Daniel E., Astrophysicist. B.A. (1956) Haverford College; M.A. (1957), Ph.D. (1961) California Institute of Technology. Research specialties: Nonthermal processes in extragalactic sources: clusters of galaxies, radio galaxies, and quasars with a particular emphasis on relativistic jets.

JERIUS, Diab, Astrophysicist. B.S. (1984) Wayne State University; Ph.D. (1992) University of Michigan. Research specialties: Numerical cosmology; galaxy cluster evolution.

JUDA, Michael, Astrophysicist. B.S. (1981) California Institute of Technology; Ph.D. (1988) University of Wisconsin. Research specialties: X-ray astronomy; studies of the interstellar medium; supernova remnants; instrumentation; cryogenic X-ray detectors; X-ray optics.

KAROVSKA NEILY, Margarita, Astrophysicist. Ph.D. (1984) Universite de Nice. Research specialties: Late-spectral-type stars; interacting binaries; AGN; multiwavelength high angular resolution imaging, and interferometry; X-ray astronomy; solar corona.

KASHYAP, Vinay L., Astrophysicist. M.S. (1993), Ph.D. (1994) University of Chicago. Research specialties: Solar and stellar coronae; diffuse X-ray emission; X-ray analysis algorithms.

KASPER, Justin Christophe, Astrophysicst. A.B. (1999) University of Chicago; Ph.D. (2003) Massachusetts Institute of Technology. Research specialties: Thermal plasma, high energy particle, mass spectroscopy, and electromagnetic sensors for space-flight and ground-based instrument with applications including Earth, Moon, Sun, and solar system exploration.

KENTER, Almus, Astrophysicist. B.S. (1982) Columbia University; M.S. (1984), Ph.D. (1989) University of Wisconsin. Research specialties: X-ray detector and instrumentation development; X-ray astronomy of compact objects; TeV gamma-ray astronomy and detector technology.
KIM, Dong-Woo, Astrophysicist. B.S. (1980), M.S. (1982) Seoul National University; Ph.D. (1988) University of California, Los Angeles. Research specialties: Interstellar matter in early-type galaxies; X-ray emission from normal galaxies.

KORRECK, Kelly Elizabeth, Astrophysicist. B.S. (1999), M.S. (2002), Ph.D. (2005) University of Michigan. Research specialties: solar magnetic reconnection and associated particle acceleration, shock physics in supernova remnants and the heliosphere.

KRAFT, Ralph P., Physicist. B.S. (1988) University of Pittsburgh; Ph.D. (1995) Pennsylvania State University. Research specialties: Instrumentation for X-ray astronomy, astrophysical jets, hydrodynamics, galaxy mergers, formation of structure.

MACHACEK, Marie Esther, Astrophysicist. B.A. (1969) Coe College; M.S. (1970) University of Michigan; Ph.D. (1973) University of Iowa. Research specialties: Galaxy interactions and evolution; X-ray studies of hot gas in galaxies, clusters, and groups.

McCLINTOCK, Jeffrey E., Senior Astrophysicist. B.S. (1964) Stanford University; Ph.D. (1969) Massachusetts Institute of Technology. Research specialties: stellar-mass black holes; measurements of mass and spin, and studies of jets and other relativistic phenomena.

McCOLLOUGH, Michael L., Archival Astrophysicist. B.S. (1975), M.S. (1981) Auburn University; Ph.D. (1989) Indiana University. Research specialties: X-ray binaries; microquasars; high-energy astrophysics; multi-wavelength studies; X-ray astronomy; gamma-ray astronomy; supernova remnants.

McDOWELL, Jonathan C., Astrophysicist. B.A. (1981), Ph.D. (1987) Cambridge University. Research specialties: Quasars; black holes; multiwaveband studies; astronomical software.

MUENCH-NASRALLAH, August, Astrophysicist. B.S. (1995) Georgia Institute of Technology; M.S. (1997), Ph.D. (2002) University of Florida. Research specialties: observational star and planet formation; infrared astronomy; development and utilization of online astronomical resources.

NICHOLS, Joy S., Astrophysicist. B.A. (1968), M.S. (1970) Northwestern University; Ph.D. (1992) University of Amsterdam. Research specialties: Interstellar medium; winds of hot stars; high-energy plasma physics.

NULSEN, Paul E.J., Astrophysicist. B.S. (1975) University of Western Australia; Ph.D. (1980) Cambridge University. Research specialties: X-ray astronomy; dynamics and gas dynamics; hot gas in galaxies and clusters; active galactic nuclei.

PATNAUDE, Daniel, Astrophysicist. B.S. (1995) University of Massachusetts, Amherst; Ph.D. (2005) Dartmouth College. Research specialties: Supernova Remnants; ISM Studies; Cosmic Rays; X-ray Astronomy; Computational Physics; Accretion; Supernovae.

PLUCINSKY, Paul P., Astrophysicist. S.B. (1987) Massachusetts Institute of Technology; Ph.D. (1993) University of Wisconsin, Madison. Research specialties: Local X-ray background; supernova remnants; Interstellar Medium; Nearby Galaxies; X-ray detectors.

PRESTWICH, Andrea H., Astrophysicist. B.Sc. (1984) Queen Mary College, London; M.Sc. (1985) University of Manchester; Ph.D. (1989) Imperial College, London. Research specialties: Multiwavelength studies of clusters of galaxies; extragalactic star formation.

PRIMINI, Francis A., Astrophysicist. B.S. (1972) Rensselaer Polytechnic Institute; Ph.D. (1977) Massachusetts Institute of Technology. Research specialties: Observational X-ray astronomy, including number counts and distributions of X-ray source populations in the Milky Way and other similar galaxies; surveys of extragalactic X-ray sources; X-ray binaries; time-series analysis of X-ray sources.

RANDALL, Scott W., Astrophysicist. B.A. (1997) Wesleyan University; Ph.D. (2005) University of Virginia. Research specialties: X-ray astronomy; High-energy astrophysics; Galaxy clusters and groups; AGN feedback.

REEVES, Katharine, Astrophysicist. B.A. (1996) Reed College; M.S. (1999) Northeastern University; Ph.D. (2006) University of New Hampshire. Research specialties: Modeling and data analysis of solar flares and coronal mass ejections.

REID, Paul B., Senior Astrophysicist. B.A. (1975), M.A. (1977), Ph.D. (1982) Columbia University. Research specialties: X-ray optics.

ROMAINE, Suzanne E., Physicist. B.S. (1974) Michigan State University; S.M. (1986) Harvard University; Ph.D. (1992) Boston University. Research specialties: X-ray optics, deposition of multilayer coatings, thin film coatings, materials science of thin films; low-temperature physics; semiconductor and superconductor device physics.

ROTS, Arnold H., Astrophysicist. B.Sc. (1967), M.Sc. (1971), Ph.D. (1974) University of Groningen. Research specialties: Interstellar medium in extended galaxies; dynamics of galaxies; study of pulsars, in particular timing; data analysis algorithms; time keeping; data archives; Virtual Observatory.

SAAR, Steven H., Astrophysicist. B.A. (1980) Northwestern University; Ph.D. (1987) University of Colorado. Research specialties: Solar/stellar magnetic fields, dynamos, and related activity; stellar rotation, convection, and surface features; detection of extrasolar planets.

SCHWARTZ, Daniel A., Senior Physicist. B.S. (1963) Washington University (St. Louis); M.S. (1966), Ph.D. (1969) University of California, San Diego. Research specialties: X-ray astronomy; Active Galactic Nuclei (AGN) and Extragalactic Jets; Observational Cosmology; X-ray mirror and detector instrumentation.

SIEMIGINOWSKA, Aneta L., Astrophysicist. M.S. (1985) University of Warsaw; Ph.D. (1991) Copernicus Astronomical Center, Poland. Research specialties: Physics of Active Galaxies and Quasars. Evolution of Radio Galaxies. X-ray emission associated with relativistic outflows. Astrostatistics.

SILVER, Eric H., Senior Astro Physicist. B.S. (1973) Massachusetts Institute of Technology; M.Phil. (1976), Ph.D. (1978) Columbia University. Research specialties: X-ray spectroscopy and polarimetry of laboratory and astrophysical plasmas.

SLANE, Patrick O., Astrophysicist. B.S.E. (1977) University of Wisconsin, Whitewater; M.S. (1983) University of Wisconsin, Milwaukee; Ph.D. (1988) University of Wisconsin, Madison. Research specialties: Galactic X-ray and gamma-ray astronomy; supernova remnants; pulsar wind nebulae; young neutron stars.

SLAVIN, Jonathan David, Astrophysicist. B.S. (1984) Georgetown University; Ph.D. (1990) University of Wisconsin. Research specialties: Theories of the interstellar medium (ISM), especially local ISM (including our local interstellar cloud) and interactions of hot gas and cooler gas; supernova remnant (SNR) evolution; interstellar dust; X-ray, ultraviolet and infrared observations of SNRs and the hot ISM; intracluster medium in rich clusters.

SMITH, Randall Knowles, Astrophysicist. B.S (1991) Carnegie Mellon University; Ph.D (1996) University of Wisconsin. Research specialties: X-ray Astronomy: Interstellar Medium, Interstellar Dust, Galaxy Clusters; Atomic Physics: Theoretical Calculations, X-ray Spectroscopy.

TANANBAUM, Harvey D., Senior Astrophysicist; Director, Chandra X-ray Observatory Center. B.A. (1964) Yale University; Ph.D. (1968) Massachusetts Institute of Technology. Research specialties: X-ray astronomy; quasars.

TESTA, Paola, Astrophysicist. Laurea in Physics (2001), Ph.D. (2005) University of Palermo. Research specialties: Solar and stellar coronal physics; stellar magnetic activity; modeling of coronal loops; X-ray astronomy.

TIAN, Hui, Astrophysicist. B.E. (2005), Wuhan University; Ph.D. (2010), Peking University. Research specialties: Solar transition region and coronal dynamics; EUV/FUV spectroscopy of the upper solar atmosphere and coronal mass ejections.

VIKHLININ, Alexey A., Astrophysicist. B.S. (1993) Moscow Institute of Physics and Technology; Ph.D. (1995) Russian Space Research Institute. Research specialties: X-ray astronomy; clusters of galaxies.

VRTILEK, Jan M., Astrophysicist. B.A. (1975) University of Wisconsin; A.M. (1976), Ph.D. (1983) Harvard University. Research specialties: Clusters and groups of galaxies; X-ray astronomy; astronomical instrumentation.

VRTILEK, Saeqa Dil, Senior Astrophysicist. B.S. (1975) Massachusetts Institute of Technology; M.A. (1979) Brandeis University; Ph.D. (1985), M.Phil. (1985) Columbia University. Research specialties: Optical tomography of X-ray binaries; physics of accretion disks and jets; multiwavelength studies of X-ray binaries and planetary nebulae; science education/public outreach; 3d modeling and classification of XRBs.

WARGELIN, Bradford, Astrophysicist. S.B. (1985) Massachusetts Institute of Technology; Ph.D. (1993) University of California, Berkeley. Research specialties: Laboratory X-ray astrophysics: high-resolution spectroscopy, electron impact excitation, and charge exchange; stellar coronae; solar wind charge exchange and soft X-ray background; calibration of X-ray instrumentation.

WEBER, Mark, Astrophysicist. B.S. (1991) Harvey Mudd College; M.S. (1995), Ph.D. (1999) Montana State University. Research specialties: Coronal differential rotation; large-scale structure of corona; magnetic loop models; variation of solar neutrino flux.

WILKES, Belinda J., Senior Astrophysicist; Assistant Director, Chandra X-ray Center. B.Sc.(Hons)(1978) St. Andrews University; Ph.D. (1982) Cambridge University. Research specialties: X-ray and multifrequency studies of quasi-stellar objects; Multi-wavelength surveys (ChaMP,SWIRE).
WOLK, Scott J., Astrophysicist. A.B. (1988) Cornell University; Ph.D. (1996) State University of New York, Stony Brook. Research specialties: Multiwavelength studies of regions of star formation; Evolution of young stars; Stellar flares; Stellar disks; Brown dwarfs; X-ray astronomy; X-ray studies of exoplanets, planets and comets; Next generation of X-ray telescopes.

ZHAO, Ping, Astrophysicist. B.S. (1981) Peking University; Ph.D. (1986) Yale University. Research specialties: High Energy Astrophysics: X-ray telescopes and their mirrors; multi-wavelength studies of X-ray binaries; black holes; neutron stars; Atomic physics: atomic beams; laser physics; high precision measurements.

AFFILIATED RESEARCH STAFF

BRISSENDEN, Roger J., Deputy Director, Harvard-Smithsonian Center for Astrophysics; Manager, Chandra X-ray Center. B.S. (1985) University of Adelaide; Ph.D. (1989) Australian National University. Research specialties: Multiwavelength studies of active galactic nuclei; BL Lac objects; Science Center and Mission Operations.

GAENSLER, Bryan M., Research Associate, Smithsonian Astrophysical Observatory. B.Sc. (1993), Hons Class I (1994), Ph.D. (1998) University of Sydney. Research specialties: Neutron stars; supernova remnants; supernovae; the interstellar medium; magnetic fields; shocks; turbulence; the Magellanic Clouds; radio polarimetry; interferometry; high energy astrophysics; history of astronomy.

GRINDLAY, Jonathan E., Robert Treat Paine Professor of Astronomy, Harvard University. A.B. (1966) Dartmouth College; A.M. (1969), Ph.D. (1971) Harvard University. Research specialties: High energy astrophysics; X-ray observations and models of compact Objects in binaries in globular clusters; active galaxies; gamma-ray bursts; development of hard X-ray imaging detectors and telescopes; time domain astrophysics and surveys.

KELLOGG, Edwin M., Astrophysicist. B.S. (1960) Rensselaer Polytechnic Institute; M.S. (1963), Ph.D. (1966) University of Pennsylvania. Research specialties: X-ray astronomy; clusters of galaxies; symbiotic stars; X-ray instrumentation.

LEE, Julia C., Astrophysicist; Assistant Professor of Astronomy, Harvard University. B.S. (1994) University of California, Los Angeles; Ph.D. (1999) Cambridge University. Research specialties: Multi-wavelength (primarily X-ray) spectroscopic studies of energetic accretion systems (X-ray binaries, AGN); interstellar dust composition studies through laboratory experiments and space-based observations.

MATTISON, Edward M., Physicist. B.S. (1963) Queens College of the City University of New York; Ph.D. (1974) Massachusetts Institute of Technology. Research specialties: Hydrogen masers; high-stability frequency standards.

MURRAY, Stephen S., Senior Astrophysicist. B.S. (1965) Columbia University; Ph.D. (1971) California Institute of Technology. Research specialties: X-ray astronomy; Clusters of Galaxies, Active Galactic Nuclei, Supernova Remnents, Large Area Surveys; space physics; single-photon-counting detection systems; information systems; detectors, optics, and interferometry.

SEWARD, Frederick D, Astrophysicist. A.B. (1953) Princeton University; Ph.D. (1958) University of Rochester. Research specialties: X-ray astronomy; Supernova remnants; Neutron Stars.

TUCKER, Wallace H., Astrophysicist, Senior Theoretician. B.S. (1961), M.S. (1962) University of Oklahoma; Ph.D. (1966) University of California. Research specialties: High-energy astrophysics.

VAN DEN BERG, Maureen, Research Associate, Harvard College Observatory. Ph.D. (2001) Utrecht University. Research specialties: Galactic X-ray source populations; X-ray sources in old open clusters, globular clusters, Galactic center and bulge; X-ray and optical/infrared studies of interacting binaries; compact binaries.

ZEZAS, Andreas, Astrophysicist. B.Sc. (1997) University of Patras; Ph.D. (2000) University of Leicester. Research specialties: X-ray astronomy; discrete X-ray sources in galaxies; X-ray binaries, supernova remnants; multiwavelength observations of galaxies; galaxy interactions; low-luminosity active galactic nuclei.

OPTICAL AND INFRARED ASTRONOMY

Research in this division spans extragalactic and galactic astronomy, with special emphases on cosmology, the large-scale structure of the universe, cosmic gamma-ray sources, clusters of galaxies, clusters of stars, the halo of our galaxy, and the formation and evolution of stars and galaxies. Observations are made from orbiting observatories including the Hubble Space Telescope and the Spitzer Space Telescope, as well as from ground-based observatories such as the MMT, Magellan, and FLWO. SAO/CfA astronomers were the first to uncover the large-scale structure of the distribution of galaxies in space and the acceleration of the Universe. Division scientists have also led the exploration of the very high energy (TeV) gamma-ray universe using atmospheric Cerenkov telescopes. OIR scientists are heavily involved in the analysis of Spitzer data and led the development of the Infrared Array Camera (IRAC) for Spitzer. They are active in the development of both advanced optical and infrared instruments for existing ground-based facilities, and concepts for the next generation of large optical/infrared telescopes and instruments, including the Giant Magellan Telescope (GMT), a 25-m telescope made up of seven 8.4-m segments; the first segment is currently being fabricated.

RESEARCH STAFF

ASHBY, Matthew L. N., Astrophysicist. B.A. (1988) University of Colorado; M.S. (1991), Ph.D. (1995) Cornell University. Research specialties: Infrared properties of nearby and distant galaxies; active galactic nuclei; galaxy evolution; radiative transfer.

BENBOW, Wystan, Astrophysicist, VERITAS. B.S. (1996) University of Iowa; M.S. (1998), Ph.D. (2002) University of California, Santa Cruz. Research specialties: Very-high-energy (E > 100 GeV) Gamma-ray Astronomy: Observational studies of extragalactic objects; PI of the VERITAS experiment (http://veritas.sao.arizona.edu) & contributor to the development of the CTA experiment (http://www.cta-observatory.org).

BROWN, Warren R., Astrophysicist. B.S. (1995) University of Arizona; A.M. (1998), Ph.D. (2002) Harvard University. Research specialties: Hypervelocity stars; Merging white dwarf binaries; Stellar halo of the Milky Way; Optical and infrared instruments for ground-based telescopes.

CALDWELL, Nelson, Astronomer. B.A. (1976) University of South Florida; Ph.D. (1982) Yale University. Research specialties: M31; star clusters in galaxies; dwarf galaxies; star formation in galaxies.

FABRICANT, Daniel G., Senior Physicist; Associate Director, Optical and Infrared Astronomy Division, Harvard-Smithsonian Center for Astrophysics. B.S. (1974) Massachusetts Institute of Technology; Ph.D. (1978) Harvard University. Research specialties: Galaxy clusters; galaxy evolution; large-scale structure; instrumentation for optical and infrared astronomy.

FALCO-ACOSTA, Emilio, Astronomer. B.S., M.S. (1983), Ph.D. (1986) Massachusetts Institute of Technology. Research specialties: Observational cosmology; estimation of cosmological parameters and studies of galaxy evolution; searches for and studies of gravitational lenses in all-sky surveys; searches for extrasolar planets.

FAZIO, Giovanni G., Senior Physicist. B.S. (1954), B.A. (1954) St. Mary's University, Texas; Ph.D. (1959) Massachusetts Institute of Technology. Research specialties: Infrared astronomy, including satellite and ground-based observations using infrared array cameras; the early universe; star formation and evolution; brown dwarfs; and ultraluminous galaxies.

GEARY, John C., Physicist. B.A. (1967) Michigan State University; M.S. (1969), Ph.D. (1975) University of Arizona. Research specialties: Design and construction of advanced electronic imaging detector systems for astronomical observations.

GELLER, Margaret, Senior Astronomer. A.B. (1970) University of California, Berkeley; Ph.D. (1975) Princeton University; DSHC (1995) Connecticut College; DSHC (1997) Gustavus Adolphus College; DSHC (2000) Universi-

ty of Massachusetts (Dartmouth); DSHC (2009) Colby College; DSHC (2009) Universitat Rovira i Virgili (Tarragona, Spain). Research specialties: Extragalactic astronomy and cosmology; mapping the universe; the formation and history of galaxies like the Milky Way; matter distribution in the universe; structure of the Milky Way; black holes and hypervelocity stars.

HORA, Joseph L., Astronomer; IRAC Program Scientist. B.A. (1985) Northwestern University; Ph.D. (1991) University of Arizona. Research specialties: Infrared astronomy; infrared instrumentation; star formation; planetary nebulae.

HUANG, Jiasheng, Astrophysicist. A.S. (1985), M.S. (1988) Nanjing University; Ph.D. (1997) University of Hawaii. Research specialties: Extragalactic survey; galaxy formation and evolution; cosmology.

KURTZ, Michael J., Astronomer. B.A. (1977) San Francisco State University; Ph.D. (1982) Dartmouth College. Research specialties: Observational cosmology; galaxy photometry and spectroscopy; image-processing techniques; numerical classification methods; scientific information systems; digital libraries.

LACASSE, Marc G., Engineer/Instrument Support Scientist. B.A. (1976) Dartmouth College; M.A. (1978), Ph.D. (1984) University of Rochester. Research specialties: Instrument support, astronomical spectroscopy & imaging, interferometry; image reconstruction; light scattering; polarization.

LATHAM, David W., Senior Astronomer. B.S. (1961) Massachusetts Institute of Technology; Ph.D. (1970) Harvard University. Research specialties: Searches for and characterization of extrasolar planets; the formation and early history of the Milky Way Galaxy; the frequency and orbital characteristics of binaries in various stellar populations.

McLEOD, Brian A., Astronomer. B.A. (1988) Cornell University; Ph.D. (1994) University of Arizona. Research specialties: Optical and infrared instrumentation; gravitational lensing; galaxy evolution.

MEIBOM, Soren, Astronomer. Ph.D. (2005) University of Wisconsin. Research specialties: Stars: late type; binary stars; tidal evolution; stellar rotation; stellar photometry and spectroscopy.
MELNICK, Gary J., Senior Astronomer. B.A. (1974), M.S. (1979), Ph.D. (1980) Cornell University. Research specialties: Infrared spectroscopy and interstellar matter; satellite infrared and submillimeter astronomy; dark energy and cosmology.

PAHRE, Michael Andrew, Astrophysicist. A.B. (1989) Harvard University; Ph.D. (1998) California Institute of Technology. Research specialties: Elliptical galaxies; galaxy evolution; high-redshift galaxies and quasi-stellar objects; stellar populations; infrared instrumentation; searches for clusters of galaxies.

SCHILD, Rudolph E., Astronomer. B.S. (1962), M.S. (1964), Ph.D. (1966) University of Chicago. Research specialties: Gravitational lenses and microlensing; quasar structure and photometry; dark matter; quasar time series analysis.

SMITH, Howard A., Senior Astrophysicist. S.B. (1966), S.B. (2) (1966) Massachusetts Institute of Technology; Ph.D. (1976) University of California, Berkeley. Research specialties: Galactic and extragalactic star formation; infrared spectroscopy; instrumentation; Spitzer (IRAC team); Herschel Space Observatory; Infrared Space Observatory; education and public outreach activities.

SZENTGYORGYI, Andrew H., Astrophysicist. B.S. (1979) State University of New York, Stony Brook; M.S. (1983), Ph.D. (1986) University of Wisconsin. Research specialties: Exoplanets; globular clusters; open clusters; supernovae; astronomical instrumentation; high resolution astronomical spectroscopy.

TOLLS, Volker, Astronomer. Diploma (1988), Ph.D. (1992) University of Cologne. Research specialties: Design and test of radio telescope instrumentation, ground-based and spaceborne, millimeter-to-infrared astronomy; interstellar chemistry; planet detection and imaging; coronagraphic techniques.

TORRES, Guillermo, Astronomer. Ph.D. (1991) University of Cordoba. Research specialties: Binary stars; precise determination of fundamental stellar parameters; pulsating stars; Doppler searches for extrasolar planets; follow-up of transiting extrasolar planets; radial-velocity studies of star-forming regions.

WANG, Zhong, Astronomer. B.A. (1982) Nanjing University; M.A. (1985), Ph.D. (1989) Boston University. Research specialties: Spectroscopic, photometric, and interferometric observations of stars and interstellar medium in galaxies, including the Milky Way; Astrophysics of star formation, galaxy evolution and galaxy interactions.

WILLNER, Steven P., Astronomer. A.B. (1971) Harvard College; Ph.D. (1976) California Institute of Technology. Research specialties: Infrared observations of galaxies, both nearby and distant; Development of infrared instruments.

AFFILIATED RESEARCH STAFF

EISENSTEIN, Daniel J., Professor of Astronomy, Harvard University. A.B. (1992) Princeton University; A.M. (1994), Ph. D. (1996) Harvard University. Research specialties: Theoretical and observational cosmology and galaxy evolution.

KIRSHNER, Robert P., Clowes Professor of Science, Harvard University. A.B. (1970) Harvard College; Ph.D. (1975) California Institute of Technology. Research specialties: Supernovae; galaxies; observational cosmology.

RADIO AND GEOASTRONOMY

Astronomical research in the SAO Radio and Geoastronomy Division spans a wide range of topics and a variety of observational and theoretical techniques. Research programs include studies of black holes and active galactic nuclei, the structure and evolution of the Milky Way and other galaxies, the physics and chemistry of the interstellar medium, the formation of stars, the formation of planets within disks around young stars, circumstellar and interstellar masers, evolved stars, and planetary and cometary atmospheres. Many scientific staff use the Submillimeter Array, a powerful eight-element interferometer developed and operated by SAO, that produces high-resolution images of celestial objects at submillimeter wavelengths. Astronomical observations are also carried out with national and international facilities, including the Atacama Large Millimeter Array, the NRAO Green Bank Telescope, Very Large Array, and Very Long Baseline Array, the South Pole Telescope, the IRAM 30 meter Telescope, the NASA Spitzer Space Telescope and Herschel Space Observatory. Division astronomers are also leading the development of the Event Horizon Telescope, a world-wide collaboration to directly observe the immediate environment of a black hole by advancing the capabilities in Very Long Baseline Interferometry at millimeter wavelengths.

RESEARCH STAFF

ANDREWS, Sean M, Astrophysicist. B.A. (1997) Northwestern University; M.S. (2003), Ph.D. (2007) University of Hawaii. Research specialties: circumstellar disks, planet formation, aperture synthesis observations, radiative transfer modeling.

BLUNDELL, Raymond, Director, Submillimeter Array. B.S. (1974), Ph.D. (1980) University of Leeds. Research specialties: Millimeter-wave and submillimeter-wave techniques and instrumentation for radio-astronomy; THz spectral line astronomy.

BOURKE, Tyler, Astronomer. B.Sc. (1989) Australian National University; M.Sc. (1994), Ph.D. (1999) University of New South Wales. Research specialties: Low-mass star formation; Evolution of dense cores, protostars and protoplanetary disks; Submillimeter interferometry.

DAME, Thomas M., Radio Astronomer. B.A. (1976) Boston University; M.A. (1978), Ph.D. (1983) Columbia University. Research specialties: Molecular clouds and star formation; galactic structure.

GOTTLIEB, Carl, Astrophysicist. Sc.B. (1963) Lawrence College; Ph.D. (1969) University of Chicago. Research specialties: Laboratory astrophysics; interstellar molecules.

GREENHILL, Lincoln J., Radio Astronomer. B.S. (1984) Massachusetts Institute of Technology; M.A. (1985), Ph.D. (1990) Harvard University. Research specialties: Cosmology--the epoch of reionization (instrumenta-

tion/observation), extragalactic distance scale; AGN--structures < 1 pc from supermassive black holes; high-mass star formation--innermost 1000 AU; late-type stars-circumstellar shells; masers.

GRIMES, Paul K., Physicist. B.A. (2001), M.Sc. (2001), Ph.D. (2006) University of Cambridge. Research specialties: Millimeter and submillimeter receivers for radioastronomy.

GURWELL, Mark Andrew, Astrophysicist. B.S. (1990) University of Washington; M.S. (1992), Ph.D. (1996) California Institute of Technology. Research specialties: Milimeter/submillimeter-wave spectroscopy of planets and planetary atmospheres; planetary atmospheric evolution; KBO temperature and size measurements; interferometry; mm/submm observing techniques and absolute flux calibration; detection of high-z galaxies ('submm galaxies'); long-term quasar monitoring.

HO, Paul T.P., Senior Astrophysicist. S.B. (1972), Ph.D. (1977) Massachusetts Institute of Technology. Research specialties: Spectral-line interferometry; star formation in external galaxies; galactic nuclei; interstellar medium; massive outflows; molecular clouds; formation of OB clusters; black holes; cosmology; radio astronomy; submillimeter array.

KETO, Eric R., Astrophysicist. B.A. (1979) Princeton University; Ph.D. (1987) Harvard University. Research specialties: The interstellar medium; the formation of stars and star clusters.

LADA, Charles J., Senior Astrophysicist. B.A. (1971) Boston University; Ph.D. (1975) Harvard University. Research specialties: Star and planet formation; dense molecular clouds; bipolar molecular outflows; protoplanetary disks, extremely young star clusters; interstellar medium; infrared and millimeter-wave observational astronomy.

MORAN, James M., Senior Radio Astronomer; Professor of Astronomy, Harvard University. B.S. (1963) University of Notre Dame; S.M. (1965), Ph.D. (1968) Massachusetts Institute of Technology. Research specialties: Radio astronomy; very long-baseline interferometry; cosmic masers; star-formation studies; active galactic nuclei, black holes (especially the one in the center of the Milky Way).

MYERS, Philip C., Senior Astrophysicist; Lecturer on Astronomy, Harvard University. A.B. (1966) Columbia University; Ph.D. (1972) Massachusetts Institute of Technology. Research specialties: Radio astronomy; physical processes in molecular clouds and star formation; interstellar molecules; molecular spectroscopy; protostars; gravitational infall and condensation; formation of clusters.

PAINE, Scott N., Astrophysicist. B.S. (1984) California Institute of Technology; Ph.D. (1992) Massachusetts Institute of Technology. Research specialties: Millimeter-wave and submillimeter-wave optics and instrumentation; Fourier transform spectroscopy; Atmospheric radiometry and radiative transfer modeling.

PATEL, Nimesh A., Radio Astronomer and General Engineer. M.Sc. (1984) Bombay University; Ph.D. (1990) Indian Institute of Science, Bangalore. Research specialties: Evolved stars; Molecular spectroscopy; Star formation; Astrophysical masers; Radio interferometry; Antenna pointing and metrology; instrumentation and software.

PEARLMAN, Michael R., Physicist. S.B. (1963) Massachusetts Institute of Technology; Ph.D. (1968) Tufts University; S.M. (1980) MIT Sloan School of Management. Research specialties: Laser ranging to satellites; application of space techniques to precision geodesy for Earth Science.

PETITPAS, Glen R., Computer Engineer. B.Sc. (1995) St. Mary's, NS; M.Sc. (1997), Ph.D. (2001) McMaster University, ON. Research specialties: Submillimeter Interferometry.

QI, Chunhua, Astrophysicist. B.S. (1995) Beijing University; Ph.D. (2001) California Institute of Technology. Research specialties: Star formation; protoplanetary disks; chemistry of young stellar objects; comets; interferometry.

REID, Mark J., Senior Radio Astronomer. B.A. (1971) University of California, San Diego; Ph.D. (1975) California Institute of Technology. Research specialties: Radio astronomy, including spectral-line very long-baseline interferometry; star formation; cosmic masers; active galactic nuclei and quasars; galactic structure and evolved stars.

STARK, Antony A., Astronomer. B.S. (1975) California Institute of Technology; M.A. (1977), Ph.D. (1979) Princeton University. Research specialties: Antarctic submillimeter astronomy (AST/RO Project); radio astronomical in-

strumentation; interstellar medium; galactic structure; cosmic background radiation; Sunyaev-Zel'dovich effect observations; telescope control and data acquisition.

THADDEUS, Patrick, Astrophysicist. B.S. (1953) University of Delaware; M.A. (1955) Oxford University; Ph.D. (1960) Columbia University. Research specialties: Radio astronomy; study of galactic structure and molecular clouds; laboratory astrophysics; study of reactive molecules found in interstellar gas.
TIRUPATI, Sridharan K, Astronomer/Engineer. E.B. (1985) Madras University; Ph.D. (1993) Indian Institute of Science. Research specialties: Molecular clouds; star formations; radio holography.

TONG, Edward C., Engineer. B.Sc. (1983) University of Hong Kong; Ph.D. (1988) University of Joseph Fourier, Grenoble. Research specialties: Instrumentation for millimeter- and submillimeter-wave astronomy.

WEINTROUB, Jonathan, Correlator Group Leader. B.Sc.(Eng) (1983), M.Sc.(Eng) (1986) University of Cape Town; Ph.D. (1998) Harvard University. Research specialties: Instrumentation for astronomy signal processing; Submillimeter Array (SMA) Correlator; Astronomical masers; Submillimeter VLBI on super massive black holes, in the Galactic Center and elsewhere.

WILNER, David James, Associate Director, Radio and Geoastronomy Division, Harvard Smithsonian Center for Astrophysics. A.B. (1987) Princeton University; Ph.D. (1993) University of California, Berkeley. Research specialties: Star and planet formation; protoplanetary disks and debris disks; aperture synthesis observations and interferometry techniques.

WILSON, Robert Woodrow, Senior Scientist, part time. B.A. (1957) Rice University; Ph.D. (1962) California Institute of Technology. Research specialties: Radio astronomy; cosmic background; millimeter and submillimeter spectroscopy; telescope system design; submillimeter synthesis; radio communication.

YOUNG, Ken Harbour, Astrophysicist. B.A. (1980) Carlton College; Ph.D. (1994) California Institute of Technology. Research specialties: AGB stars; young planetary nebulae.

ZENG, Lingzhen, Physicist. B.A.(2005) University of Science and Technology, China; Ph.D. (2012) Johns Hopkins University. Research specialties: Millimeter and submillimeter instrumentation and the interstellar medium.

ZHANG, Qizhou, Astrophysicist. M.S. (1993), Ph.D. (1996) Harvard University. Research specialties: Molecular clouds and star formation; study of infall motions, disks, and outflows in star-forming regions.

ZHAO, Jun-Hui, Astrophysicist. B.S. (1982), M.S. (1985) Peking University; Ph.D. (1990) University of New Mexico. Research specialties: The Galactic center, dynamics of circum-nuclear disks, black holes, star formation, starbursts, AGNs, imaging techniques and interferometer software.

AFFILIATED RESEARCH STAFF

GOODMAN, Alyssa A., Research Associate of SAO; Professor of Astronomy, Harvard University; Founding Director of the Harvard Initiative in Innovative Computing. Sc.B. (1984) Massachusetts Institute of Technology; A.M. (1986), Ph.D. (1989) Harvard University. Research specialties: Radio through optical observations of the interstellar medium and star formation; special interests in velocity structure, magnetic fields, polarimetry; Scientific Data Visualization.

SOLAR, STELLAR, AND PLANETARY SCIENCES

Research in this division is directed toward understanding the physical properties of the Sun, other stars, and planets. The Sun is studied to determine its basic stellar properties and to understand how the Sun affects the Earth. Stars like the Sun, and other types of stars, are studied to determine stellar properties such as age and chemical composition, and to understand the formation and evolution of stars and stellar systems, including planets. Both solar and stellar work includes studies of the atmospheres and coronae. The division carries out research in extra-solar planet detection, as well as observational, computational, and theoretical work on small

bodies in the solar system. Space-based facilities include SOHO, TRACE, Hinode, Solar Dynamics Observatory (SDO), Spitzer, Chandra, and Hubble Space Telescope. Ground based facilities include the MEarth Observatory, which is located at the Fred L. Whipple Observatory and which consists of 8 robotically controlled, 40 cm telescope designed to look for planets in around M dwarfs. The HAT-South telescope network is now collecting data from three continents in the Southern hemisphere: Las Campanas Observatory in Chile, Sliding Springs in Australia, and at the HESS site in Namibia.

RESEARCH STAFF

AVRETT, Eugene H., Senior Physicist. B.S. (1957) Georgia Institute of Technology; Ph.D. (1962) Harvard University. Research specialties: Theory of stellar atmospheres and spectra; models of solar and stellar atmospheres; computer simulation of solar, stellar, and nebular spectra.

BRICKHOUSE, Nancy Susan, Astrophysicist; Associate Director, Solar, Stellar, and Planetary Sciences Division, Harvard-Smithsonian Center for Astrophysics. B.S. (1977) University of North Carolina; Ph.D. (1984) University of Wisconsin. Research specialties: Plasma physics; solar and stellar coronae; plasma emission line spectroscopy; ultraviolet and X-ray spectroscopy of astrophysical sources; laboratory astrophysics.

CHEN, Guo-Xin, Physicist. B.A. (1989) Zhe Jiang University; M.S. (1992) Peking University; Ph.D. (2004) The Ohio State University. Research specialties: Theoretical Atomic Astrophysics.

CRANMER, Steven R., Astrophysicist. B.S. (1990) Drexel University; M.S. (1991) Ohio State University; Ph.D. (1996) University of Delaware. Research specialties: Heating of the solar corona and acceleration of the solar wind; Plasma physics and kinetic theory of waves and turbulence; Rotating hot stars (O, B, Wolf-Rayet) and circumstellar fluid dynamics; Radiative transfer and spectroscopy.

DUPREE, Andrea K., Senior Astrophysicist. B.A. (1960) Wellesley College; Ph.D. (1968) Harvard University. Research specialties: Astronomical spectroscopy; theory of solar and stellar atmospheres and spectra; stellar chromospheres and coronae; mass loss and stellar winds.

GINGERICH, Owen, Senior Astronomer Emeritus; Professor of Astronomy and the History of Science Emeritus, Harvard University. B.A. (1951) Goshen College; M.A. (1953), Ph.D. (1962) Harvard University. Research specialties: History of astronomy, especially the sixteenth to twentieth centuries.

KALKOFEN, Wolfgang, Astrophysicist. Vordiplom (1956) Goethe University; M.A. (1961), Ph.D. (1963) Harvard University. Research specialties: Radiative transfer in continua and in spectral lines through static and moving media; radiative gas dynamics; propagation and dissipation of shock waves in stellar atmospheres.

KENYON, Scott J., Senior Astrophysicist. B.S. (1978) Arizona State University; M.S. (1979), Ph.D. (1983) University of Illinois. Research specialties: Numerical calculations of planet formation; structure of debris disks; the formation and evolution of single and multiple stars; accretion disks.

KOHL, John L., Senior Astrophysicist;. B.S. (1963) Muskingum College; M.S. (1966), Ph.D. (1969) University of Toledo. Research specialties: Space based spectroscopic experiments to study the acceleration and evolution of solar wind streams and coronal mass ejections..

KORZENNIK, Sylvain G., Physicist. Degree of Engineering (1977) Free University of Brussels; Ph.D. (1990) University of California, Los Angeles. Research specialties: Astronomy; solar physics; helioseismology; astroseismology; extrasolar planets.

MIRALLES, Mari Paz, Astrophysicist. M.Sc. (1989), Ph.D. (1993) Complutense University of Madrid. Research specialties: Solar physics: solar corona, ultraviolet spectroscopy of solar-wind source regions; star formation: radio astronomy, molecular clouds, OB stars, ultracompact H II regions, infrared imaging and spectroscopy.

NOYES, Robert W., Astrophysicist; Professor of Astronomy, Harvard University. B.A. (1957) Haverford College; Ph.D. (1963) California Institute of Technology. Research specialties: Solar and stellar physics; solar structure and dynamics; detection and characterization of planets around other stars; origin and evolution of planetary systems.

PANASYUK, Alexander V., Computer Scientist. M.S. (1988) Moscow Physical Technical Institute; Ph.D. (1992) Acoustics Institute of the Russian Academy of Sciences, Moscow. Research specialties: Propagation of acoustical waves in nonlinear media; numerical analysis and simulation; software development for data acquisition and control systems.

PETAEV, Michail, Senior Geologist. M.A. (1979) Moscow State University; Ph.D. (1985) Vernadsky Institute of Geochemistry and Analytical Chemistry, Moscow. Research specialties: Experimental and theoretical cosmochemistry; petrologic and chemical studies of the meteoritic record of events and processes in the primordial solar nebula; thermodynamic and kinetic modeling of nebular condensation and igneous and aqueous processes on asteroids.

RAYMOND, John C., Astrophysicist. B.A. (1970), Ph.D. (1976) University of Wisconsin, Madison. Research specialties: Supernova remnants; solar physics; cataclysmic variables.

ROSATI, Richard, Physicist. B.A. (1992) Boston University; M.S. (1997), Ph.D. (2003) University of Pittsburgh. Research specialties: Atomic, Molecular, Optical and Plasma Physics; Experimental Astrophysics.

SOON, Willie, Astrophysicist. B.Sc. (1985), M.Sc. (1987), Ph.D. (1991) University of Southern California. Research specialties: Observational analysis and physical modeling of phenomena relevant to the Sun, Sun-like stars, and the Earth.

SPAHR, Timothy, Astronomer. B.S. (1993) University of Arizona; Ph.D. (1998) University of Florida. Research specialties: Distribution of asteroids; sky surveys for near-Earth objects; determination of orbits.

STRACHAN, Leonard, Astrophysicist. S.B. (1982) Massachusetts Institute of Technology; A.M. (1987), Ph.D. (1990) Harvard University. Research specialties: Observations and modeling of the solar corona and solar wind; ultraviolet spectroscopy from space.

VAN BALLEGOOIJEN, Adriaan, Astrophysicist. Ph.D. (1982) State University of Utrecht. Research specialties: Solar magnetic fields; magnetohydrodynamics; nonthermal heating of the solar atmosphere; solar prominences.

AFFILIATED RESEARCH STAFF

BELL, Barbara, Astronomer Emeritus, Harvard College Observatory. A.B. (1944), Ph.D. (1951) Radcliffe College. Research specialties: Associations between solar phenomena and geomagnetic disturbances; postglacial climate fluctuations and their possible role in ancient history, especially Egypt and the Nile; spectroscopy; solar spectrum; solar gf values.

CHARBONNEAU, David B., Thomas D. Cabot Associate Professor of Astronomy, Harvard University. Hons. B.Sc. (1996) University of Toronto; A.M (1999), Ph.D. (2001) Harvard University. Research specialties: Detection and characterization of planets orbiting nearby stars; design and implementation of automated telescopes for photometric monitoring.

FRANKLIN, Fred A., Astronomer and Physicist. B.A. (1954) Harvard College; M.A. (1956), Ph.D. (1962) Harvard University. Research specialties: Planetary photometry; stability problems; investigations of concentration and scattering properties of small particles in the solar system; techniques and instrumentation to measure the Earth's albedo.

KURUCZ, Robert L., Research Associate. A.B. (1966) Harvard College; Ph.D. (1973) Harvard University. Research specialties: Radiative transfer; stellar atmospheres; solar physics; atomic and molecular spectroscopy.

SASSELOV, Dimitar, Professor, Harvard University. M.Sc. (1986), Ph.D. (1988) University of Sofia; Ph.D. (1990) University of Toronto. Research specialties: Stellar pulsation; radiation hydrodynamics; stellar spectroscopy; extrasolar planets.

THEORETICAL ASTROPHYSICS

Research in the Theoretical Astrophysics division utilizes both physical analysis and mathematical modeling to understand astronomical systems. A broad range of topics is investigated, including the formation, structure, and evolution of stars, the properties of atoms and molecules in interstellar space, the structure and properties of accretion systems, high-temperature plasmas, the formation and evolution of planetary systems, both solar and extrasolar, the formation of galaxies, clusters, and quasars in the universe, and theories of the early universe.

RESEARCH STAFF

CHANDLER, John F., Physicist. S.B. (1973), Ph.D. (1979) Massachusetts Institute of Technology. Research specialties: Experimental tests of general relativity; planetary ephemerides; interplanetary radar ranging; astrometric optical interferometry.

DI STEFANO, Rosanne, Astrophysicist. B.A. (1973) Queens College of the City University of New York; M.A. (1976) Columbia University; Ph.D. (1982) State University of New York, Stony Brook. Research specialties: Gravitational lensing, particularly its application to the study of stellar remnants and planetary systems in the vicinity of the Sun; Interacting binaries, especially the progenitors of Type Ia supernovae; Wide-field monitoring surveys, including Kepler, the microlensing surveys, Pan-STARRS and LSST.

HOLMAN, Matthew J., Astrophysicist; Associate Director, Theoretical Astrophysics Division, Harvard-Smithsonian Center for Astrophysics. S.B. (1989), Ph.D. (1994) Massachusetts Institute of Technology. Research specialties: Nonlinear dynamics; solar system dynamics; extrasolar planetary systems; ground-based and space-based optical astronomy.

SHAPIRO, Irwin I., Senior Scientist, Smithsonian Institution; Timken University Professor, Harvard University. A.B. (1950) Cornell University; A.M. (1951), Ph.D. (1955) Harvard University. Research specialties: Radio and radar techniques: applications to astrometry, astrophysics, geophysics, planetary physics, and tests of theories of gravitation; precollege and college science education: curriculum development and teacher training.

AFFILIATED RESEARCH STAFF

FINKBEINER, Douglas Paul, Assistant Professor of Astronomy, Harvard University. B.S. (1994) University of Michigan; Ph.D. (1999) University of California, Berkeley. Research specialties: Interstellar dust; observational cosmology; particle astrophysics.

HERNQUIST, Lars Eric, Mallinckrodt Professor of Astrophysics, Harvard University. B.A. (1977) Cornell University; Ph.D. (1985) California Institute of Technology; M.A., Hon. (1998) Harvard University. Research specialties: Cosmology; physics of compact stars; numerical astrophysics.

LOEB, Abraham, Professor of Astronomy, Director of the Institute for Theory & Computation, Harvard University. B.S. (1983), M.S. (1985), Ph.D. (1986) Hebrew University of Jerusalem. Research specialties: Theoretical cosmology and astrophysics.

NARAYAN, Ramesh, Senior Astronomer; Professor of Astronomy, Harvard University. B.S. (1971) University of Madras; M.S. (1973), Ph.D. (1979) Bangalore University. Research specialties: Gravitational lensing; accretion disks; black holes; neutron stars; gamma-ray bursts.

RYBICKI, George B., Senior Physicist; Professor of the Practice of Astronomy, Harvard University. B.S. (1956) Carnegie-Mellon University; M.A. (1957), Ph.D. (1965) Harvard University. Research specialties: Radiative processes and radiative transfer; cosmology; radiation hydrodynamics; stellar and galactic dynamics.

STUBBS, Christopher William, Professor, Harvard University. B.S. (1981) University of Virginia; Ph.D. (1988) University of Washington. Research specialties: Fundamental physics, dark matter, dark energy, experimental gravitation, observational cosmology.

SCIENCE EDUCATION DEPARTMENT

The Science Education Department (SED) conducts several programs designed to improve the teaching of precollege science and mathematics, partly through the use of examples from astronomy. These programs include the development of curriculum materials and standardized tests, the production of films and videos, research on the effect of precollege science courses on students' college science success, and the training of precollege educators. In addition, SED manages the “Un-iverse! Education Forum,” a major education and outreach initiative designed to enhance the public’s appreciation of current research on the structure and evolution of the universe.

RESEARCH STAFF

GOULD, Roy R., Education Analyst, SAO Education Forum. A.B. (1968) Cornell University; Ph.D. (1974) Harvard University. Research specialties: Science education; technology-based tools for science and math education; integration of contemporary science into school curricula; public understanding of science.

SADLER, Philip M., Frances W. Wright Senior Lecturer on Celestial Navigation, Harvard University; Director, Science Education Department, Harvard-Smithsonian Center for Astrophysics. B.S. (1973) Massachusetts Institute of Technology; Ed.M. (1974), Ed.D. (1992) Harvard University. Research specialties: Science education; children's scientific misconceptions; remote telescopes; curriculum development; simulation software; celestial navigation; sundials; assessment; technology education; history of science.

SCHNEPS, Matthew H., Director, Laboratory for Visual Learning. B.S. (1974) City College of New York; Ph.D. (1979) Massachusetts Institute of Technology. Research specialties: Science education; use of computer media for science learning; student preconceptions in science; impact of learning disabilities in science; visual learning; neurology of vision, memory and attention; eye tracking.

AFFILIATED RESEARCH STAFF

COOK-SMITH, Nancy, Psychometrician. B.A. (1972) Presbyterian College (Clinton, South Carolina); M.S.L.S. (1974) University of Kentucky; Ph.D. (1989) University of South Carolina. Research specialties: Qualitiative, quantitative, and mixed-methods research in education and behaviorial/social sciences; educational assessment and program evaluation.

SONNERT, Gerhard, Research Associate. M.A. (1982), D. Phil. (1986) University of Erlangen-Nürnberg; M.P.A. (1988) Harvard University. Research specialties: Sociology of science, of gender, and of education; history of science; science education.

WARD, R. Bruce, Senior Research Associate, Harvard College Observatory. B.A. (1958) Macalester College; Th.M. (1962) McCormick Seminary; Ed.M. (1982), Ed.D. (1988) Harvard University. Research specialties: Science education; school-to-work programs; integration of contemporary learning theory into science and technology education.

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER

Anson H. Hines, Director

The Smithsonian Environmental Research Center (SERC) is the world's leading research center for environmental studies of the coastal zone. These fragile regions at the land-sea interface are the stage of the 21st century's biggest envi-ronmental challenges, and their health is critical for the survival of both our oceans and our terrestrial environments. For 45 years, SERC has been addressing the need to understand the linkages between ecosystems in the coastal zone through critical research, professional training for young scientists, and environmental education.

A diverse and growing team of 20 research staff composed of senior scientists, research scientists, and emeritus scientists, as well as an interdisciplinary team of more than 180 researchers, technicians, and students conduct long-term descriptive and experimental research on such issues as global change, the effects of nutrients and chemicals passing through our landscapes, maintenance of productive fisheries, the environmental consequences from biological invaders, and the ecosystem services provided by wetlands and woodlands. Our accomplishments range from running some of the world's longest continuous ecological studies, to creating new technology that expands the horizons of science.

The research center, 25 miles from the Nation's Capital, lies along the western shores of the Chesapeake Bay and serves as a hub for studies that extend around the globe. SERC's main campus encompasses 2,650 acres of land along the Rhode River, a subestuary of the Bay, and includes forest, cropland, pasture, freshwater wetlands, tidal marshes, and estuary. Much of our research focuses on this subestuary and its 12-square-mile watershed as a representative model system for the enormous (64,000-square-mile) Chesapeake drainage basin. As a highly visible and fragile ecosystem on the doorstep of the nation's capital, the Chesapeake Bay is indicative of the complex environmental issues facing the world.

Like the Chesapeake watershed, the Rhode River site has been impacted by human activities such as agriculture, forestry, and extensive commercial fishing, with an influx of diffuse pollutants in the tributaries and estuarine basin. The Re-search Center serves as a natural laboratory and a focal point for long-term monitoring programs and research projects.

Expanding outward from the main campus, SERC researchers conduct studies at field sites around the world—from Australia to Belize and Antarctica to Alaska. Visiting scientists come from across the globe to study at our central facility, which has become one of the world's premier training facilities for the next generation of environmental scientists—900 in-terns and 500 post doctoral, pre-doctoral and graduate student fellows from around the world have conducted research at SERC. On average 40 interns and 20 fellows participate in SERC's professional training program annually.

SERC is the headquarters for the National Ballast Water Clearinghouse and a leader in the field of invasive species research. SERC houses the world's longest data record on the increase in ultraviolet (UVB) solar radiation impacting the Earth, and developed the standardized tool for measuring UVB radiation. Our Scientists conduct groundbreaking research on human health issues such as mercury contamination in water and PCB's found in wild-caught fish.

Facilities

SERC's programs are supported by an advanced, energy-efficient 90,000 m2 square-foot laboratory facility, a library networked with the central Smithsonian library; two research vessels and fleet of small boats for estuarine research; and an array of modern instruments for analytical chemistry. Computer facilities include ERDAS, NT server, and high speed internet service. Software site license provides access to all modules of ESRI ArcGIS Geographic Information System software and Leica's Geosystems ERDAS Imagine Professional suite for Image Analysis and Remote Sensing. Available programming languages include the Absoft FORTRAN and C compliers and Microsoft's Visual Studio.net (which in-cludes Microsofts' VisualBasic, C+, C#, and J# languages). Sup-ported

statistical and graphics software tools include the Statistical Analysis System (SAS), R, S-plus, DataDesk, Amos 5, Sig-maPlot, and Adobe Illustrator. Global Positioning Sys-tems (GPS) systems are available for collecting geographic coordinates in the field, and we have a Calcomp digitizing tablet for digitizing paper maps.

SERC's ecological field research is supported by a wet laboratory with flowing estuarine water for maintaining live aquatic animals; culturing facilities for planktonic and other aquatic organisms; an instrumented 50-meter-tall tower for access to the canopy-atmosphere interface of a mature deciduous hardwood forest; the Global Change Research Wetlands where several long-term experiments are directed at understanding the vulnerability of tidal wetlands to sea level rise; an Inductively Coupled Plasma – Mass Spectrometer (ICP-MS) for measuring trace metals and tracing metal stable isotope markers in samples; and a green house, lath house, and experimental garden for terrestrial plant experiments. SERC's Public Education Program is supported by a 900 m2 building on the Chesapeake shoreline for orientation and teaching of children, teachers, and other visitors. SERC provides limited dormitory and short-term residential housing for students and visiting scientists.

Informing Policy and Professional Training

For improved stewardship of the biosphere, SERC's research provides data, publications and expert consultation in support of conservation, environmental policy, and management of natural resources. SERC's research findings are communicated to other scientists through publications, conferences, workshops, and through extensive networks of research sites in the U.S. and in other countries.

Connected to an international network of collaborators, SERC trains future generations of scientists to address ecologi-cal questions through well established undergraduate, graduate, and postdoctoral programs that attract participants from around the world. These include an ongoing internship program for currently enrolled undergraduate and beginning graduate students, and a fellowship program at the graduate, predoctoral, and postdoctoral levels. Visiting scientists from many coun-tries conduct collaborative research at SERC, fostering international cooperation in solving global environmental problems. Decision makers often consult SERC for advice in managing natural resources, and news media seek expert comment from SERC scientists on environmental issues.

Education and Public Programs

SERC's Education Department teaches K-12 students, teachers, and the general public about research conducted at SERC, historical land use, and the natural components of various ecosystems surrounding the Rhode River subestuary and Chesapeake Bay.

Through collaborations with other organizations, SERC's message of estuarine ecology reaches a national and international audience. SERC has conducted more than 100 video conferences annually to reach schools in 50 states and four countries, and in recent years our electronic field trips attracted more than 81 million participants. From the regional community, nearly 20,000 people visit SERC annually, including 5,000 students (kindergarten through college), 7,000 program participants of all ages and 7,000 drop-in visitors joining in our hands-on science education programs and self-guided activities. Our education department also runs teacher-training workshops and educational programs for adults that are open to the general public including an evening lecture series and guided canoe tours of the estuary.

RESEARCH STAFF

BREITBURG, Denise, Marine Ecologist. B.A. (1975) Arizona State University; M.A. (1982), Ph.D. (1984) University of California, Santa Barbara. Research specialties: marine and estuarine ecology, hypoxia, fish behavior and ecology, gelatinous zooplankton.

DRAKE, Bert G., Emeritus Plant Physiologist. B.A. (1961) University of Maine; M.S. (1967) Colorado State University; Ph.D. (1970) Utah State University. Research specialties: Effects of elevated atmospheric carbon dioxide and climate change on plant and ecosystems processes.

FELLER, Ilka C., Plant - Animal Ecologist. B.A. (1969) University of North Carolina; Ph.D. (1993) Georgetown University. Research specialties: Animal-plant interactions; canopy arthropods; wood-boring insects; mangrove; insects and elephant herbivory on Acacia forests in Kenya.

GALLEGOS, Charles L., Phytoplankton Ecologist. B.A. (1973) Duke University; Ph.D. (1979) University of Virginia. Research specialties: Photosynthesis, primary production, and population dynamics of estuarine phytoplankton; optical properties of turbid waters; effects of nutrient enrichment on structure of microbial food webs; factors governing timing and magnitude of phytoplankton blooms.

GILMORE, Cynthia, Microbial Ecologist. B.A. (1980) Cornell University; Ph.D. (1985) University of Maryland. Research specialties: Trace metal biogeochemistry, particularly mercury: mechanisms and control of microbial mercury methylation from the cellular to ecosystem level; microbial ecology of estuarine, lacustrine and wetland systems; sulfate-reducing bacteria and sulfur biogeochemistry.

JORDAN, Thomas E., Chemical Ecologist. B.S. (1974) Bucknell University; Ph.D. (1980) Boston University. Research specialties: Flows of nitrogen and phosphorus through watersheds, wetlands and estuaries; denitrification.

McCORMICK, Melissa, Ecologist. B.S. (1992) Trinity University; Ph.D. (1999) Michigan State University. Research specialties: mycor-rhizae; plant-fungus interactions; orchid-fungus interactions; molecular analysis of soil fungal communities.

MEGONIGAL, J. Patrick, Deputy Director, Biogeochemist. B.S. (1982), M.S. (1986) Old Dominion University; Ph.D. (1996) Duke University. Research specialties: wetland ecology, microbial ecology, soil ecology, biogeochemistry, climate change impacts; tidal wetland vulnerability to sea level rise.

MCMAHON, Sean, Forest Ecologist. B.A. (1992) University of Texas Austin; M.A. (1993) University College of Dublin; M.S. (2006), Ph.D. (2006) University of Tennessee Knoxville. Research specialties: forest ecology; global change; community ecology of forest trees.

MILLER, Whitman A., Ecologist. B.A. (1984) Earlham College; M.A. (1995), D. Env. (2000) University of California, Los Angeles. Research specialties: invasive marine species, ocean acidification, marine invertebrate ecology.

NEALE, Patrick J., Photobiologist. B.A. (1976) State University of New York, Purchase; M.A. (1981) Columbia University; Ph.D. (1985) University of California, Davis. Research specialties: Effects of UV radiation on phytoplankton and other aquatic organisms; chlorophyll fluorescence as an indicator of plant biomass and photosynthetic rates; spectral measurement of solar UVB; UV in the aquatic environment.

OFTEDAL, Olav T., Emeritus Nutritional Ecologist. A.B. (1971) Harvard University; Ph.D. (1981) Cornell University. Research specialties: nutritional ecology of terrestrial and marine animals; interactions of plants and herbivores; evolution of amniote reproduction; nutritional requirements of reptiles and mammals; marine mammals; mammalian milks and lactation strategies.

OSMAN, Richard, Marine Ecologist. A.B. (1970) Brown University; Ph.D. (1975) University of Chicago. Research specialties: Population and community ecology of marine invertebrates; larval settlement and recruitment processes; invasive species ecology; effects of physical, chemical and biological stresses on marine and estuarine ecosystems.

PARKER, Geoffrey G., Forest Ecologist. B.Sc. (1976) McGill University; M.S. (1981) University of Virginia; Ph.D. (1985) University of Georgia. Research specialties: Energy, water and carbon balance of forests; the forest canopy; atmosphere-canopy interactions; spatial vari-ability, pattern, and scale; community ecology of forest trees.

PARKER, John D., Animal-Plant Ecologist. B.S. (1993) University of Virginia; M.S. (1998) College of William & Mary/VIMS; Ph.D. (2005) Georgia Institute of Technology. Research specialties: Community ecology, consumer-prey interactions, and invasive species.

RUIZ, Gregory M., Marine Ecologist. B.A. (1980) University of California, Santa Barbara; Ph.D. (1987) University of California, Berkeley. Research specialties: Population and community ecology of marine and estuarine ecosys-

tems; animal behavior; larval recruitment of marine invertebrates; ecological parasitology; life history evolution; predator-prey interactions; invasion biology and transfer.

WELLER, Donald E., Quantitative Ecologist. B.A. (1974) Wabash College; Ph.D. (1985) University of Tennessee. Research specialties: landscape ecology; ecosystem ecology; ecological modeling; modeling nutrient cycling within ecosystems and nutrient transport among ecosystems; regional biogeochemistry; wetland and stream assessment; aquatic ecosystem health; land-sea interactions.

WHIGHAM, Dennis F., Plant Ecologist. B.A. (1966) Wabash College; Ph.D. (1971) University of North Carolina. Research specialties: Ecology in terrestrial and wetland ecosystems; orchid-mycorrhizal interactions; role of disturbance in forests; ecological life history and population ecology of woodland and wetland species, ecology of invasive, landscape ecology.

AFFILIATED RESEARCH STAFF

BLAKESLEE, April, Research Associate, Invasive Species. B.A. (1998), M.A. (2001) Boston University; Ph.D. (2007) University of New Hampshire. Research specialties: My research specialities include population genetics of invasive species and parasites; marine ecology of free-living invertebrates and parasites; conservation biology.

BOOMER, Kathleen B., Research Associate, Landscape Modeling. Ph.D. (2006) Cornell University. Research specialties: Watershed hy-drology and modeling, wetlands, biogeochemistry, landscape ecology.

CANNING-CLODE, João, Research Associate, Invasive Species. M.S. (2005) University of Madeira, Portugal; Ph.D. (2008) Christian Albrechts University of Kiel, Germany. Research specialties: Invasion Ecology; Marine Ecology; Biogeography; Community and Spatial Ecology; Biofouling; Climate Change.

CARNEY, Karen, Research Associate, Biogeochemistry. B.A. (1993) Kalamazoo College; Ph.D. (2004) Stanford University. Research specialties: the impacts of land use, species diversity, invasive species, elevated CO2, and climate change on ecosystem structure and function.

COATS, D. Wayne, Emeritus Protistan Biologist. B.A. (1970) University of Illinois; M.S. (1974), Ph.D. (1977) University of Maryland. Research specialties: Protistan ecology, structure and function; taxonomy of Ciliophora.

FREESTONE, Amy L., Research Associate, Marine Ecology. B.S. (2000) Rutgers University; Ph.D. (2005) University of California, Davis. Research specialties: Ecological drivers of diversity patterns in marine invertebrate and terrestrial plant systems; community and spatial ecology; latitudinal gradients; species invasions; conservation ecology.

HAVELOCK, Glenn M., Research Associate, Paleoecology. B.Sc. (1999) University of Derby; M.Sc. (2001) University of Reading; Ph.D. (2009) University of Exeter. Research specialties: Holocene paleoclimate and sea-level reconstruction; paleoecology; estuarine and fluvial geomorphology and paleohydrology; sedimentology; biogeochemistry (stable isotopes); alluvial geoarchaeology; Quaternary land-scape/geomorphic evolution.

HUNGATE, Bruce, Director, Center for Ecosystem Science and Society. B.S. (1990), B.A. (1990) Stanford University; PhD (1995) University of California, Berkeley. Research specialties: Ecology of Global Environmental Change.

JOHNSON, Eric G., Research Associate, Fisheries Ecology. B.A. (1994) DePauw University; M.S. (1996) Florida Institute of Technology; Ph.D. (2004) North Carolina State University. Research specialties: Fisheries ecology, quantitative population and metapopulation dynamics, marine and estuarine ecology.

KARLSON, Ronald H., Research Associate, Marine Ecology. B.A. (1969) Pomona College; M.A. (1972), Ph.D. (1975) Duke University. Research specialties: marine benthic ecology; coral and fouling community ecology; local and regional variation in community structure.

KNEE, Karen, Assistant professor of environmental science. B.S. (2002) Brown University; Ph.D. (2010) Stanford University. Research specialties: Land use change, human impacts on water quality, ecohydrology, submarine groundwater discharge, pollution fate and transport.

LAANBROEK, Hendrikus J., Research Associate, Wetland Ecology. M.Sc. (1975), Ph.D. (1978) State University of Groningen. Research specialties: Microbial Ecology, with special emphasis on the role of microbial diversity on geochemical cycles.

RICHMOND, Courtney E., Research Associate, Marine Ecology. B.A. (1991) Swarthmore College; Ph.D. (1998) University of South Car-olina. Research specialties: Marine ecology, the effects of environmental stressors on population dynamics, life history consequences of environmental conditions, ecological modeling.

RIEDEL, Gehardt, Emeritus Biogeochemist. B.S. (1974), A.B. (1974) Humboldt State University; M.S. (1978), Ph.D. (1983) Oregon State Universi-ty. Research specialties: Trace metal and nutrient geochemistry and biogeochemistry.

RODRIGUEZ, Wilfrid, Ph.D. (2003) University of Rhode Island. Research specialties: Remote Sensing, Geographical Information Systems, Landscape Ecology.

ROSE, Kevin C., Research Associate and AAAS Science and Technology Policy Fellow. B.S. (2004), B.A. (2005) Lehigh University; Ph.D. (2011) Miami University, Ohio. Research specialties: Optical characterization of aquatic ecosystems, biogeochemistry, carbon cycling, aquatic ecology.

SUTTON-GRIER, Ariana, Environmental Scientist with the National Oceanic and Atmospheric Administration. B.S. (2000), B.A. (2000) Oregon State University; Ph.D. (2008) Duke University. Research specialties: wetland restoration and biogeochemistry, carbon and iron cycling, plant traits and ecosystem functions, ecosystem services, blue carbon, and environmental markets.

SYTSMA, Mark, Research Associate, Invasive Species. B.S. (1978) Iowa State University; M.S. (1983) University of Washington; Ph.D. (1992) University of California, Davis. Research specialties: Limonology and the biology and management of aquatic invasive species.

SZLAVECZ, Katalin, Research Associate, Soil Ecology. Ph.D. Eotvos University. Research specialties: Soil community ecology; the in-teraction of soil animals and microorganisms; the role of soil organisms in carbon and nitrogen cycling; ecology of invasive soil invertebrates.

TZORTZIOU, Maria, Research Scientist, Remote Sensing and Plankton Ecology. B.S. (1997), M.Sc. (1999) Aristotle University of Thes-saloniki; M.S. (2001), Ph.D. (2004) University of Maryland. Research specialties: Remote sensing retrieval of biogeochemical variables in coastal regions; Land-ocean exchanges of carbon and nutrients and effects on coastal water quality, photochemistry and biogeochemical processes; Underwater radiative transfer modelling; Effects of air-pollution on water quality (e.g. nitrogen deposition) and coastal ecosystem processes.

WHITLACH, Robert, Research Associate, Marine Ecology. B.S. (1970) University of Utah; M.S. (1972) University of the Pacific; Ph.D (1976) University of Chicago. Research specialties: Marine benthic population and community ecology; ecology of invasive species; shellfish biology.

SMITHSONIAN INSTITUTION ARCHIVES

Anne Van Camp, Director

The Smithsonian Institution Archives (SIA) is the institutional memory of a unique American cultural resource and a steward of the national collections. In order to ensure institutional accountability and enhance public appreciation of a great national treasure, we are committed to serving the Smithsonian community, scholars, and the general public by: appraising, acquiring, and preserving the records of the institution and related documentary materials; offering a range of reference, research, and records services; and creating products and services which promote understanding of the Smithsonian and its history. For information on SIA visit http://siarchives.si.edu/.

Institutional History Division

The Institutional History Division is dedicated to advancing knowledge and understanding of the history of the Smithsonian Institution. Division staff conduct research, prepare reports, scholarly and popular publications, website resources, educational and public programs, and exhibits, and respond to public and scholarly inquires on the history of the Institution. The Oral History Program supplements existing documentation in the Archives through audio and videotaped interviews with administrative and scholarly staff. The Smithsonian Videohistory Collection documents the history of American science and technology.

Institutional History Division staff serve as advisors to scholars interested in the history of the Smithsonian, legal history of the Smithsonian, American social and cultural history, history of science, history of women in science, history of museums and oral history, and to interns interested in public history and oral history. For information on IHD programs and the history of the Smithsonian, go to http://siarchives.si.edu/history. For detailed information on Smithsonian events, images, legal documents, bibliography and Board of Regents, visit the History of the Smithsonian catalog at www.siris.si.edu.

Archives Division

As the Smithsonian Institution Archives proper, the Archives Division serves several major functions. It is a repository for records and papers of historic value about the Smithsonian and the fields of science, art, history, and the humanities, serving as the official memory of the Smithsonian and as a resource for scholars. The Archives Division also engages in research and training in the administration of archives and manuscript collections.

The Smithsonian Archives was organized in 1967 to collect, preserve, and make accessible the official records of the Smithsonian. The archival collections document the full range of Smithsonian activities, including American history, art history, science and art related exhibitions, astrophysics, botany, ecology, tropical biology and zoology, and though particularly strong in nineteenth-century American science the Division also documents the role the Institution played in twentieth-century astrophysics, biology, museum administration, research, and exhibitions.

The Archives contains a diverse collection of papers, which include Robert Goddard's early work in rocketry and the papers of Joseph H. Hirshhorn, founder of the Hirshhorn Museum and Sculpture Garden, as well as all Smithsonian secretaries. Secretarial records and papers include significant collections for Joseph Henry, Spencer F. Baird, Charles D. Walcott, and Alexander Wetmore, representing such scientific fields as physics, meteorology, ornithology, and paleontology.

The Archives has a number of collections that complement the official records of the Smithsonian concerning expeditions, international expositions, scientists, collectors, professional societies, projects and institutions. Additionally it contains a substantial collection of photographs and small collections of architectural drawings, scientific illustrations, moving images, and sound recordings.

The Archives sponsors students interested in gaining experience in archival administration. Staff provides guidance and supervision in the full range of archival practices, including accessioning and appraisal, arrangement and description, preservation, and reference services. The Archives also supports research associates, fel-

lows, and interns interested in scholarly research in its holdings in such areas as the history of science, cultural history, the history of art, and museology.

The Smithsonian Archives is open to all researchers. Descriptions of the Archives holdings are available electronically in SIRIS (Smithsonian Institution Research Information System), which is accessible at www.siris.si.edu. Detailed finding aids to collections can be searched on the Archives' web site at http://siarchives.si.edu/collections. The staff offers research assistance and refers scholars to relevant sources of information elsewhere in the Smithsonian and Washington, D.C.

Collections Care Division

The Collections Care Division (CCD) provides support within the SIA and to research centers, museums, education and outreach programs, and administrative staff of the Smithsonian Institution in the preservation of analog records in all formats. Its purview includes concerns for the environment and security of archival collections, proper housing and shelving of records, reformatting of selected materials, and training. A special division within CCD is devoted to the management of the historic photograph negative archives of the Institution, including arranging, describing, making accessible, and preserving the collection.

CCD is the liaison to facilities maintenance at the various SIA locations, especially regarding collections areas. It also provides the liaison support for the Smithsonian's nitrate roll and sheet film collections housed by the Library of Congress.

CCD's expertise is available to any Smithsonian archival unit in need of conservation advice or treatment. Through the Smithsonian Center for Archives Conservation (SCAC), CCD offers a full range of preservation services to the Smithsonian archival community. This includes consultation and training and conducting condition survey assessments. SCAC takes in archival objects for conservation treatment, which includes examination and documentation, exhibit preparation, cleaning, deacidification, mending, and other stabilization efforts.

The Collections Cares Division hosts interns and fellows, works with national and international organizations to advance research in the proper preservation of records in all formats, and conducts workshops and other training opportunities.

Digital Services Division

The Digital Services Division addresses the Smithsonian Institution Archives' digital preservation, digital curation, electronic records management and online collection accessibility needs. Concentrations of the division are an Electronic Records Program, the Web and New Media group, and Digitization Services.
Through the Electronic Records Program, the DSD curates born digital records and preserves objects from a wide variety of formats for permanent retention. It contributes to the advancement of digital preservation technology with research projects in file format identification and validation as well as archival preservation of large bodies of email, such as email accounts. It assists in the development of records disposition schedules and records appraisals.

The Web and New Media group works to promote and enhance the Internet-based accessibility of our collections through dynamic websites, blogs, social media and mobile applications. This group works to facilitate both wider and deeper use of our collections by researchers and scholars as well as inspiring new audiences to learn. Staff also provides leadership to pan-Institutional projects seeking to make the treasures of the Institution available to people all over the world.

The Digitization staff provides services to units across the Institution, specializing in still image and video digitization and photographic printing. Services available for still images include digital restoration of photographs.

The DSD hosts interns and works with national and international organizations to advance research and standardization in the proper preservation and retention of digital records. It works with other units to develop strategies, standards and policies for Smithsonian-wide digitization and digital curation, a necessity for the successful retention of our digital heritage.

RESEARCH STAFF

ALERS, Ellen, Assistant Archivist. B.A. (1982) St. John's College, Annapolis; M.A. (2006) Johns Hopkins University. Research specialties: Smithsonian history.

FERRANTE, Riccardo, Information Technology Archivist and Digital Services Program Director. B.S. (1987) Northwestern University. Research specialties: Digital Archives; Digital Curation and Preservation; Website and E-mail Preservation; Trustworthy Digital Repositories; Digital Archive-related Data Standards and Best Practices; Electronic Records Management.

HENSON, Pamela M., Historian. B.A. (1971); M.A. (1975) George Washington University; Ph.D. (1990) University of Maryland. Research specialties: History of the Smithsonian; history of science; history of museums; American Studies; oral history.

LOCKSHIN, Nora, Paper Conservator. B.F.A. (1992) Rhode Island School of Design; M.L.I.S., with Advanced Certificate in Conservation Studies (2002) University of Texas, Austin. Research specialties: Archive and library preservation and conservation, including: books, paper, photographic and recording media.

PETERS, Tammy L., Supervisory Archivist. B.A. (1990) Bethel College; M.A. (1994) Purdue University. Research specialties: Smithsonian Institution history.

STAUDERMAN, Sarah, Collections Care Manager. B.A. (1986) Amherst College; M.A. and certificate in art conservation (1997) State University College, Buffalo. Research specialties: Non-aqueous deacidificants; magnetic media preservation; preservation managment; disaster preparedness and response for cultural institutions.

AFFILIATED RESEARCH STAFF

CHRISTEN, Catherine A., Research Associate. A.B. (1983) Harvard/Radcliffe Colleges; M.A. (1990), Ph.D. (1995) Johns Hopkins University. Research specialties: Environmental history, especially history of conservation biology, of Smithsonian science (STRI, NZP), and of GIS/remote sensing; Latin American history; oral history.

DANIELS, Brian I., Research Associate. B.A. (2000) San Francisco State University, M.A. (2003) San Francisco State University, M.A. (2006) University of Pennsylvania. Research specialties: nineteenth- and twentieth-century American cultural and intellectual history; history of museums; cultural heritage policy.

KAPSALIS, Effie, Head of Web & New Media, Smithsonian Institution Archives. B.A (1993), M.I.D. (2003) University of the Arts. Research specialties: Information Architecture; Social Media Outreach; User Experience Design; Pan-Smithsonian Web Development.

EWING, Heather Peale, Research Associate. B.A. (1990) Yale University; M.A. (1998) Courtauld Institute of Art, London. Research specialties: Biography of James Smithson; history of the Smithsonian.

KEINER, Christine, Research Associate. B.A. (1993) McDaniel College; Ph.D. (2001) Johns Hopkins University. Research specialties: History of ecology and environmental politics; history of American science and technology.

LAFOLLETTE, Marcel C., Research Associate. B.S. (1967) Little Rock University; M.S. (1968) Boston University; Ph.D. (1979) Indiana University. Research specialties: History of science communication; history of science popularization; ethics and policy of scientific and academic publishing.

PRUNA GOODGALL, Pedro, Research Associate. M.S. (1967) Moscow State University; Ph.D. (1980) U.S.S.R. Academy of Sciences. Research specialties: History of natural history, especially in Cuba; history of biology (systematics and evolution); institutional history of science (Cuba); history of yellow fever.

ROTHENBERG, Marc, Research Associate. B.A. (1970) Villanova University; Ph.D. (1974) Bryn Mawr College. Research specialties: Documentary editing; history of astronomy; American science.

SMITHSONIAN LATINO CENTER

Eduardo Díaz, Director

The Smithsonian Latino Center (SLC) is an educational outreach and research center of the Smithsonian Institution, focused on ensuring that Latino contributions to art, science, and the humanities are highlighted, understood and advanced through the development and support of public programs, scholarly research, museum collections and its affiliated organizations across the United States.

The Center

The SLC promotes the inclusion of Latino contributions in Smithsonian programs, exhibitions, collections and public outreach. It does this in three principle ways:

- It funds cultural, historical, scientific projects across the Smithsonian that represent significant Latino achievements through funding, professional development and technical assistance;
- It develops and manages educational programs, products and outreach.
- It promotes public awareness of Latino programs at the Smithsonian museums and its affiliates across the United States.

SMITHSONIAN TROPICAL RESEARCH INSTITUTE

Eldredge Bermingham, Director

Thirty-five permanent scientific staff and twelve hundred visiting scientists each year at the Smithsonian Tropical Research Institute offer a dynamic intellectual community for students of tropical biology. Our two areas of excellence: discovering and understanding life's diversity, and the study of human diversity and cultural change, embrace a wide range of academic disciplines.

STRI is the world's premier international research platform for tropical biologists working in more than forty countries. We offer expertise, data, training programs and tools to young scientists and professionals alike. This enriches our own endeavor as STRI staff engage in collaborations and intellectual exchange with scholars and students from a wide range of partner institutions.

The Smithsonian's history of 100 years of tropical research in Panamaon evolution, ecology and behavior of tropical organisms informs STRI's innovative initiatives in soil science, plant physiology, canopy biology, paleoecology and climate change, molecular biology and neurobiology.

The Isthmus of Panama offers unique advantages for biodiversity research. Formed about three million years ago, the isthmus is a complex zone of contact between the floras and faunas of North and South America. In addition, it separates closely related forms of marine life that were isolated in the Atlantic and Pacific Basins. Panama's topography and small size mean that a wide range of habitats are accessible within a short distance. Terrestrial habitats range from dry grasslands and scrub, through seasonal and evergreen lowland tropical forests, to montane and perpetually wet cloud forests. Marine envi-ronments include muddy, sandy, and rocky shores, coral reefs, mangroves, sea grasses and the open waters of the Caribbean and the eastern Pacific. Rivers and lakes provide opportunities for freshwater studies. Ten modern research facilities in the Republic of Panama provide an ideal base for tropical biology research.

STRI's headquarters, including administrative offices, library, and the Earl S. Tupper Research and Conference Center, are located in the Ancon area of Panama City. The Tupper Center houses laboratories and offices for scientists as well as an auditorium and meeting rooms. STRI's Tropical Sciences Library is one of the most comprehensive in the world for tropical studies, receiving 500 periodicals, containing more than 60,000 volumes and offering fast, online reference services.

Barro Colorado Island (BCI) is one of the best known sites in the world for the study of lowland tropical forest. A reserve since 1923, research at BCI builds on more than eight decades of scientific studies that have resulted in over fifteen hundred publications. Facilities include modern laboratories and living quarters for approximately 65 visiting scientists. The 5,000-hectare Barro Colorado Nature Monument includes the island, five mainland peninsulas, and many smaller islands, which afford opportunities for the study of primary and secondary forests, freshwater habitats, and island biogeography.

STRI's Center for Tropical Paleoecology and Archeology in Panama City is a five minute walk from its headquarters. This facility houses scientists, fellows and research assistants studying the geological rise of the Central American Isthmus, the evolution of tropical rainforests since the last glaciation, human colonization of the Isthmus and the origins of agriculture.

STRI is developing major new laboratory facilities in the town of Gamboa intended to foster increased academic interchange among fields. The nearby22,000 hectare (54,362 acre) Soberania National Park, contains lowland forest of various ages and a variety of freshwater habitats. A facility at Gamboa is also available for field courses. A station in Fortuna, Chiriqui, Panama's western province, provides scientists with access to wet montane forests.

The STRI Tropical Forest Canopy Program uses construction cranes to study the upper canopy of tropical forests. Cranes are now in place at a dry tropical forest in the Parque Natural Metropolitano, in Panama City, and at a very wet tropical forest site on the Caribbean side, providing safe access to the forest canopies in contrasting environments.

With marine laboratories on both the Pacific and Caribbean (Atlantic) coasts, STRI presents unique and unparalleled opportunities for comparative studies on the biota of the two oceans. Naos, on the Pacific, is a short distance from STRI headquarters near Panama City. The Molecular Evolution Laboratories, at the Naos Island Laboratories, host studies in evo-lutionary biology, genetics and molecular systematics. The Galeta Laboratories, 80 km (50 mi) north, on the Atlantic coast, is located at the edge of a fringing coral reef adjacent to mangrove forest. STRI's Caribbean (Atlantic) laboratory is located in Isla Colón, in the Bocas del Toro Archipelago. This laboratory offers a range of services, including boats and SCUBA to provide investigators with access to an extraordinary diversity of marine and terrestrial biota.

STRI has expanded its research on animal behavior and evolutionary biology by establishing a laboratory of Evolutionary Neurobiology and Behavior. The new facility focuses on comparative neurobiological and behavioral studies of tropical invertebrates with extreme body size reduction. The laboratory also provides well-equipped facilities for visiting neurobiologists; will host symposia on topics relating to brain miniaturization; and will explore connections between brain miniaturization and applied research related to engineering and information technology.

STRI scientists collaborate with research and academic organizations at sites throughout the tropics. STRI maintains formal cooperative research partnerships with colleagues in Kenya, Malaysia, India, Thailand, Sri Lanka, Ecuador, Brazil, Cameroon and other countries.

Large-scale, permanent forest plots have been established based on methods originally developed on Barro Colorado Island in Panama. These forest dynamic plots form a Global Earth Observatory network under The Center for Tropical Forest Science (CTFS), a STRI program to promote long-term biological and socio-economic research within tropical forests and forest-dependent communities, and to translate this information into relevant forest management, conservation, and natural resources policies. Many findings are tested directly in the Panama Canal watershed and at other sites as part of a huge, landscape-level study of reforestation with native tree species coordinated the CTFS and the Yale School of Forestry and Environmental Studies and in close cooperation with the Panama Canal Authority and Panama's Environmental Authority (ANAM). At the Mpala Research Centre in the Laikipia Plateau of Kenya, scientists integrate research in disciplines ranging from wildlife/livestock management, ecology, geology, and animal physiology.

The Biological Dynamics of Forest Fragments Project (BDFFP) is the world's largest-scale and longest-running study of habitat fragmentation, operated cooperatively by the Smithsonian Tropical Research Institute and Brazil's National Institute for Amazonian Research. Located in the central Amazon, near the city of Manaus, Brazil, the BDFFP was initiated in 1979 to assess the impacts of fragmentation on rainforest animals, plants, and ecological and ecosystem processes. Research in the BDFFP's 1000 square-kilometer study area is conducted by staff scientists, Brazilian and foreign graduate students, and visiting researchers. In addition to its research mission, the BDFFP sponsors education programs for Latin American university students and decision-makers. To date the BDFFP has produced well over 300 publications or graduate theses, and has trained hundreds of scientists in the Amazon region. It was awarded the prestigious Ford/Conservation International Award for Conservation Research and Training in Brazil.

In addition to Smithsonian wide fellowships administered by the Office of Fellowships in DC, STRI offers its own international, competitive awards to support the research of visiting students. Requests for fellowship information should be addressed to the Office of Academic Programs (E-Mail: fellows@si.edu). Information on facilities usage, housing and fees can be addressed to the Office for Visitors Services (E-Mail: STRIRegistration@si.edu). Further information on STRI facilities and research programs can be found at STRI's web site: http://www.stri.org.

RESEARCH STAFF

AIELLO, Annette, Entomologist. B.A. (1972), Brooklyn College, New York; Ph.D. (1978) Harvard University. Research specialties: Life histories, behavior, and evolution of insects, especially moths and butterflies.

BERMINGHAM, Eldredge, Director, Senior Staff Scientist. B.A. (1977) Cornell University; Ph.D. (1986) University of Georgia. Research specialties: Molecular population genetics and evolutionary biology; historical biogeography of Neotropical fishes and Caribbean birds.

CHRISTY, John, Biologist. B.A. (1970) Lewis and Clark College, Oregon; Ph.D. (1980) Cornell University. Research specialties: Animal communication; sexual selection and mating systems; functional morphology; reproductive cycles, larval dispersal; behavioral ecology of intertidal invertebrates with an emphasis on fiddler crabs.

COATES, Anthony G, Scientist Emeritus. Ph.D. (1963) London University. Research specialties: Geology (stratigraphy and Paleontology).

COLLIN, Rachel, Staff Scientist, Director of the Bocas del Toro Research Station. Sc.B. (1993) Brown University; M.S. (1996) University of Washington; Ph.D. (2002) University of Chicago. Research specialties: Evolution of marine invertebrate life histories and development; systematics of marine gastropods.

CONDIT, Richard, Biologist. B.S. (1978) University of Illinois; Ph.D. (1984) University of California, Santa Cruz. Research specialties: Population biology; tropical forest ecology, microbial population dynamics, animal behavior.

COOKE, Richard, Archaeologist. B.A. (1968) University of Bristol; Ph.D. (1972) University of London. Research specialties: Archaeology of New World tropics; faunal analysis; human ecology; history of fishing.

CORREA, Mireya D., Scientific Staff, Botanist. Licenciado (1963) University of Panama; M.A. (1967) Duke University. Research specialties: Tropical plant systematics, especially the flora of Panama; ethnobotany, especially medicinal plants.

EBERHARD, William G., Biologist, Professor, Universidad de Costa Rica. A.B. (1965), Ph.D. (1969) Harvard University. Research specialties: Behavior of insects and web-building spiders; sexual selection by cryptic female choice; genitalic evolution, effects on behavior of miniaturization of nervous system.

GUZMAN, Hector M., Staff Biologist. B.Sc. (1979), M.Sc. (1986) University of Costa Rica; Ph.D. (1994) Newcastle University, UK. Research specialties: Ecology and population dynamic of coral reefs; sclerochronology; conservation biology; human impacts on marine ecosystems, coastal management and marine pollution.

HALL, Jefferson, Staff Scientist and Principal Investigator, Agua Salud Project. B.A. (1983) Miami University; M.F.S. (1992), Ph.D. (2002) Yale University. Research specialties: Tropical forest silviculture and management, restoration ecology, ecosystem services, secondary succession.

HERRE, E. Allen, Biologist. B.A. (1977) University of Chicago; Ph.D. (1988) University of Iowa. Research specialties: Coevolution of figs and their pollinator wasps; host-parasite coevolution; the evolutionary effects of population structure on sex ratio, sexual selection and parasite virulence; and interactions between tropical host plants and both mycorrhizal and endophytic fungi.

HUBBELL, Steven, Staff Scientist. B.A. (1963), Carleton College; Ph.D. (1969) University of California, Berkeley. Research specialties: Tropical forest ecology; theoretical community ecology.

JACKSON, Jeremy B.C., Biologist Emeritus. B.A. (1965), M.A. (1968) George Washington University; M.Phil. (1970), Ph.D. (1970) Yale University. Research specialties: Diversity, speciation and extinction of tropical marine invertebrates; ecology and conservation of tropical coastal communities.

JARAMILLO, Carlos, Staff Scientist. B.A. (1992) Universidad Nacional de Colombia; M.S. (1995) University of Missouri-Rolla; Ph.D. (1999) University of Florida. Research specialties: palynology, paleobotany, paleontology, biostratigraphy, paleobiology.

KNOWLTON, Nancy, Sant Chair for Marine Science. A.B. (1971) Harvard University; Ph.D. (1978) University of California, Berkeley. Research specialties: Marine Biodiversity; ecology, behavior, evolution and systematics of coral reef organisms.

LEIGH, JR., Egbert G., Biologist (Emeritus). B.A. (1962) Princeton University; Ph.D. (1966) Yale University. Research specialties: Evolution of mutualism; the role of mutualism in evolution and ecosystem function; evolutionary implications of population genetics; why there are so many kinds of tropical trees; analogies between economies and ecosystems.

LESSIOS, Harilaos, Senior Scientist. B.A. (1973) Harvard College; M.Phil. (1976), Ph.D. (1979) Yale University. Research specialties: Molecular evolution and population genetics of marine organisms; ecology of coral reefs.

LINARES, Olga F., Senior Research Staff - Anthropologist Emeritus. B.A. (1958) Vassar College; Ph.D. (1964) Harvard University. Research specialties: Cultural and ecological processes among sub-Saharan African farmers; Agrobiodiversity; Social and political organization of agrarian systems; Urban farming; Home gardens.

MULLER-LANDAU, Helene Clara, Staff Scientist. B.A. (1995) Swarthmore College; M.A. (1997), Ph.D. (2001) Princeton University. Research specialties: Plant community ecology; Ecological and evolutionary theory; Anthropogenic influences on forests; Carbon budgets of forest ecosystems.

PAGE, Rachel, Research Scientist. B.A. (1996) Columbia University; Ph.D. (2008) University of Texas, Austin. Research specialties: Vertebrate behavior, sensory and cognitive ecology, predator-prey interactions, signal evolution.

PIPERNO, Dolores R., Archaeologist/Paleobotanist Emeritus. B.A. (1971) Rutgers University; M.A. (1979), Ph.D. (1983) Temple University. Research specialties: Archaeology and human ecology of tropical regions; paleobotany and paleoethnobotany.

POTVIN, Catherine, Research Associate. B.Sc. (1981); M.Sc. (1982) University of Montreal; Ph.D. (1985) Duke University. Research specialties: Plant ecology, global change biology, ethnobotany.

ROBERTSON, D. Ross, Staff Scientist. B.Sc. (1966), Hons. (1968), Ph.D. (1974) University of Queensland, Australia. Research specialties: Zoogeography of neotropical shorefishes; Coral reef fishes: behavioral ecology; larval, reproductive and population biology; demography.

ROUBIK, David W., Entomologist. B.S. (1975) Oregon State University; Ph.D. (1979) University of Kansas. Research specialties: Tropical bees and beekeeping, ecology, systematics and behavior of bees, pollination systems; palynology; ecology and entomology.

SALAZAR ALLEN, Noris, Part-time Scientific Staff, STRI, Research Professor and Curator of Bryophytes and Lichens, Herbarium, Department of Botany, Universidad de Panamá. B.A. (1969) Trinity College; M.A. (1973) State University of New York, Geneseo; Ph.D. (1986) University of Alberta, Edmonton. Research specialties: Biosystematics, phytogeography, morphology and evolution of tropical bryophytes; lichens of Panama.

SANTOS-GRANERO, Fernando, Researcher, Social Anthropology. Licenciatura (1980) Pontificia Universidad Católica del Perú; M.Sc. (1981), Ph.D. (1986) London School of Economics and Political Science. Research specialties: Native Amazonian leadership and philosophies of power; history of native Amazonian peoples; Amerindian forms of slavery and servitude; tropical American chiefdoms; Amazonian regional economies.

STALLARD, Robert, Research Scientist, Staff. B.S. (1974), Ph.D. (1980) Massachusetts Institute of Technology-Woods Hole Oceanographic Institute. Research specialties: Earth-surface environmental processes with a focus on the study of water quantity and quality in streams, weathering, soil development, and erosion as related to land-cover and climate change in the tropics.

TORCHIN, Mark Erik, Staff Scientist. B.A. (1991)University of California, Santa Barbara; M.S. (1994) University of Oregon; Ph.D.(2002) University of California, Santa Barbara. Research specialties: Marine population and community ecology; host-parasite interactions; invasion ecology; conservation biology.

TURNER, Ben, Staff Scientist. B.Sc. (1996) University of Sheffield; Ph.D. (2000) Royal Holloway, University of London. Research specialties: Soil biogeochemistry, including soil organic phosphorus and the nutrition of plants, nuclear magnetic resonance spectroscopy, soil carbon, tropical forest soils, tropical wetlands.

VAN BAEL, Sunshine, Associate Scientist. B.A. (1996) University of Chicago; Ph.D. (2003) University of Illinois, Urbana-Champaign. Research specialties: plant-animal-microbial interactions, vertebrate ecology.

WCISLO, William, Biologist. B.S. (1982) University of Michigan; Ph.D. (1991) University of Kansas. Research specialties: Evolutionary biology; ethology; behavior and behavioral evolution of bees, ants and wasps; perception and learning; social evolution; brain evolution.

WEST-EBERHARD, Mary Jane, Entomologist. B.A. (1963), Ph.D. (1967) University of Michigan. Research specialties: Social behavior,natural history, and evolution of wasps (especially Vespidae); social evolution; sexual and social selection; developmental plasticity and evolution.

WINDSOR, Donald M., Research Biologist. B.S. (1966) Purdue University; Ph.D. (1972) Cornell University. Research specialties: Macroevolutionary studies of Tortoise Beetle (Coleoptera, Chrysomelidae, Cassidinae) diversification related to food plant, parasitoid and mite associations worldwide.

WINTER, Klaus, Biologist. Dr.rer.nat. (1975) Darmstadt; Habil. (1983) Würzburg. Research specialties: Plant Physiology; plant physiological ecology; photosynthesis and photoinhibition; crassulacean acid metabolism; plant responses to elevated CO2.

WRIGHT, S. Joseph, Biologist. A.B. (1974) Princeton University; Ph.D. (1980) University of California, Los Angeles. Research specialties: Ecology of tropical forests; community ecology.

AFFILIATED RESEARCH STAFF

ANGEHR, George, Research Associate. B.S. (1973) Cornell University; Ph.D. (1980) University of Colorado. Research specialties: Ecology and distribution of the birds of Panama; Bird distribution in Latin America and Africa; Conservation of birds; Conservation of tropical forests.

ASHTON, Mark S., Research Associate. B.S. (1982) University of Maine, Orono; M.F. (1985), Ph.D. (1990) Yale University. Research specialties: Tree seedling ecology, physiological and morphological adaptations of leaves to environment, forest microenvironments, disturbance and landscape level dynamics of forests and their applications to: regeneration silviculture of natural forests, restoration of degraded forestlands, plantation analogs of mixed-species stands, and silviculture of non-timber forest crops.

BALUNAS, Marcy, Research Associate. B.A. (1995) University of Rochester; M.S. (2003) State University of New York College of Environmental Science and Forestry; Ph.D. (2007) University of Illinois at Chicago Research specialties: Selectivity and specificity of drug action, using marine natural products chemistry to address critical questions within the broader field of chemical biology.

BARRIOS, Hector, Professor of Entomology, University of Panama. Ph.D. Instituto de Zoologia de la Academia de Sciencias. Research specialties: Entomology.

BOOMSMA, J.J. Koos, Senior Research Associate. M.Sc. (1977), Ph.D. (1982) Vrije Universiteit. Research specialties: Social Evolution; Conflict and Cooperation; Co-evolution Mating systems; Conservation.

BRAWN, Jeffrey, Research Associate. B.S. (1975) University of Massachusetts, Amherst; M.S. (1979) University of Missouri, Columbia; Ph.D (1986) Northern Arizona University. Research specialties: Avian Ecology, tropical ecology, comparative life histories, demography.

BREEDY, Odalisca, Research Associate. B.A. (1979), Licence (1986), M.A. (2003) Universidad de Costa Rica. Research specialties: Octocoral taxonomy and biogeography, eastern Pacific and Caribbean.

COLEY, Phyllis, Research Affiliate. Ph.D. (1981) University of Chicago. Research specialties: Tropical plant ecology; plant herbivore interactions, chemical ecology.

COLLINS, Laurel, Research Associate. B.S. (1974) University of Maryland; M.S. (1985) George Washington University; M.Phil. (1985), Ph.D. (1989) Yale University. Research specialties: Paleobiology of foraminifera, paleoenvironments, Caribbean, Tropical Eastern Pacific.

COMITA, Liza, Research Associate. B.A. (1999), M.A. (1999) University of Pennsylvania; Ph.D. (2006) University of Georgia. Research specialties: tropical forest ecology.

CROFOOT, Margaret, Research Associate. B.A. (2001) Stanford University; M.A. (2003), Ph.D. (2008) Harvard University. Research specialties: primate behavioral ecology, movement ecology.

DALLING, James, Research Associate. B.A. (1988) Oxford University; Ph.D. (1992) Cambridge University. Research specialties: Seed ecology and forest regeneration.

DAVIDAR, Priya, Research Associate. B.Sc. (1973), M.Sc. (1975) Madras University; Ph.D. (1979) Bombay University; S.M. (1985) Harvard University. Research specialties: Tropical forest ecology and conservation, pollination and seed dispersal mutualisms, biodiversity of Andaman islands and Western Ghats of India.

DEKROON, Hans, Research Associate. M.Sc. (1984), Ph.D. (1990) Utrecht University. Research specialties: plant population ecology; population models; plant plasticity; root ecology; biodiversity mechanisms.

DICK, Christopher William, Research Associate. B.A. (1990) Hampshire College; Ph.D. (1999) Harvard University. Research specialties: tropical forest ecology, biogeography, and ecological genetics of tropical forest trees.

DUDA JR., Thomas Franklin, Research Associate. B.S. (1988) Texas A&M University; M.A. (1992) San Francisco State University; Ph.D. (1999) Harvard University. Research specialties: Evolution of molluscs (population genetics, phylogenetics, biogeography and molecular evolution).

DUDLEY, Robert, Research Associate. B.S. (1983) Duke University; Ph.D. (1987) University of Cambridge. Research specialties: Biomechanics, physiology, and evolution of flight in insects and vertebrates.

ELSENBEER, Helmut, Research Associate. Diploma (1980) University of Munich; M.S. (1982) University of California, Davis; Ph.D. (1989) North Carolina State University. Research specialties: Hydrological, hydrochemical and surficial processes in tropical ecosystems (natural and man-made) and their response to land-use change.

FERRAZ, Gonzalo, Research Associate. Licenciatura (1995) University of Lisbon; Ph.D. (2004) Columbia University. Research specialties: Population ecology and site-occupancy dynamics with applications to neotropical ornithology and epidemiology.

GERWICK, William H., Research Associate. B.S. (1976) University of California, Davis; Ph.D. (1981) Uinversity of California, San Diego. Research specialties: Marine natural products chemistry and drug discovery; biosynthesis and molecular biology of marine natural products.

GILBERT, Gregory, Research Associate. B.S. (1985) State University of New York; M.S. (1988), Ph.D. (1991) University of Wisconsin. Research specialties: Plant disease ecology, fungal community ecology, and tropical forest ecology and conservation.

HARMS, Kyle E., Research Associate. B.S. (1989) Iowa State University; Ph.D. (1997) Princeton University. Research specialties: Population, community & evolutionary ecology of tropical forests & sub-tropical pine savannas.

JIGGINS, Christopher, Research Associate. B.A. Hons. (1993) University of Cambridge; Ph.D. (1997) University College London. Research specialties: Genetic basis of adaptation and speciation in mimetic butterflies.

KASPARI, Michael, Research Associate. B.S. (1983), M.S. (1985) University of Nebraska; Ph.D. (1992) University of Arizona. Research specialties: Community and Biogeography of soil communities, with a taxonomic focus on ants.

KAYS, Roland, Research Associate. B.A. (1993) Cornell University; Ph.D. (1999) University of Tennessee. Research specialties: Temperate and neotropical mammals, especially carnivores; radio-telemetry; non-invasive surveys; spatial ecology; canopy biology.

KITAJIMA, Kaoru, Research Associate. B.A. (1984) University of Tokyo; M.S. (1987), Ph.D. (1992) University of Illinois, Champaign-Urbana. Research specialties: Plant functional traits; physiological ecology of tropical trees; seed and seedling ecology; plant-soil interactions; functional basis for plant invasion.

KRAUSE, Heinrich, Research Associate. M.S. (1964), Ph.D. (1966) University of Bonn. Research specialties: Physiological responses of tropical plants to high solar radiation.

KURSAR, Thomas, Research Affiliate. B.A. (1971) Rutgers College; M.S. (1976), Ph.D. (1982) University of Chicago. Research specialties: The physiology and ecology or tropical rainforest plants. Linking the discovery of novel uses of biodiversity to conservation and economic development..

LAURANCE, Susan, Research Associate. B.Sc. (1989) Queensland University; M.Nat.Res. (1996), Ph.D. (2001) University of New England. Research specialties: Anthropogenic impacts on rainforest plant and wildlife communities; rainforest tree ecology.

LAURANCE, William, Research Associate. Ph.D. (1989) University of California, Berkeley. Research specialties: Tropical forest ecology and conservation; Climate change science

LIPS, Karen, Research Affiliate. B.S. (1988) University of South Florida; Ph.D. (1995) University of Miami. Research specialties: Ecology and conservation of amphibians; amphibian population declines; wildlife diseases; Appalachian salamanders; role of amphibians in tropical ecosystems.

LOVEJOY, Thomas E., Research Associate. B.S. (1964), PhD. (1971) Yale University. Research specialties: Tropical ecology; conservation biology; environment/policy.

MAYO, Julia, Research Associate. Ph.D. (2004) Universidad Complutense de Madrid, España. Research specialties: stone or earthen features, such as mines, low relief carvings ("petroglyphs"), platforms, ditches, groups of sculpted and un-sculpted stone columns, dry stone walls, stone and cobble pavements, and stone and earthen circles and mounds; Gran Coclé precolumbian culture area of central Panama relation to the exploitation of the natural resources.

MEYLAN, Peter, Research Associate. B.S. (1976), M.S. (1980), Ph.D. (1985) University of Florida. Research specialties: Ecology, phylogeny, systematics and paleontology of reptiles especially turtles.

MEYLAN, Anne, Research Associate. B.S. (1974), M.S. (1978), Ph.D. (1984), University of Florida. Research specialties: Reproductive biology, ecology and migrations of marine turtles; global status of hawksbill turtle (Eretmochelys imbricata).

OGDEN, Fred L., Research Associate. B.S. (1987), M.S. (1989), Ph.D. (1992) Colorado State University. Research specialties: Hydrologic Model Development, Physical Hydrology, Hydrologic and Atmospheric Remote Sensing, Hydraulics, Ecohydrology.

RANERE, Anthony, Research Associate. B.A. (1964) Harvard University; M.A. (1968) Idaho State University; Ph.D. (1972) University of California, Davis. Research specialties: Archaeology of the American tropics; origins of agriculture; early human colonization of the Americas; lithic analysis.

RICKLEFS, Robert E., Research Affiliate. A.B. (1963) Stanford University; Ph.D. (1967) University of Pennsylvania. Research specialties: Evolutionary ecology; historical biogeography of the West Indies; life-history diversification in birds; avian malaria parasites.

ROBERTS, Tyson, Research Associate. B.A. (1961), Ph.D. (1968) Stanford University. Research specialties: systematics and evolutionary biology of fishes, currently including oarfishes, synbranchids, and piranhas. Khmerology: identification of portrait statues of ancient Cambodian devaraja or divine kings with the reigning monarchs they portray.

RYAN, Michael, Research Associate. B.A. (1975) Glassboro State College; M.S. (1977) Rutgers University; Ph.D. (1982) Cornell University. Research specialties: Evolution and mechanisms of animal behavior, especially animal communication and sexual selection.

SÁNCHEZ-AZOFEIFA, G. Arturo, Research Associate. B.Sc. (1990) University of Costa Rica; M.Sc. (1993), Ph.D. (1996) University of New Hampshire. Research specialties: Hyperspectral remote sensing, tropical dry forests, wireless sensor networks.

SCHNITZER, Stefan A., Research Associate. Ph.D. (2001) University of Pittsburgh. Research specialties: Plant Community Ecology; Tropical Forest Ecology; Plant Competition; Ecology of Lianas.

SRYGLEY, Robert, Research Associate. B.A. (1983) University of Washington; Ph.D. (1991) University of Texas. Research specialties: Physiology, behavior, evolution and ecology of insect migration, predator-prey interactions, and flight.

TANNER, Edmund, Research Associate. B. Sc. (1973) Univesity of London; Ph.D. (1977) University of Cambridge. Research specialties: Tropical forests, nutrients, water, trees, biodiversity, forest dynamics.

VENCL, Fredic, Research Associate. B.A. (1972) Hiram College; M.A. (1975), Ph.D. (1977) Stony Brook University. Research specialties: Evolution of dietary specialization in phytophagous insects and its relation to host plant and insect diversification; speciation via sexual selection; taxonomy and systematics of shining leaf beetles (Chrysomelidae); sexual selection fireflies (Lampyridae).

WARKENTIN, Karen, Research Associate. B.Sc. (1985) University of Guelph; M.Sc. (1990) Dalhousie University; Ph.D. (1998) University of Texas, Austin. Research specialties: Phenotypic plasticity, behavioral ecology & ecological developmental biology of amphibians, especially egg and larval stages; Predator-prey interactions and inducible hatching; Vibrations as an information source; Ecology of fear.

WIKELSKI, Martin C., Research Associate. Diploma (1991) Ludwig Maximilian University; Ph.D. (1994) University of Bielefeld. Research specialties: Radio tracking; birds; migration; Physiological ecology; field endocrinology; field energetics.

WOODHAMS, Douglas, Research Associate. B.S. (1999) Michigan State University; Ph.D. (2003) James Cook University. Research specialties: Disease ecology; Amphibian conservation; The interaction between innate immune defenses and microbial communities.

ZOTZ, Gerhard, Research Associate. M.Sc. (1989); Ph.D. (1993) University of Wuerzburg. Research specialties: Ecology of vascular and non-vascular epiphytes; tropical biodiversity; ecophysiology of mosses

RESEARCH ASSISTANCE PROGRAMS

OFFICE OF INTERNATIONAL RELATIONS

Molly Fannon, Director

The Office of International Relations (OIR) at the Smithsonian Institution (SI) serves as the central point for Institution-wide advice, insight, analysis, and coordination of all international activities of the Institution. As the central external representative of international programs for the Institution, OIR leads institutional relationships with U.S. government and international organizations, including the U.S. Department of State, the U.S. Agency for International Development, foreign embassies, and other governmental and private organizations in the U.S. and abroad.

OIR offers a fast-paced working environment staffed with a small, highly productive team of professionals with a wide variety of strengths in international program management, international business development, international visa/travel regulation expertise, and museum project management. We offer opportunities in the arts and cultural side (including cultural heritage and livelihoods) as well as in the science, research and conservation side of our international work.

The Office of International Relations has benefitted from working with interns on a variety of projects and seeks intern support on an as-needed basis throughout the year. We accept in person as well as virtual interns. If you are a graduate or undergraduate student interested in participating in an internship with the Office of International Relations, you should contact our office for any current openings.

Contact: Molly Fannon

Contact Email: FannonM@SI.edu

Deadline: Considered year-round

Term: 2 month minimum

Apply Through: SOLAA

PROGRAM STAFF

HIRSCH, Leonard Paul, Senior Policy Advisor. B.A. (1976) Pomona College; M.A. (1978), Ph.D (1980) Northwestern University. Research specialties: Science and environmental policy.

SMITHSONIAN CENTER FOR LEARNING AND DIGITAL ACCESS

Stephanie Norby, Director

The Smithsonian Center for Learning and Digital Access (SCLDA) offers programs for educators, students, and museum professionals and manages the Institution's central education website, www.smithsonianeducation.org. The Center partners with universities and other organizations to explore new ways of learning such as online gaming and mobile applications, and it offers professional development to the Smithsonian community on these topics.

The Center's outreach to national and global audiences includes distance-learning series, Smithsonian Online Education Conferences, and the Shout Global Environmental Initiative, and it also publishes *Smithsonian in Your Classroom*, which it distributes free of charge to schools in all 50 states. In addition to its efforts in the K-12 education community, the Center conducts an enrichment program for select faculty members at a local com-

munity college. It also produces five Heritage Family Days in collaboration with the units, to bring thousands of parents and children into the museums for interdisciplinary, participatory programs.

PROGRAM STAFF

COLLINS, James, Information Technology Specialist. B.S. (2007) DePaul University; J.D. (2010) Washington & Lee University. Research specialties: educational technology and data mining.

ENGELKE, Stevie, Director of Programs. B.A. (1968); M.A. (1970) Columbia University; M.A. (1995) The George Washington University. Research specialties: art education; professional development for educators (museum and school); incorporating museum resources into curriculum.

MILLIGAN, Darren, Senior Media Designer/Webmaster. B.S. (1999) Allegheny College. Research specialties: digital learning research and development.

MONACO, Pino, Director of Program Evaluation and Audience Research. M.D. (1983) University of Naples, Italy; Ph.D. (1991); M.L.S/M.A. (2004) University of Oklahoma. Research specialties: audience research and evaluation.

NORBY, Stephanie, Director. B.S. (1973) University of California, Davis; M.A. (1982) University of Missouri. Research specialties: Family history and history of education.

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SPINALE, Tracie C., Academic Programs Manager, B.A. (1996) Beloit College; M.A. (1998) George Washington University. Research specialties: internship programs, museum studies.

WADMAN, Melissa. Manager of Program Evaluation. M.A. (2000) George Washington University. Research specialties: audience research and evaluation.

SMITHSONIAN INSTITUTION LIBRARIES

Nancy E. Gwinn, Director

As the largest and most diverse museum library in the world, the Smithsonian Libraries (SIL) leads the Smithsonian in taking advantage of the opportunities of the 21st-century digital society. SIL provides authoritative information and creates innovative services for SI researchers and the general public to further their quest for knowledge. Through paper preservation and digital technologies, the Libraries ensures broad and enduring access to its collections for all.

The Smithsonian Institution Libraries serves the Institution and the public through support of Smithsonian-related curatorial, research, exhibition, and educational and outreach activities. The Smithsonian Libraries is a member of the Association of Research Libraries (ARL), the Chesapeake Information and Research Library Alliance (CIRLA), and the Federal Library Information Center Committee (FLICC). The Libraries participates in the reciprocal borrowing and interlibrary loan programs of OCLC, an international bibliographic utility and is a member of the RLG Partnership, with over 22,000 participating libraries, museums and archives.

The Smithsonian Libraries collections of approximately 1.8 million volumes and nearly 6,000 currently received journal titles are available to Smithsonian staff, visiting researchers, and other scholars through a system

of twenty libraries located in Washington, DC, Maryland, New York City, and the Republic of Panama. Users of SIL's list of online journals (http://www.sil.si.edu/eresources/tfr_index.cfm) have access to over 4,000 electronic journals and databases. SIL collections are particularly strong in natural history, tropical biology, ecology and environmental management, wildlife conservation, American ethnology and culture, American history, the history of science and technology, aviation history and space flight, postal history, design and decorative arts, African art, American art, modern and contemporary art, Asian art, horticulture, conservation, and museum administration. Collections in African American and Latino history and culture are growing steadily. In addition, the Libraries hold a distinguished collection of 50,000 historically important rare books and manuscripts; over 480,000 examples of manufacturer's commercial trade catalogs, representing 30,000 companies, dating from the 19th and 20th centuries; and 2,000 manuscripts groups.

The Smithsonian Institution Research Information System (SIRIS) includes the online catalog of library collections as well as automated acquisitions, circulation, and other library functions. Holdings are accessible through the Internet at http://siris.si.edu. Records of the Libraries collections are also accessible through OCLC, and the Libraries maintains access to this and other national library and commercial databases. The Smithsonian Libraries maintains a website which presents a constantly increasing variety of content in science, American history, art and design, and industry and technology. SI re-searchers demand continuous, instant access to information, and SIL delivers reliable information to internal and external users when and wherever it's needed, from whatever source. See http://www.sil.si.edu.

SIL constantly build its capacity to collaborate across the SI community to transform SI content and programs (collections, research products) into digital products readily available to the world. Digital offerings include full texts of rare books, collections of unique research resources, online exhibitions, resource guides, newsletters and other SI Libraries publications, and links to other web resources in Smithsonian areas of interest. The Smithsonian Libraries' Galaxy of Images (http://www.sil.si.edu/imagegalaxy) opens up our collections in a way never possible before. These images are a growing sample of the library materials that support the research of the Smithsonian.

In addition to providing customary library services, the Smithsonian Institution Libraries serves the Institution and the general public through education and outreach programs, including exhibitions, lectures, and publications, and through internship and volunteer programs.

The Smithsonian Institution Libraries offers three programs for Resident Scholars to use SIL Special Collections: The Dibner Library Resident Scholar Program, the Spencer Baird Society Resident Scholar Program and the Margaret Henry Dabney Penick Resident Scholar Program. Dibner Library Resident Scholars conduct research using rare works from the Dibner Library of the History of Science and Technology. The core of the holdings of the Dibner Library consists of approx-imately 10,000 rare books and manuscripts that were generously donated to the nation by the Burndy Library (founder, Bern Dibner) on the occasion of the nation's Bicentennial (1976). The strengths of the Dibner Library collection are in the fields of mathematics, astronomy, classical natural philosophy, theoretical physics (up to the early 20th century), experimental physics (especially electricity and magnetism), engineering technology (from the Renaissance to the late 19th century), and scientific apparatus and instruments. The rare books, which date from the 15th to the 20th centuries, include significant holdings of works by Galileo Galilei, Johannes Kepler, Euclid, Carl Friedrich Gauss, Leonhard Euler, René Descartes, and Pierre Simon, marquis de Laplace, and Aristotle. Scientists represented by significant manuscript papers include Dominique François Arago, Humphry Davy, John William Lubbock, Isaac Newton, Henri Milne-Edwards, Hans Christian Ørsted, Henry Hureau de Sénarmont, Benjamin Silliman, Jr., and Silvanus P. Thompson. The Dibner Library collections support the research interests of Smithsonian staff in the National Museum of American History, and provide valuable resources for other Smithsonian and external museums and researchers. This program is supported bythe Dibner family.

Baird Society Resident Scholars will undertake research in SIL's Special Collections located in Washington, D.C. and New York City. These special collections include printed materials on world's fairs in the Dibner Library (19th and early 20th centuries); trade literature in the National Museum of American History Library used to study American industrialization, mass production, and consumerism; natural history rare books in the Joseph F. Cull-

man 3rd Library of Natural History (pre-1840 works on topics such as botany, zoology, travel and exploration, museums and collecting, geology, and anthropology), as well as James Smithson's library; air and space history in the National Air and Space Museum Library's Ramsey Room (ballooning, rocketry, and aviation, late 18th to early 20th centuries); and European and American decorative arts, architecture, and design in the Cooper-Hewitt National Design Museum Library's Bradley Room (18th to 20th centuries). This award is supported by the Spencer Baird Society of the Smithsonian Institution Libraries.

The Margaret Henry Dabney Penick Resident Scholar Program is a new fellowship announced by the Smithsonian Institution Libraries in June of 2009. This Resident Scholar Program was founded by a bequest of Mrs. Margaret P. Nuttle. The Margaret Henry Dabney Penick Resident Scholar Program supports scholarly research into the legacy of Patrick Henry and his political circle, the early political history of Virginia, the history of the American Revolution, founding era ideas and policy-making, as well as science, technology, and culture in colonial America and the Early National Period. As research resources, the Smithsonian Institution Libraries offers to the future fellows the rich holdings of its Special Collections, especially at the National Museum of American History Library, the Dibner Library of the History of Science and Technology, the American Art/ National Portrait Gallery Library, and the American Civilization Collection at the National Museum of the American Indian. The Libraries also provides guidance and contact information to relevant historical collections in the Washington, DC area, especially regarding the holdings of Patrick Henry materials and resources of the pre-American Revolution and the colonial era.

DIRECTOR'S OFFICE

ADAMS, Marcia, Assistant Director, Technical Services. B.A. (1969) Purdue University; M.L.S. (1972) Indiana University. Research specialties: Integrated library systems; Library Technical Services.

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KALFATOVIC, Martin, Assistant Director, Digital Services. B.A. (1983) Catholic University of American M.S.L.S. (1990) Catholic University. Research specialties: Information technology.

THOMAS, Mary A., Deputy Director. A.B. (1973) Mount Holyoke; M.S. (1978) Catholic University of America. Research specialties: Library administration; Smithsonian Libraries History.

TECHNICAL SERVICES DIVISION

ASHLEY, Lowell E., Head, Original Cataloging Section. B.A. (1963) Emory and Henry College; M.L.S. (1973) Vanderbilt University. Research specialties: Cataloging, cataloging of audiovisual materials, cataloging of music, cataloging of electronic resources, authority control.

DUNLOP, Douglas, Metadata Librarian. B.F.A. (1992), MA (1997), MLS (2004) University of North Texas. Research specialties: Library and Information Science; Metadata.

HAIGHT, Vanessa, Book Conservator. B.A. (1984) Washington College; Postgraduate Diploma (2006) West Dean College; M.A.(2007) University of Sussex. Research specialties: Library exhibition planning; study of book leathers; Seventeenth-century English binding.

MISSELL, Elizabeth, Librarian. B.A. (1990) University of New Hampshire; M.A. (1994) George Washington University; M.L.S. (1997) University of Maryland. Research specialties: Provide new methods for the dissemination of traditional and hidden collections; Promote the sharing, reusing, and repurposing of data used in

the processing of digital projects, traditional library materials, and unique hidden materials; Library systems administration and support.

PILSK, Suzanne Chernau, Librarian (Head, Metadata Unit). B.A. (1984) Trinity College, Hartford; M.L.S. (1987) Vanderbilt University. Research specialties: Library science, cataloging, metadata.

RILEY, Sheila Maureen, Head, Catalog Management Section. B.A. (1974) Marquette University. Research specialties: Library Cataloging, Metatdata, Technical Services.

SHAW, Diane, Librarian, (Special Collections Cataloger). B.A. (1981) Agnes Scott College; M.A. (1983) Fordham University; M.S. (1986) University of North Carolina. Research specialties: Rare materials cataloging.

READER SERVICES DIVISION

ALTSTATT, Lynne, Librarian, Vine Deloria, Jr. Library, National Museum of the American Indian Library. B.A. (1971), M.L.S. (1973) University of Oklahoma; Certificate in Database Application Development and Design (2002) Columbia University. Research specialties: Native American Studies, technology in libraries.

BAXTER, William E., Librarian, National Air and Space Museum Library. B.A. (1975), M.A. (1978) St. Louis University; M.S. (LS) (1982) Drexel University. Research specialties: U.S. history; special collections; history of psychiatry; history of science.

BROMAN, Elizabeth, Reference Librarian, Cooper-Hewitt, National Design Museum Library. B.S. (1995) City College, New York; M.S./M.L.S. (1999) Pratt Institute, Brooklyn, NY. Research specialties: Decorative Arts, Art & Architecture, Gravestone Studies and Cemetery Art & Architecture, Pop-Up and Moveable Books, Rare Books.

BROOKE, Anne, Librarian, Hirshhorn Museum and Sculpture Garden Library. B.A. (1964), M.L.S. (1965) University of California, Berkeley; M.A. (1988) American University. Research specialties: Contemporary and modern art.

CHANG-YAU, Vielka, Librarian, Earl S. Tupper Tropical Sciences Library, Smithsonian Tropical Research Institute. B.A. (1971) Keuka College; M.A. University of Chicago. Research specialties: Library administration, library services, library management.

COHLMAN, Jennifer, Librarian. B.A. (1998) University of Illinois, Urbana-Champaign; M.A. (2007) Queens College, City University of New York. Research specialties: digital project management.

COTTRILL, Chris, Senior Reference Librarian, National Museum of American History Library. B.A. (1995) University of Maryland; M.L.S. (1998) University of Maryland. Research specialties: U.S. military and naval history.

DITTEMORE, Margaret R., Librarian, John Wesley Powell Library of Anthropology. B.A. (1971), M.L.S. (1973) University of California, Berkeley; Ph.D. (1983) University of Chicago. Research specialties: Anthropological bibliography, anthropology, Middle East, social science bibliography, research libraries especially collections.

HAGGINS, Angela, Asst. Dept. Head, Natural & Physical Sciences, Smithsonian Institution Libraries. B.A. (1971) Elmhurst College. Research specialties: Chesapeake Bay ecology and land use history, ecology, ecosystems, estuarine, landscape and coastal zone ecology.

JUNEAU, Ann, Head, Natural and Physical Sciences Department and Librarian, National Museum of Natural History Library. B.A. (1972) University of New Orleans; M.Ln (1973) Emory University. Research specialties: Natural History librarianship and reference.

LASKER, Patricia L., Reference Librarian, Natural Museum of Natural History Library and National Zoological Park Library. B.A. (1978) East Carolina University. Research specialties: Integrated library systems, database searching, reference assistance.

LITTS, Doug A., Senior Reference Librarian, Smithsonian American Art Museum/National Portrait Gallery Library. B.A. (1988) University of Florida; M.A. (1992) New York University; M.S. (1997) University of Illinois, Urbana-Champaign. Research specialties: Western Art, especially American; Library Science Reader Services.

McCUTCHEON, Paul K., Librarian, National Postal Museum Library. B.A. (1982), M.L.S. (1989) University of Maryland. Research specialties: Reference in the history of aviation and space flight, philately and postal history, Asian art, African American history and culture; digitization and the preservation of library materials.

OVERSTREET, Leslie K., Curator of Natural-History Rare Books, Joseph F. Cullman 3rd Library of Natural History. B.A. (1971) Reed College; M.A.T. (1972) Reed College; M.L.S. (1988) University of Maryland. Research specialties: Descriptive (physical) bibliography of natural history literature; naturalist Mark Catesby (1683-1749).

PHILLIPS, Kathryn, Assistant Head Librarian. B.A. University of Maryland; M.L.S. Catholic University of America. Research specialties: Art and architecture of the Middle East, South Asia and Southeast Asia.

ROAN, James P., Reference Librarian, National Museum of American History Library. B.A. (1974) University of Maryland. Research specialties: Trade literature, material culture and history of science and technology.

SHAW, Courtney Ann, Senior Reference Librarian, National Museum of Natural History Library. B.A. (1968) University of Wisconsin; M.S.L.S. (1970) Case Western Reserve University; Ph.D. (1992) University of Maryland. Research specialties: Textiles, Art History, Animal imagery, especially vertebrates.

SHU, Yue, Assistant Librarian, Freer Gallery of Art and Arthur M. Sackler Gallery of Art Library. B.A. (1986) Beijing Second Foreign Language Institute; M. Ed. (1992) George Washington University; M.L.S. (2001) Catholic University. Research specialties: Chinese art.

SMITH, Mike, Assistant Librarian, Freer Gallery of Art and Arthur M. Sackler Gallery of Art Library. B.A. (1990), University of Maryland; M.L.S. (1999), Catholic University of America. Research specialties: Library Science, East Asian Studies.

STANLEY, Janet, Librarian, Warren M. Robbins Library, National Museum of African Art. B.A. (1968) American University; M.S.L.S. (1970) Catholic University of America. Research specialties: African art bibliography and documentation.

STEERE, JR., David T., Senior Reference Librarian, National Museum of Natural History Library. B.A. (1978) University of Pennsylvania; M.S. (1983) Drexel University. Research specialties: General and specialized reference expertise in National Museum of Natural History Library, with additional responsibility for electronic resources for all of the Smithsonian Libraries.

TAYLOR, Gil, Librarian, Museum Support Center Library. B.A. (1983), M.L.S. (1989) University of Maryland. Research specialties: Literature and bibliographic databases in the study of biology and the conservation of museum objects.

VAN DYK, Stephen H., Head, Art Libraries and Librarian, Cooper-Hewitt, National Design Museum Library. B.A. (1972) William Paterson College; M.S. (1974) University of North Carolina; M.A. (Candidate), Rutgers University. Research specialties: Design and decorative arts and architecture, 19th and 20th centuries.

YOSHIMURA, Reiko, Librarian, Freer Gallery of Art and Arthur M. Sackler Gallery Library. B.A. (1981) Millersville University of Pennsylvania; M.L.S (1983) Indiana University. Research specialties: Books and publishing in the Edo period (1600-1868), Japan.

DIGITAL LIBRARY AND INFORMATION DIVISION

HUTCHINSON, Alvin R., Information Services Librarian. B.A. (1986) University of Baltimore; M.L.S. (1988) University of Maryland. Research specialties: Science publishing and communication; Digital libraries.

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AND

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