SCIENCE MATTERS
Priorities and Strategies

2005-2010

ORIGIN AND NATURE OF THE UNIVERSE

FORMATION AND EVOLUTION OF THE EARTH AND SIMILAR PLANETS

DISCOVERING AND UNDERSTANDING BIOLOGICAL DIVERSITY

STUDY OF HUMAN DIVERSITY AND CULTURAL CHANGE

Smithsonian Institution

OUR MISSION

Smithsonian science is engaged in research and discovery focused on the origin and nature of the universe, the formation and evolution of the Earth and similar planets, discovering and understanding biological diversity, and the study of human diversity and cultural change.

We use our unique, publicly accessible collections, research facilities, and staff to inform, educate, and inspire a diverse public.

OUR VISION

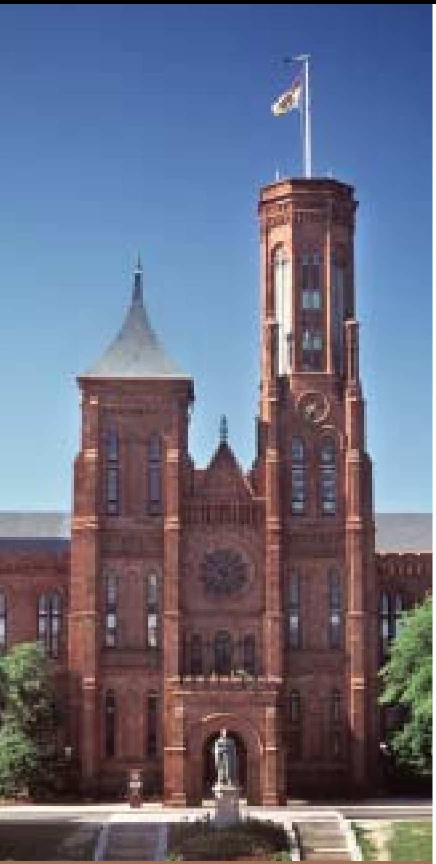
Smithsonian science works to increase scientific knowledge and improve society's scientific literacy by inspiring the public to understand how scientists learn about the world and how science affects people's lives.

Cover:

The four principal areas of scientific research at the Smithsonian Institution are depicted on the cover.

- **Dish antennas of the newly erected Submillimeter Array on Mauna Kea, Hawaii, represent the Smithsonian's efforts to understand the origin and nature of the universe.**
- **Lava flows on Hawaii represent Smithsonian investigations to understand the formation and evolution of the Earth and similar planets.**
- **A rainforest in Costa Rica represents Smithsonian work toward discovering and understanding biological diversity.**
- **Tribesmen of the Masai in Kenya represent Smithsonian studies of human diversity and cultural change.**

Contents



Erected in 1855, the original Smithsonian building is popularly known as the Castle.

An Obligation to Inquire, Inform, and Inspire

Thanks to a generous and prescient bequest from English scientist James Smithson, the Smithsonian Institution was founded in 1846 for "the increase and diffusion of knowledge." The Smithsonian always has been and always will be a scientific Institution with a proud record of achievement. Given the many critical scientific issues facing the public today, the Smithsonian, more than any other time in its history, has a pressing obligation to pursue its dual mission of seeking to answer key scientific questions and increasing the public's understanding of those questions. The issues are global, and the survival of the human species may be at stake. With its unique structure and stature, the Smithsonian is better positioned than any other institution to tackle these key issues.

Global warming, human cloning, the loss of biological diversity, stem cell research, the spread of diseases such as AIDS, genetic engineering, the impact of nanotechnology, the use of natural resources—these are all issues that we face today. They arise either because of a scientific discovery, or because science will help inform our solutions to these problems. In our democracy, scientists certainly don't make policy decisions—nor should they. But policy decisions must be made with a cognizance of our best scientific knowledge. Thomas Jefferson noted that our form of government demands an informed electorate: "If a nation expects to be ignorant and free, in a state of civilization, it expects what never was and never will be."

A recent survey by the National Science Foundation revealed that 90 percent of Americans are either moderately or very interested in learning about new scientific discoveries. Unfortunately, of the 90 percent, fewer than 60 percent knew that it takes 365 days for the Earth to revolve around the sun. As a nation, our level of scientific literacy remains abysmally low, especially in view of the decisions we will be required to make in the 21st century.

The Smithsonian is uniquely qualified to understand the many scientific dilemmas and explain the many facets of those dilemmas to the public. We have 93 percent name recognition and the attention, respect, and trust of the public. We operate the most popular museums in the world, receiving more than 24 million visitors a year and more than 78 million online visits. We reach tens of millions of parents, students, and teachers at school, at home, and online. We have the collections, capabilities, personnel, and land and water facilities to perform unique studies over time and disseminate the results to the public.

Given this confluence of resources and standing, it is indeed our obligation and our mission to inform and inspire all our visitors. The first Secretary of the Smithsonian, scientist Joseph Henry wrote in 1850, "The worth and importance of the Institution are not to be estimated by what it accumulates within the walls of its building, but by what it sends forth to the world." When the famous naturalist Spencer Fullerton Baird arrived from Dickinson College in 1850 to work as assistant secretary at the Smithsonian, he brought two railroad boxcars filled with his natural history specimens, many of which are still at the Smithsonian today—and still in use. As the second secretary of the Smithsonian, Baird opened up new worlds for the Institution, shaping it as both a collecting and a disseminating institution, broadening the dissemination of the Smithsonian's science and collections to the public at large.

Currently more than 500 scientists are on the Smithsonian's staff, augmented by roughly 485 fellowship appointments and hundreds of collaborators from around the world. They work at an astonishing array of worldwide field stations and laboratories, and on research vessels, collections, and databases that constitute one of the world's greatest resources for scientific research. Today, we are more determined than ever to communicate our scientific achievements to the public. The issues facing the world demand no less. By the end of the decade:

- We will have modernized our approach to science and allocated our human, financial, and physical resources to four specific areas of inquiry: the origin and nature of the universe, the formation and evolution of the Earth and similar planets, discovering and understanding biological diversity, and the study of human diversity and cultural change.
- We will have reached further back into the history of the universe and projected its future.
- We will be far more confident in answering the question as to whether we are alone in the universe.
- We will have published the first edition of the *Encyclopedia of Life*.
- We will better understand the origins of humankind.
- We will have delivered the results of our science to the public in inspiring, engaging, informative venues using 21st-century technology.
- Recognition of Smithsonian science by the general public, the Congress, and the philanthropic community will approach the recognition of our museums.
- Financial support for Smithsonian science will have grown dramatically.
- The American public will be better able to use scientific information in its exercise of democracy.

As the Smithsonian Institution moves into the 21st century, it is the largest museum complex in the world.

David L. Evans

David L. Evans
Under Secretary for Science
Smithsonian Institution

There Is But One Smithsonian Institution

Since its founding in 1846, the Smithsonian Institution has played a prominent role in a wide variety of scientific disciplines. Coupled with this effort, the Smithsonian's responsibility is to inform the American public about the latest scientific and technological discoveries.

The Smithsonian is uniquely different from a government agency or a university in that federal appropriations provide the core support for our science efforts, museum functions, and infrastructure, while trust resources, including external grants and private donations, provide the support for new discoveries and investigations, and the global exchange of new ideas. This combination of support has allowed the Smithsonian to produce outstanding scientific research that is flexible, independent, and capable of exploring potentially high-risk areas of inquiry. Today, the Smithsonian is the largest museum and research complex in the world, with vast collections far exceeding the breadth and depth of collections in other institutions.

Throughout its history, the Smithsonian has set a precedent for endowed foundations that have supported scientific research as a primary goal—rather than as secondary to other missions in government agencies and universities. One of the greatest strengths of Smithsonian science is its ability to pursue a long-term, synthetic, big-picture perspective on scientific issues, such as the

A small cub became famous as "Smokey Bear" while living at the National Zoological Park.

origin of the universe and the effects of globalization on the environment. This view is crucial for addressing many of the most profound scientific questions challenging our world today, such as how fast species are becoming extinct and whether we are alone in the universe. Smithsonian science is capable of concentrating resources on many of these profound questions in the form of scientists, curators, educators, museums, and research facilities. Many nations around the world have museums and research organizations, but as Joseph Henry, the first Secretary of the Smithsonian, declared in the Institution's 1876 annual report, "there is but one Smithsonian Institution."

The Smithsonian Astrophysical Observatory is the largest and broadest astrophysical research institute in the United States, and the Smithsonian Tropical Research Institute is the world's premier tropical research facility. The irreplaceable collections housed at the National Museum of Natural History and the National Zoological Park make the Smithsonian an internationally important research center in many areas. Utilizing a unique site on Chesapeake Bay, the nation's largest estuary, Smithsonian Environmental Research Center scientists have led groundbreaking studies in the ecological dynamics between land and sea. And, Smithsonian geologists at the National Air and Space Museum are international leaders in the exploration of the Moon and Mars.

REFOCUSING SCIENCE PRIORITIES

Because our world is constantly changing, the Smithsonian must position itself to change with it. As noted by the Smithsonian Science Commission's December 2002 report, the Smithsonian Institution has had no comprehensive science strategy. This Institution-wide strategic plan for Smithsonian science significantly links the Smithsonian's individual museums and research centers. It is designed to provide a new focus and build on the strengths of the following science themes identified by the Science Commission.

Origin and Nature of the Universe

The field of astrophysics is still young, with advances coming from discoveries as much as from experimentation. Scientists at the Smithsonian continue to push every branch of astrophysical observation forward using ground-based telescopes, such as the 6.5-meter Multi-Mirror Telescope Observatory in Arizona and the Submillimeter Array in Hawaii, and space-borne telescopes, such as the Chandra X-ray and the Spitzer Infrared observatories. The approach used by our scientists is broader than that of any other institution in the world, and allows us to understand connections among many threads of evidence in building a big picture of the universe that lets us look back toward our origins.

An ancient riverbed on the surface of Mars may hold the key to finding life on other planets.

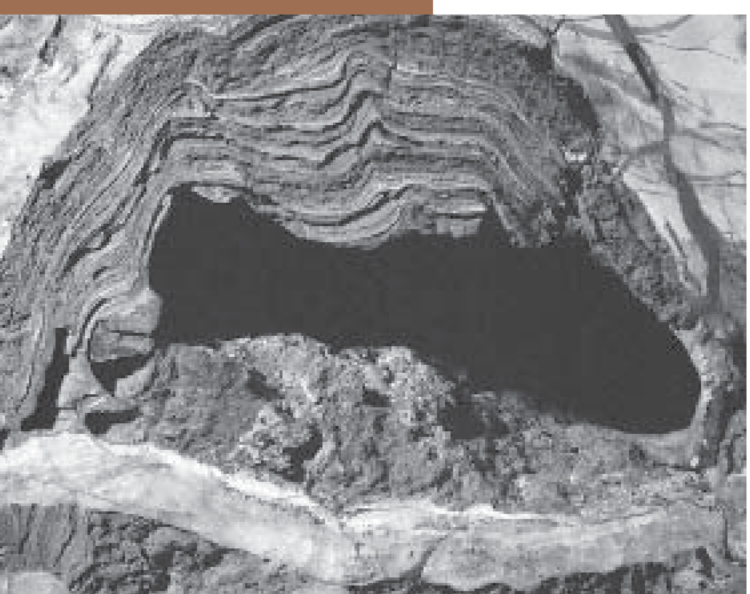
A skull belonging to Antrodemus*, a dinosaur that appears to be closely related to* Allosaurus*.*

Formation and Evolution of the Earth and Similar Planets

Since its beginning, the Smithsonian has been a leader in understanding the physical and chemical processes that form and shape the Earth's surface. Over the past 40 years of space exploration, it has become clear that knowledge of these processes can often be illuminated by studying other planets and vice versa. The Smithsonian is already an intellectual leader in the fields of volcanology and mineralogy and the study of meteorites. With the growing national and international interest in the exploration of Mars, the depth of Smithsonian expertise in remote-sensing and planetary surface processes has made the Institution a leader in this exciting new research area as well. Smithsonian scientists were the first to discover a planet circling another sun, establishing the new field of extrasolar planetary research and expanding our research efforts into other planetary systems.

Discovering and Understanding Biological Diversity

The Smithsonian has been amassing a collection of natural objects since it was founded. Today the Institution has the world's largest collections of plants, animals, and fossils. Smithsonian scientists use these objects to determine how life on Earth is distributed in space and time, how it came to be this way, and why life is so diverse. Field studies and laboratory research are conducted on both individual species, such as Asian elephants, and complete ecosystems, such as tropical rainforests and marine estuaries. This research uses the most modern methods available with a degree of urgency stimulated and informed by the current rate of loss of biodiversity.



At almost 3.5 billion years old, this fossil stromatolite is the oldest form of life on Earth.

Study of Human Diversity and Cultural Change

Smithsonian scientists conduct research to understand the processes that shape human biological, cultural, and linguistic diversity and change from the earliest origins of the human species through the present day. In the face of rapid globalization and the steady loss of languages and traditional cultures, this research is critical for providing the historic perspectives on human impacts on and responses to modern environmental and social change.

BUILDING THE SCIENCE STRATEGY

This Science Strategy was developed by the Smithsonian Under Secretary for Science and the Smithsonian Science Executive Committee. Composed of Unit Directors from the National Museum of Natural History, the National Air and Space Museum, the National Zoological Park, the Smithsonian Astrophysical Observatory, the Smithsonian Environmental Research Center, and the Smithsonian Tropical Research Institute, the Science Executive Committee serves a critical role in advising and guiding the practice of science across the Smithsonian. In addition to its responsibility for articulating the mission and vision for Smithsonian science and formulating the Science Strategy, the Committee kept in mind that the Smithsonian serves the American people, who will be the judge of this strategy's success.

To ensure the Science Strategy reflects wide integration of the research efforts across the Institution's different units, the Science Executive Committee selected four teams of distinguished scientists within their fields of study. Each of these teams reflected one of the four science themes identified by the Science Commission and specified in the Institution's mission. These theme teams were charged with articulating the big questions (priority research areas) within their respective fields; identifying the Institutional assets, capabilities, and collections that will allow the Smithsonian to address these questions; and identifying what additional resources are needed to guarantee our success in responding to new opportunities. Input from the entire scientific community at the Smithsonian as well as from our colleagues in academic, research, and museum environments was solicited and received. Based on that input and on the key philosophies presented on page 9, the Science Executive Committee built a plan that has five strategic goals:

- Advance the Smithsonian's contribution to scientific discovery and understanding through increased agility, innovation, collaboration, focus, and communication.
- Increase the visibility of and access to Smithsonian science, and promote recognition of and support for its value and contributions.
- Enable the Smithsonian science community to pursue creativity and excellence and to promote its common mission and goals.
- Provide and maintain the technology, tools, instrumentation, and facilities necessary to meet current needs and future requirements.
- Achieve adequate, stable, multi-year funding to support the Smithsonian's mission and goals.

Dillandia subumbellata, *a new member of the sunflower family discovered by Smithsonian scientists researching in the Andes.*

In addition to these goals, this Science Strategy presents strategies and actions for achieving them, along with highlights of successful outcomes realized as a result of five years of implementing these strategies and actions.

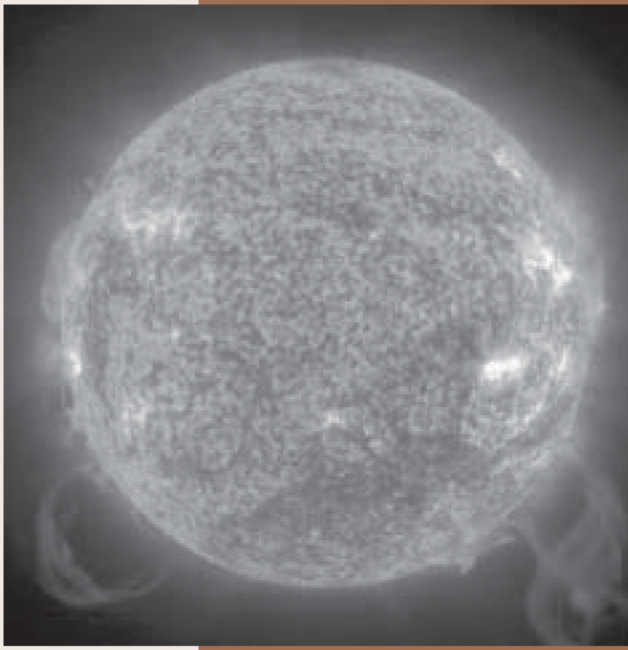
CREATING OPPORTUNITIES

The ability of Smithsonian science to undertake different kinds of research using different approaches in different settings is unique. The Smithsonian's distinctive combination of talent, collections, and resources makes the Institution an invaluable asset for leading America's exploration, discovering and understanding our natural world and our place in the universe, and inspiring the public.

If the past has taught us anything, it is that the future is unpredictable. Basic research leads to discoveries that create opportunities. Given the extent of the Smithsonian's scientific resources, we are often poised to exploit these opportunities. Using this Science Strategy as a roadmap, the Smithsonian will be more than a sum of its parts and can increase its contributions to pressing national and international needs, while dramatically advancing science worldwide.

Kandula was born on November 25, 2001, as part of a captive breeding program for endangered Asian elephants at the National Zoological Park.

KEY PHILOSOPHIES GUIDING THE SMITHSONIAN SCIENCE STRATEGY



A solar flare seen from NASA's Solar and Heliospheric Observatory (SOHO). Smithsonian scientists have been studying the sun for over a century.

THE SMITHSONIAN IS COMMITTED TO BASIC RESEARCH.

Basic research is responsible for all fundamental advances in our knowledge of nature. No one can predict where the next fundamental advance in science will take place. For this reason, we believe that scientific research should be supported across a broad range of disciplines. Smithsonian scientists pursue basic research that is curiosity-driven and has high scientific interest and a record of important payoff. For example, forensic techniques developed by Smithsonian anthropologists are now routinely used by the Federal Bureau of Investigation in solving crimes.

THE SMITHSONIAN PURSUES SCIENTIFIC RESEARCH AND DIFFUSES SCIENTIFIC KNOWLEDGE.

The bequest of James Smithson was to establish an Institution for "the increase and diffusion of knowledge." We are committed to upholding this mandate every day by both conducting scientific research and conveying the results of that research to the public and other scientists in a way that is intelligent, current, and inspiring.

THE SMITHSONIAN IS COMMITTED TO STRENGTHENING EXPERTISE IN CORE AREAS.

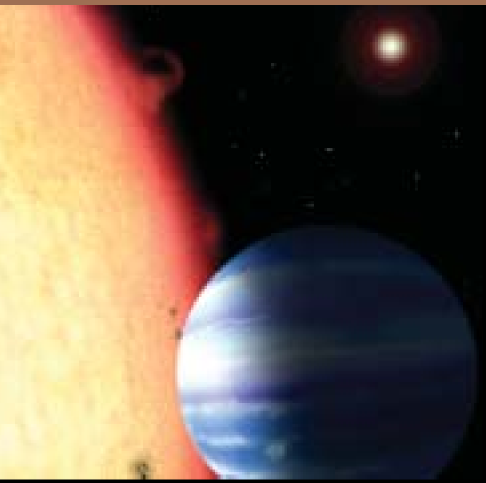
The Smithsonian has internationally recognized expertise in many important scientific disciplines. We are committed to building on this expertise in order to strengthen our role as a scientific leader, developing these scientific disciplines, and creating a more informed public.

THE SMITHSONIAN PLAYS AN IMPORTANT INTERNATIONAL ROLE IN SCIENCE-BASED CONSERVATION.

Our natural and cultural systems are being pushed to their limits. Invasive species, habitat loss, and global climate change are some of the many environmental and economic concerns affecting our nation and the world. Smithsonian scientists are committed to work in cooperation with international partners to increase global understanding of the pressures placed on different environments and ecosystems.

THE SMITHSONIAN FOSTERS THE INTEGRATION OF RESEARCH, COLLECTIONS, EDUCATION AND OUTREACH, AND MANAGEMENT ACROSS ITS UNITS.

Multidisciplinary studies are needed to address the more complicated—and often the most profound—scientific questions. The Smithsonian is committed to fostering integration and collaboration among research scientists from different units in order to effectively share our resources, such as instrumentation and laboratory equipment; do a better job of informing the public by providing a wider array of educational programs and exhibits; and enhance our ability to raise external funds by writing more competitive research proposals.



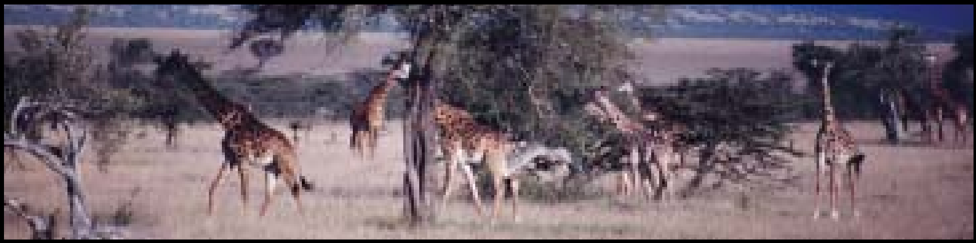
Over 5,000 light years away, OGLE 2003-BLG-238, the most distant planet discovered to date, was found using pioneering astronomical techniques developed by Smithsonian astronomers.

Science—Research, Collections, and Outreach/Education

Advance the Smithsonian's contribution to scientific discovery and understanding through increased agility, innovation, collaboration, focus, and communication.

The surface of Mars as seen by the Spirit rover. Smithsonian scientists participated in landing site selection as well as in the Mars Exploration Rover missions.

The largest number of Smithsonian scientists focus research on studying biological diversity.



A former resident of the Jamestown settlement prior to exhumation. Smithsonian scientists pioneered the new field of forensic anthropology.

The Smithsonian's research activities are inseparable from the Institution's collection and educational activities. In addition to improving our daily lives and providing answers to questions fundamental to human nature, the science expertise at the Smithsonian is critical for making informed, intelligent decisions regarding objects and materials to add to the National Collection. Our scientific expertise also provides the basis for increasing the nation's scientific literacy through inspiring exhibits, exciting public programs, accurate and thorough Web sites, and informative educational activities. We are committed to advancing our contribution to scientific discovery by focusing resources on key research programs that build on our strengths and take advantage of key opportunities that will be available during the next five years; strengthening our collections so that they reflect the scientific efforts and challenges of our time; and improving our efforts to inform the American public by updating and adding new exhibits, enhancing our Web sites, and increasing our educational and outreach products.

A portion of the Eagle nebula imaged by the Hubble Space Telescope.

ORIGIN AND NATURE OF THE UNIVERSE

Understand the origin and nature of the universe by studying dark matter and dark energy, star and planet formation, and black holes.

The Smithsonian has built a remarkable record of scientific achievement over a very broad range of astrophysical topics. Among our greatest strengths is our expertise across the electromagnetic spectrum for probing the universe. For example, our scientists designed the highly successful Chandra space telescope to study x-ray emissions from exploding stars and black holes, and our instruments on board the Spitzer space telescope are measuring infrared energy radiated from stars and planets as they are forming. The Smithsonian is also a world leader in ground-based astronomical observations, with five major field sites around the world.

The Smithsonian's scientific leadership in the exploration of the universe is reflected in the volume and share of competitive support we receive—nearly three times our federal appropriation. To maintain our leadership role, we must invest in the next generation of ground-based observatories, such as the Giant Magellan 25-meter telescope, and advanced space telescopes, such as the Constellation X

The proposed Giant Magellan Telescope shown next to the existing Smithsonian MMT telescope.

Observatory. The Smithsonian is also well positioned to address national research initiatives, such as recent recommendations made by the Interagency Working Group on the Physics of the universe, which include focused efforts on understanding the nature of dark energy.

The M81 galaxy, 12 light-years away, is one of our closest galactic neighbors and very similar to our own Milky Way. This image was one of the first to be taken by the Smithsonian's Infrared Array Camera on board the Spitzer Space Telescope. The distribution of hot dust and hydrogen is shown in red.

Priority Research Areas

STRATEGIES

Dark Matter and Dark Energy—Advance knowledge and understanding of how structure formed in the universe over time.

Star and Planet Formation—Enhance knowledge and understanding of the formation and evolution of stars and planets and characteristics of their surroundings.

Black Holes—Increase understanding of the formation, evolution, and interaction of compact objects, such as black holes.

5-YEAR RESULTS

Relative contributions of gravity and star energy as a function of distance and galaxy type determined.

Distant supernovae observed, and acceleration history determined.

Velocity and temperature structure of protostellar disks measured, and composition of the dust identified.

Giant Magellan Telescope initiated: conceptual design completed, and development of instruments begun.

Center for X-ray Technology established and staffed.

Collections

STRATEGIES

Organize a digital data archive of raw data collected at Smithsonian Astrophysical Observatory (SAO) telescope facilities.

Make the astronomical catalogues more accessible.

Increase the size of the astronomical digital library at SAO, particularly the historical literature.

5-YEAR RESULTS

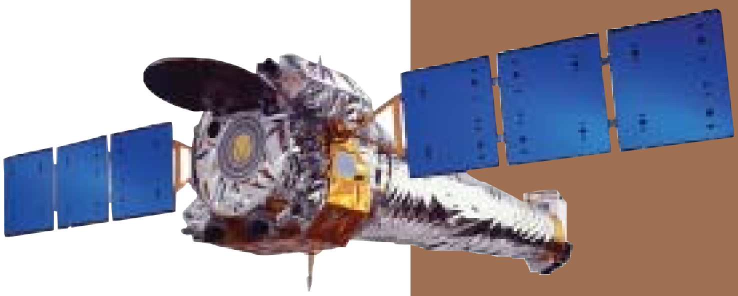
More than 25 percent of current digital archive and all new digital information input in the database.

Multi-wavelength data system developed utilizing SAO data sets as a test bed for the Virtual Observatory.

Digitization of historical astronomical literature completed.

Outreach/Education

STRATEGIES



Increase public access to SAO research.

Expand the Chandra X-ray Center Education Public Outreach Web site.

Increase SAO's presence on the National Capital Mall.

Expand research in science education.

Continue to be the Education Forum for the National Aeronautics and Space Administration's (NASA's) Structure and Evolution of the universe theme.

5-YEAR RESULTS

Interactive Web museum for astronomical images from SAO facilities created.

Public Access Center at SAO completed.

"Astronomy Exhibits of the Month" contributed to the National Capital Mall.

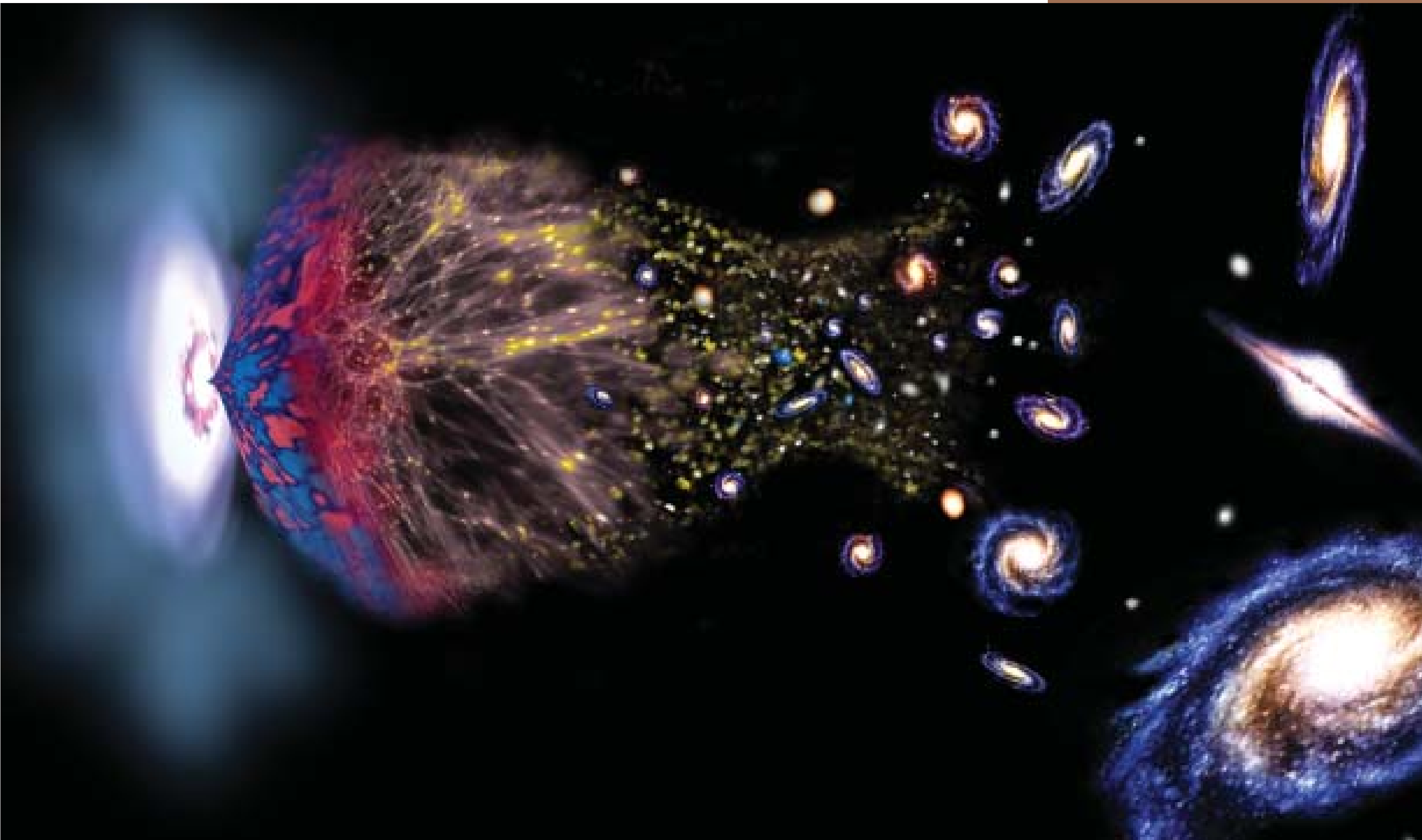
Oak Ridge Observatory transformed to an education and historic preservation facility.

Public Astronomy Lecture Series on the National Capital Mall expanded.

Educational materials generated based on astronomical data.

The Chandra X-ray telescope was designed to measure X-rays from high-energy sources, such as exploding stars or black holes. Built in cooperation with NASA, it represents the largest, most successful externally funded science project in Smithsonian history.

An artist's depiction of the formation and the evolution of the universe, beginning with the Big Bang and followed by the formation of galaxies, and the currently observed expansion of the universe.



Just a few of the 375,000 jewels in the National Gem and Mineral Collection. They were all cut from differently colored varieties of the mineral fluorite.

FORMATION AND EVOLUTION OF THE EARTH AND SIMILAR PLANETS

Understand the formation and evolution of the Earth and similar planets.

Since the Smithsonian's inception, our scientists have collected and studied rocks and minerals. They witnessed the dawn of modern geology more than 100 years ago, and today are applying basic geologic principles to study the surfaces of other planets.

Using a variety of astronomical instruments they designed and constructed, Smithsonian scientists found the first planet circling around another sun. Our expertise in volcanism led to the first international effort to monitor volcanic eruptions. Analyses of imagery data, remote-sensing measurements, and terrestrial field studies provided the first evidence that rainfall occurred on early Mars.

Our vast collection of meteorites, spacecraft images, and remote data allow our scientists to unravel the geologic history of all the terrestrial planets, including Earth. And astronomical observations and advanced theoretical calculations allow us to watch as new solar systems form from accretion disks hundreds of light-years away.

Smithsonian scientists will provide intellectual support for the President's Moon–Mars initiative. Our expertise in determining the surface characteristics of other planets has already been instrumental in locating safe landing sites for the last three successful Mars missions. We have the capacity to lead in defining the emerging field of astrobiology, providing the scientific basis for looking for extraterrestrial life. Our studies of the interaction between mineral surfaces and microbes position us to take advantage of major new programs funded by NASA and the National Science Foundation (NSF). To date, we have found most of the 100-plus planets in solar systems outside our own, and we will enhance this capability to measure extra-solar planetary atmospheres and find Earth-like planets around other suns.

Priority Research Areas

STRATEGIES

Planetary Formation and Evolution—Advance knowledge and understanding of how planetary systems form and evolve.

Evolution of Earth-like Planets—Focus research on how Earth-like planets evolve.

Planetary Habitability—Increase our knowledge and understanding of what makes planets suitable for life.

This peridotite xenolith (a type of ultramafic rock) is a fragment of the Earth's mantle brought to the surface by a volcanic eruption.

5-YEAR RESULTS

Lead taken on NASA-funded Planetary Robotics mission.

Instrumentation developed for exploration of Mars.

Kepler planet finding mission participation, and plan developed for follow-up.

Major research program in Astrobiology established.

Concept for a Smithsonian Planetary Science and Education Center explored.

New microchemical analytical capability achieved.

Initial analyses completed of global databases to explore the feasibility of forecasting volcanic eruptions.

Students learn to operate a rover on a simulated martian landscape.

Collections

STRATEGIES

Expand Gem and Mineral, Rock and Ore, and Meteorite collections to enhance their value to the world scientific community.

Expand the Volcano Data Center.

Achieve analytical microchemical capability.

Digitize the Regional Planetary Image Facility.

5-YEAR RESULTS

75 percent of mineral science collections included in the electronic catalogue.

Holdings increased to represent 70–75 percent of all known minerals.

3,000 new Antarctic meteorites in the National Meteoritic Collection classified and accessioned.

Ultramafic (iron- and magnesium-rich) rocks in the National Rock and Ore Collection expanded by 5 percent.

3,000 digital images from Apollo lunar missions added to the Regional Planetary Image Facility Collection.

Smithsonian scientists study gulley formation on Hawaii as a possible analog to valley networks on Mars.

Outreach/Education

STRATEGIES

Become the nation's primary showcase for planetary discoveries.

Increase Smithsonian science in exhibitions.

Expand Web outreach.

5-YEAR RESULTS

National Air and Space Museum's Exploring the Planets Gallery replaced.

New gallery (Living and Working in Space) planned for the National Air and Space Museum.

Temporary exhibit on Astrobiology displayed at the National Museum of Natural History.

Geology, Gems, and Minerals Web site expanded.

Global Volcanism Web site expanded into a portal for global-scale volcanic data sets.

Smithsonian geologists specialize in understanding the history of early Earth and Mars. In this artist's depiction, impact craters light up the night skies on both the Earth and the Moon over 4 billion years ago.

A geologist shares results of the latest Mars mission with visitors.

DISCOVERING AND UNDERSTANDING BIOLOGICAL DIVERSITY

Discover and understand biological diversity, and advance knowledge of its evolution and sustainability.

The Smithsonian has internationally recognized expertise in systematics, paleobiology, ecology, and biology conservation, and extensive resources in collections and living laboratories. With these strengths, we are uniquely situated to explore the loss of biodiversity and to respond to governmental initiatives on climate change, tropical forest conservation, invasive species, and endangered species. We are making significant contributions to national and international science through partnerships in bioinformatics initiatives; in coordinated research networks, such as the National Ecological Observatory Network and the Tree of Life; and in emerging biodiversity fields. Although centered in North America, our research reaches around the globe through international collaborations and extensive field expeditions. It also includes significant programs in both marine and terrestrial habitats.

Since the 1850s, the Smithsonian has been a leader in the study of biological diversity. Our researchers have discovered and named hundreds of thousands of species from around the world. Our collections include more than 250,000 "type specimens"—the specimens used to formally represent individual species. Fifty percent of all type specimens in American museums and universities are resident in the Smithsonian collections. From these resources our researchers are able to estimate that the 1.7 million species known today represent only 10 percent of all species, and can track biodiversity loss on a species-by-species basis. Unsurpassed fossil collections, including the Burgess Shale, have allowed Smithsonian researchers to compare this current biodiversity loss with mass extinctions of the geological past and examine the role of global climate change, then and now. Our living laboratories in our research centers and field stations, such as Barro Colorado Island in Panama and Java Farm on the Chesapeake, provide the longest ongoing experiments to examine the link between global climate change and biodiversity loss in terrestrial communities and ecosystems. The Smithsonian is a leader in the exploration of marine biodiversity from coral reefs to deep-sea vents. For species on the edge of extinction, our researchers develop effective conservation plans and have pioneered assisted reproduction for endangered species from Florida panthers to Chinese pandas.

The beautiful clouded leopard is one of many endangered species being kept as part of a captive breeding program at the National Zoological Park.

Smithsonian research is critical for monitoring populations of the blue crab, which is the most valuable crustacean fishery in North America.

Priority Research Areas

STRATEGIES

Encyclopedia of Life—Discover and describe the diversity of species.

Forces of Change—Understand the evolutionary and ecological forces (including human impacts) that affect diversity.

Biology of Extinction—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.

5-YEAR RESULTS

Smithsonian Web portal for the *Encyclopedia of Life* established.

Smithsonian Center for Conservation Biology established, linking facilities and capacity.

Collaborative programs established to study community diversity, focusing on coastal marine and tropical forests.

History of the invasibility of coastal marine ecosystems across latitudinal gradients documented and modeled.

Program established to study microbial processes in tropical and temperate soils.

Smithsonian's contribution to the Tree of Life increased and coordinated.

This new species of ginger, Smithatris myanmarensis, *was recently discovered by Smithsonian scientists during field studies in Myanmar.*

Collections

STRATEGIES

Enhance collections management and accessibility; the storage, conservation, and preservation of natural collections; and the housing and welfare of living collections.

Accelerate electronic cataloging.

Prioritize the growth of collections.

Develop and manage biomaterials (tissue, blood products, germ plasm, and DNA) as collections.

5-YEAR RESULTS

Specimen-associated biomaterials electronically integrated with general collections.

Digitization of all "type specimens" completed.

Care and storage conditions of collections surveyed and prioritized.

Representative collections of non-native and invasive species developed.

Collecting from threatened habitats and underrepresented taxa prioritized.

DNA bar-coding used for selected taxa.

Outreach/Education

STRATEGIES

Strengthen the public's appreciation of biological diversity.

Enhance the collections' accessibility to support outreach and education efforts.

Expand and integrate Smithsonian science in cross-unit exhibits and programs.

Promote professional capacity-building through training.

Expand distance learning and electronic field trips.

Expand the presence of the Smithsonian Environmental Research Center and the Smithsonian Tropical Research Institute on the National Capitol Mall and at the National Zoological Park.

5-YEAR RESULTS

Outreach to underrepresented audiences increased, including inner-city, rural, and Latino/Hispanic communities.

Distance learning and field trips used to highlight research on estuaries, forests, and invasions.

Permanent exhibitions completed for Anatomy of a Tropical Forest, Asia Trail, Dinosaur Hall, Mammal Telemetry, Mangroves, and Oceans Hall.

The golden lion tamarin, one of the world's most endangered species, is making a dramatic comeback in Brazil thanks to efforts led by Smithsonian scientists.

The canopy crane is one of many innovations devised by Smithsonian biologists for exploring the diversity of life in tropical forests.

A collection of Clovis Points, some of the oldest tools discovered in North America.

STUDY OF HUMAN DIVERSITY AND CULTURAL CHANGE

Understand the processes that shape human, biological, cultural, and linguistic diversity and change.

The Smithsonian has played an important role in the development of North American anthropology, ethnology, and archaeology over the past 150 years, and in the fields of forensic anthropology and human origins during the past 50 years. Our large and definitive collection, important monograph series, and extensive archives of field notes, photographs, recordings, and films are critical resources for the entire field of anthropology. With these traditional strengths in place, the Smithsonian can add modern research tools and techniques to revitalize core research areas and to respond to new opportunities ranging from examining the effects of current—and even past—globalization in transforming cultures, to examining biological and cultural adaptations and recent human impacts on the environment.

The 1848 first volume of the Smithsonian Contribution to Knowledge series, *Ancient Monuments of the Mississippi*, was a milestone for the field of North American anthropology. Since then, the Smithsonian has been the leader in studies of Native American culture, history, language, and ethnology. The Smithsonian has published more than 200 volumes of scientific reports and 17 volumes of the *Handbook of the North American Indian*, summarizing knowledge about Native Americans. These resources, and the extensive National Anthropological Archives, allowed the rescue of a dying Native American language, Meskwaki. Smithsonian research has revolutionized the understanding of human interaction with the environment, showing how the first humans were affected by dramatic environmental fluctuations, how cultural adaptations allow humans to live in the arctic north, and how humans affect our current environment. Smithsonian researchers have pushed back, by thousands of years, estimates of when plants and animals were first domesticated. Examinations of ancient and modern human skeletons have

The Kwakiutl, native people from the Pacific Northwest, show off a traditional boat.

allowed Smithsonian researchers to track epidemics in past cultures and to assist federal and state authorities in forensic cases. The Smithsonian's repatriation of Native American skeletal remains and burial objects to their culturally affiliated tribes exceeds that of any other museum.

Curators carefully document the fossil remains of an early human being.

Priority Research Areas

STRATEGIES

Human–Environmental Interactions Through Time—Explore human origins and adaptations, human dispersals into new environments, and the emergence of agriculture.

Human Impacts on the Environment—Advance understanding of how humans have shaped the planet in recent times.

Cultural Responses to Globalization—Increase our knowledge of the maintenance, transformation, and loss of cultural and linguistic diversity in the face of globalization.

5-YEAR RESULTS

Studies of human diversity, culture, biodiversity, and change integrated.

Human ecology research program established, emphasizing how human cultures create and cope with environmental changes.

Environmental conditions for the adaptation of early humans in Africa and Asia compared; origins of agriculture in the Americas, Africa, and Near East documented.

Human environmental relationships, contacts, and transformations in arctic and subarctic regions studied.

Migration and settlement of the Americas investigated.

Capability for DNA analysis added to forensic anthropology.

Handbook of North American Indians completed.

Linguistics diversity documented, and critically endangered languages identified.

Eskimo wood mask.

Archaeologists unearth an ancient site in Mexico.

Collections

STRATEGIES

Maintain an effective anthropological repatriation program.

Safeguard anthropology collections through improved conservation and storage.

Improve collection access for research and public use.

Expand collections, especially as relevant to targeted research areas.

5-YEAR RESULTS

All claims for human remains, funerary, and sacred objects are promptly addressed.

Physical anthropology collections and film archives relocated to safe and accessible locations.

Survey of the status of the care and conservation of collections completed, building collaboration between the National Museum of Natural History and the Smithsonian Center for Materials Research and Education.

Access to collections enhanced through improved cataloging, documentation, and digitization, with special emphasis on archaeological materials.

A cylindrical seal and impression dating back to about 2,000 BC was used as a way of marking ownership or as a means of identification.

Outreach/Education

STRATEGIES

Strengthen the public's appreciation of human diversity and cultural change.

Expand distance learning through electronic outreach.

Increase anthropological content in exhibits and education programs.

Promote professional capacity building through research and collection management training.

Enhance the links among research, collections, and outreach/education.

5-YEAR RESULTS

Design of Human Origins and Adaptation Hall completed and construction begun.

Temporary exhibits created for forensic anthropology and agricultural origins.

Yearly workshop/seminar program in archaeobiology established.

Multidisciplinary "futures" conference and workshops on interactions of human culture and environmental change conducted.

Analyses of this squash seed, found in a cave in Mexico, suggest that agriculture started in the Americas over 10,000 years ago—4,000 years earlier than previous estimates.

A curator inspects the condition of one of the many cultural artifacts held in the Smithsonian's collections.

The Smithsonian holds copies of every image ever taken of another planet, including this one taken from the Apollo 17 mission on the Moon.

Recognition, Visibility, and Accessibility

Increase the visibility of and access to Smithsonian science, and promote recognition of and support for its value and contributions.

Smithsonian scientists study evidence for climate change in Egypt's remote Gulf al-Kabir.

Giant pandas on loan from China are part of an international captive breeding program at the National Zoological Park.

Panama's Barro Colorado Island has been the Smithsonian's primary site for studying lowland tropical forests since 1946.

Although the Smithsonian is internationally renowned for its museums and extensive collections, the scientific research we conduct is not as well recognized. We will make our excellent science more visible through a variety of strategies and communications. We will also make our science more accessible to the public, while promoting leadership of our scientists in the broader research community.

STRATEGY

Coordinate with the Smithsonian's Public Affairs, Government Relations, and Development Offices in the execution of a communications strategy for Smithsonian science.

ACTION

Develop annual Smithsonian science communication plan.

STRATEGY

Provide education and outreach regarding the value of Smithsonian science and its contributions to science and society, targeting policymakers, the media, the public, private donors and foundations, and our colleagues at the Smithsonian.

ACTIONS

Stimulate public interest in science and enhance public accessibility to Smithsonian science.

Provide access to digital archives.

Cross-link Web pages and historical documents.

Ensure the electronic availability of published papers.

Establish a Smithsonian library of curricula.

Prepare media for press releases.

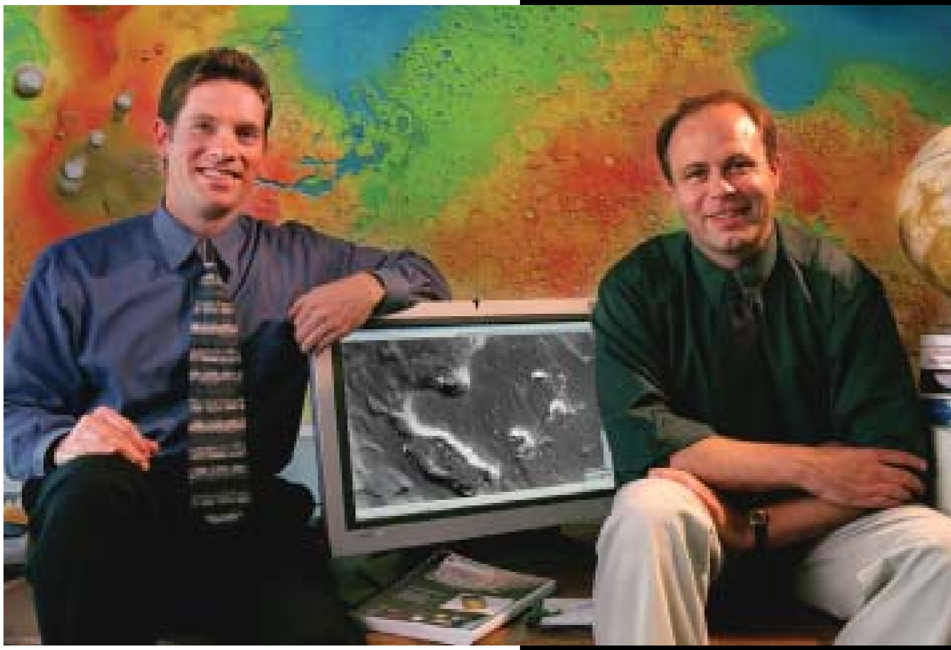
Increase video access to science activities.

Coordinate public lectures and outreach activities.

Develop exhibits and educational programming.

An ancient artifact meets modern analytical technology as an Egyptian sarcophagus undergoes a computed axial tomography (CAT) scan.

Smithsonian geologists are team members on all the current Mars missions.



The giant pandas Mei Xiang and Tian Tian are stars at the National Zoological Park.

STRATEGY

Increase the impact of Smithsonian leadership within the larger scientific community.

ACTIONS

Promote international and national scientific debates and syntheses by hosting annual science symposia and coordinating agendas of emerging scientific issues.

Encourage leadership roles for and increase professional recognition of Smithsonian scientists and staff in professional societies and organizations.

Maintain and enhance national and international partnerships to extend the depth and reach of Smithsonian science with academia, government agencies, foundations, science institutions, the private sector, museums, botanical gardens, and zoos.

Expand the Smithsonian's science presence by establishing an annual performance metric for the number of peer-reviewed publications per scientist and increasing the number of science articles and news reports in the popular press.

Strengthen the Smithsonian's contribution to training the next generation of scientists by expanding fellowships and internships, professional training programs, and academic partnerships.

A beautiful red Montana agate shown in cross section is one of over 300,000 specimens held in the National Rock and Ore Collection.

SMITHSONIAN MEMBERS OF THE NATIONAL ACADEMY OF SCIENCES

The National Academy of Sciences elects members in recognition of their distinguished and continuing achievements in original scientific research. Election is one of the highest honors that can be accorded a scientist or engineer. The Smithsonian staff currently includes 13 distinguished scientists who have received this prestigious honor.

Charles Alcock (Smithsonian Astrophysical Observatory) 2001
Alexander Dalgarno (Smithsonian Astrophysical Observatory) 2001
George B. Field (Smithsonian Astrophysical Observatory) 1989
Margaret J. Geller (Smithsonian Astrophysical Observatory) 1992
John P. Huchra (Smithsonian Astrophysical Observatory) 1993
Olga Linares (Smithsonian Tropical Research Institute) 1992
Irwin I. Shapiro (Smithsonian Astrophysical Observatory) 1974
Bruce Smith (National Museum of Natural History) 2003
Patrick Thaddeus (Smithsonian Astrophysical Observatory) 1987
Mary Jane West-Eberhard (Smithsonian Tropical Research Institute) 1988
Fred Lawrence Whipple (Smithsonian Astrophysical Observatory) 1959 (deceased 2004)
Robert Woodrow Wilson (Smithsonian Astrophysical Observatory) 1979
John A. Wood (Smithsonian Astrophysical Observatory) 1991

This species of periodical cicada emerges after spending 17 years burrowed underground as a larva, and then quickly mates and dies. Smithsonian scientists have been following changes in the population of this brood for several cycles.

Scientists check the effects of increased atmospheric carbon dioxide on plant communities at the world's longest running field experiment in Edgewater, Maryland.

Smithsonian Science Community

An anthropologist carefully uncovers ancient artifacts at a field site in Central America.

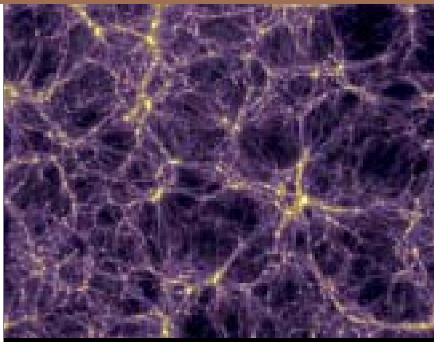
Enable the Smithsonian science community to pursue creativity and excellence and to promote its common mission and goals.

The Eagle Nebula is a region where new stars are being born.

A biologist makes underwater measurements in a mangrove swamp.

A section of banded iron contains evidence for atmospheric conditions on the early Earth.

As the Smithsonian science enterprise undertakes the research challenges in the 21st century, a highly competent, motivated workforce must be in place. We must recognize our staff's achievements and put in place recruitment strategies to attract the best and brightest of the next generation of scientists. A supportive work environment with open communication and transparent decision making will foster collaboration and build a sense of community and pride. The Smithsonian science enterprise will be known for its excellence and integrity in research.



Precise measurements of hundreds of distant galaxies allowed Smithsonian astronomers to determine the large-scale structure of the universe as depicted in this illustration.

STRATEGY

Build an institutional culture that expresses a common vision, values teamwork, is focused on clear priorities, and shares the Smithsonian science core values across the science enterprise.

ACTIONS

Develop and implement policies, practices, and rewards for managing collaboration across science museums and research centers.

Develop a mechanism for planning across science themes.

STRATEGY

Create an environment for each employee to engage in marketing Smithsonian science and its contributions to society.

ACTION

Revive conferences, workshops, and symposia.

STRATEGY

Create a culture that values and rewards interdisciplinary research collaboration, with mechanisms to facilitate cross-cutting activities and projects.

ACTIONS

Increase collaborative multi-year fellowships.

Increase joint and short-term appointments, visits, and assignments across science museums and research centers.

Increase support for interdisciplinary and collaborative projects.

Endangered Sumatra tiger cubs show off their stripes at the National Zoological Park.

Students participate in one of the many educational field activities led by Smithsonian scientists.

STRATEGY
Adjust management practices to promote a collaborative culture.

ACTIONS
Use rewards and recognition tools to acknowledge desirable culture change.

Provide leadership and management development and training.

Improve internal communications.

Simplify business practices and processes.

Increase the visibility of and access to the Science Executive Committee (SEC).

Recognize SEC as the role model for synergy, collaboration, teamwork, and trust.

Institutionalize transparent planning and decision-making processes.

STRATEGY
Instill accountability in our work approaches and practices.

ACTIONS
Institute annual program reviews.

Embed strategic plan metrics in annual performance plans.

Link the Professional Accomplishments Evaluation Committee reviews and annual performance appraisals.

STRATEGY
Align and fortify the Smithsonian science workforce to meet existing and emerging challenges, achieve our collective goals, and promote employee satisfaction.

Curators showcase a tiny portion of the animal specimens held in the Smithsonian's collections.

ACTIONS
Develop and implement a Smithsonian science strategic, multi-year staffing plan to ensure recruitment and retention of a diverse, high-quality workforce that includes scientists, scientific support staff, administrative support, fellows, interns, contractors, and volunteers.

Implement a staff training and development program to promote a competent and professional workforce in such areas as collaborative problem solving and performance management.

SMITHSONIAN SCIENCE CORE VALUES

DEDICATION AND SERVICE
We are a public science institution dedicated to the increase and diffusion of knowledge in the service of our nation and society.

EXCELLENCE AND INTEGRITY
We are known for excellence and integrity in our research, collections, and educational and outreach activities.

AGILITY AND INNOVATION
We are agile and innovative, allowing ourselves to respond to challenges and opportunities.

DIVERSITY AND RESPECT
Our staff is well trained and diverse, shows the highest levels of professionalism, and is treated with respect.

CLARITY AND TRANSPARENCY
Our decisions and the rationales behind them are communicated with clarity and transparency to our staff and our stakeholders.

This ordinary looking rock is actually a meteorite from Mars.

Curators check the condition of one of the dinosaur skeletons on display.

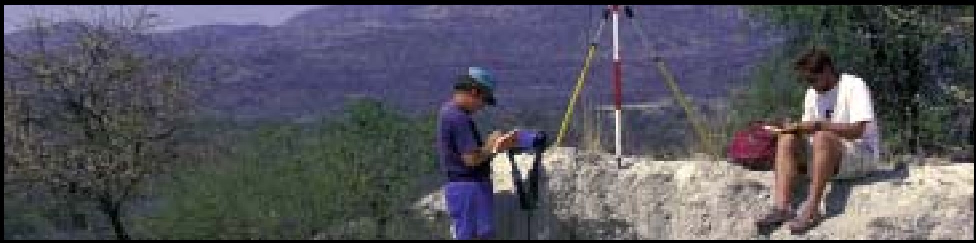
Entrance to the National Museum of Natural History.

Smithsonian Science Infrastructure

Provide and maintain the technology, tools, instrumentation, and facilities necessary to meet current needs and future requirements.

A curator monitors the environmental conditions in the National Meteorite Collection.

Aerial view of the Galeta Marine Laboratory, located on the Caribbean coast of Panama.



Field researchers record measurements from their Global Positioning System.

Cutting-edge research requires state-of-the-art facilities and equipment with the necessary support structure that ensures maintenance and replacement cycles of scientific equipment and technical tools. We must have in place plans and resources to provide the physical work environment Smithsonian scientists need to successfully undertake the research identified in this Science Strategy and compete in major missions and research projects.

An astronomer makes final adjustments to new instrumentation on the Smithsonian's 6.5-meter (21-foot) MMT telescope.

STRATEGY

Develop and implement a strategic multi-year plan to fund new construction, upgrades, and maintenance, including a master plan for each Smithsonian unit.

ACTIONS

National Air and Space Museum

Complete Space Hall and Aeronautics Hall exhibits.

Build Restoration Hangar and Small Objects storage building.

National Museum of Natural History

Move museum Alcohol Collections.

Create a Human Origins Hall.

Complete Oceans Hall.

Renovate Dinosaur Hall.

Renovate collection storage and Laboratories for Analytical Biology.

National Zoological Park

Build Asia Trail.

Develop Exhibit and Facilities master plan.

Smithsonian Astrophysical Observatory

Start new construction on SAO campus.

Relocate and consolidate off-site facilities.

Complete VERITAS gamma ray observation platform.

Smithsonian Environmental Research Center

Complete Green Village for residential housing.

Complete Mathias Laboratory to replace trailers.

Upgrade new septic system at the Smithsonian Environmental Research Center.

Main entrance to the National Zoological Park.

Smithsonian Tropical Research Institute

Start construction on new research facilities at Gamboa.

Complete scientists' housing at Bocas del Toro.

Renovate the Tupper Administration building.

STRATEGY

Provide and maintain the information technology tools necessary to enhance the goals and objectives of Smithsonian science.

The Universe Gallery opened in the National Air and Space Museum in 2003. The back-up mirror to the Hubble Space Telescope is toward the left.

ACTIONS

Improve the bandwidth of our Internet and Intranet presence.

Provide digital repository and digital asset management tools.

Integrate Geographic Information System software into central databases.

Periodically upgrade and/or replace all research-critical science unit computer hardware.

Develop informatics software.

Maintain and upgrade licensed software.

The National Air and Space Museum begins another day as the most popular museum in the world.

STRATEGY

Provide and maintain critical laboratories and scientific equipment to meet scientific goals and objectives.

ACTIONS

Establish and implement a laboratory equipment replacement and maintenance fund.

Expand the Research Equipment Fund.

Expand the Major Scientific Instrumentation Fund for all units.

STRATEGY

Maintain commitment to supporting infrastructure components.

ACTIONS

Develop and implement a field and specialized vehicle and vessel replacement program.

Provide support for the Smithsonian Institution Library to maintain and expand periodical subscription holdings and adequate Internet access.

Ensure engineering and technical support of program goals.

The nautilus creates ever-larger chambers in an outward spiral as it grows.

Newly renovated Smithsonian research facility at Carrie Bow Cay in Belize.

The famous—and infamous—Hope Diamond.

Smithsonian Science Funding

Achieve adequate, stable, multi-year funding to support the Smithsonian's mission and goals.

An artist's conception of the planned 12-meter-diameter reflectors of the Very Energetic Radiation Imaging Telescope Array System (VERITAS) that will detect and map sources of gamma-ray bursts within the universe.

The Bering Family Rotunda at the National Museum of Natural History.

Daybreak in Olorgesaile, Kenya, a field site visited by Smithsonian anthropologists looking for fossils of early man.

Federal appropriations received by the Smithsonian primarily support museum functions, scientific infrastructure, and the salaries of many scientists and key personnel. However, the Smithsonian is also dependent on other sources of funding, such as external grants, private donations, and revenue provided through the Central Trust Fund. We will achieve adequate and stable multi-year funding to support our mission and strategic goals.

Mercury *astronaut Gordon Cooper talks about spaceflight to young visitors.*

STRATEGY

Reverse the erosion of federal appropriations for salaries and expenses.

ACTIONS

Increase federal support for salaries and expenses by 5 percent per year over mandatory pay increases for the next five years.

Leverage federal funds to increase our science program's competitiveness.

Increase federal funding for fellowships.

STRATEGY

Design and implement an institutional strategic plan for raising funds for Smithsonian science apart from the annual federal appropriation.

ACTIONS

Develop and employ a new methodology for distribution of overhead recovery.

Support the growth of Smithsonian Business Ventures and review revenue-sharing agreements.

Restore support for Development Offices.

Leverage discretionary endowment funds and internal awards to create research opportunities.

Increase program funding by aggressively pursuing opportunities for grants and contracts in line with strategic plans.

Coordinate Smithsonian museums and research centers with central development functions.

Establish funded chairs and fellowships for science.

Increase our prospect pool annually.

Establish endowed chairs for directors.

The centerpiece to the Web of Life, a Smithsonian traveling exhibit describing biological diversity.

A lubber grasshopper from the Insect Petting Zoo at the National Museum of Natural History.

The Smithsonian's
MMT telescope at night.

Implementing the Smithsonian Science Strategy

Smithsonian geologists study lava flows to predict eruptions, probe into the Earth's interior, and understand the composition of volcanic materials on other planets.

Endangered black-footed ferrets are part of a successful conservation program at the National Zoological Park.

Smithsonian biologists are studying the unusual sounds treehopper insects use to communicate with one another.

While the Science Strategy defines our goals for the future of science at the Smithsonian, prioritizing and adhering to these goals will be an ongoing process of discovery, deliberation, and decision making. The Science Executive Committee will meet annually to review the desired outcomes, establish expectations for the coming years, set priorities, and allocate the resources needed to produce world-class scientific research.

Key to the success of Smithsonian science will be a detailed plan for implementing the steps necessary to achieve the Science Strategy's goals and objectives, and metrics for measuring the progress being made toward the desired outcomes. The implementation strategy, which will guide us for the next several years along with this Science Strategy, will contain specific strategies and supporting actions, including the following:

STRATEGY

Set annual priorities for meeting the Science Strategy's goals and objectives.

ACTIONS

Set annual goals and metrics for each science unit and focal area.

Conduct an annual internal review, measuring progress with presentations by Unit Directors.

Conduct a 5-year peer review by the visiting committees.

Develop and implement unit plans that execute the strategies and actions presented in this Science Strategy.

STRATEGY

Redirect 3 percent of federal funds each year to restore the base funding levels for research.

ACTION

Focus discretionary funding on research endowments, a research equipment pool, research opportunities funds, and fellowships and internships.

STRATEGY

Implement the budget planning process by developing and submitting budget initiatives.

ACTIONS

Set annual goals for federal, trust, and other funding.

Set 5-year goals for capital expenditures.

Double the science budget in 5 years.

Increase outside funding by 10 percent per year.

A researcher collects insects that live on a tree to better understand the diversity of life in tropical regions.

Precious Wentletrap shell from the south Pacific.

A biologist collects samples from a coral reef.

STRATEGY
Instill accountability in the science culture.

ACTIONS
Predicate salary and bonus decisions on progress.

Institute annual rewards for success in science focal areas.

Incorporate annual metrics into individual performance plans.

STRATEGY
Build and strengthen partnerships in the public and private sectors, and increase collaboration with partners.

Through a long-term commitment to the highest quality of research, our scientists, and our partners, the Smithsonian will continue to provide the scientific information needed to thrive in a changing world.

"Freedom is the first-born daughter of science."

—Thomas Jefferson

Young visitors explore the universe with the Chandra X-ray telescope.

National Air and Space Museum
Washington, D.C.

National Museum of Natural History
Washington, D.C.

National Zoological Park
Washington, D.C.

Smithsonian Astrophysical Observatory
Cambridge, Massachusetts

Smithsonian Center for Materials Research and Education
Suitland, Maryland

Smithsonian Environmental Research Center
Edgewater, Maryland

Smithsonian Tropical Research Institute
Panama City, Panama

For detailed information about all of the museums and research centers
at the Smithsonian, please visit our web site at www.si.edu.