

APPENDIXES



Galileo's Battle for the Heavens, produced for public television by WGBH Boston and funded by NSF, won a Emmy award for Outstanding Historical Programming.

Appendix 1

NSF DIRECTORATES AND MANAGEMENT OFFICES

The **Directorate for Biological Sciences (BIO)** supports research programs ranging from the study of the structure and dynamics of biological molecules, such as proteins and nucleic acids, through cells, organs, and organisms, to studies of populations and ecosystems. It encompasses processes that are internal as well as external to the organism and includes temporal frameworks ranging from measurements in real time through individual life spans to the full scope of evolutionary times. Among the research programs BIO supports is fundamental academic research on biodiversity, environmental biology, and plant biology, including providing leadership for the Multinational Coordinated Arabidopsis Genome Project.

The **Directorate for Computer and Information Science and Engineering (CISE)** supports research on the foundations of computing and communications devices and their use, research on computing and networking technologies and software, and research to increase the capabilities of humans and machines to create, discover, and reason with knowledge by advancing the ability to represent, collect, store, organize, locate, visualize, and communicate information. CISE also supports the planning and operations of centers and facilities that provide national cyberinfrastructure supporting science and engineering research and education. CISE supports a range of education and workforce activities that complement these efforts.

The **Directorate for Education and Human Resources (EHR)** supports activities that promote excellence in U.S. science, technology, engineering, and mathematics (STEM) education at all levels and in all settings (both formal and informal). The goal of these

activities is to develop a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians, and educators, as well as a well-informed citizenry with access to the ideas and tools of science and engineering. Support is provided for individuals to pursue advanced study, for institutions to build their capacity to provide excellent STEM education, and for collaborations to strengthen STEM education at all levels by fostering partnerships among colleges, universities, school districts, and other institutions in the public and private sectors.

The **Directorate for Engineering (ENG)** supports research and education activities contributing to technological innovation vital to the nation's economic strength, security, and quality of life. ENG invests in fundamental research on engineering systems, devices, and materials, and the processes and methodologies that provide the underpinning to support them. Emerging technologies—nanotechnology, information technology, and biotechnology—comprise a major focus of research investments. ENG also makes critical investments in facilities, networks, and people to ensure diversity and quality in the nation's infrastructure for engineering education and research.

The **Directorate for Geosciences (GEO)** supports research in the atmospheric, earth, and ocean sciences. Basic research in the geosciences advances our knowledge of Earth and our ability to predict natural phenomena of economic and human significance, such as climate change, weather, earthquakes, fluctuations in fish stock, and disruptive events in the solar-terrestrial environment. GEO also supports the operation of national user facilities.

The **Directorate for Mathematical and Physical Sciences (MPS)** supports research and education in astronomical sciences, chemistry, materials research, mathematical sciences, and physics. Major equipment and instrumentation such as telescopes and particle accelerators are provided to support individual investigators. MPS

also supports state-of-the-art facilities that enable research at the cutting edge of science and research opportunities in totally new directions.

The **Directorate for Social, Behavioral, and Economic Sciences (SBE)** supports research to build fundamental scientific knowledge about human behavior, interaction, and social and economic systems, organizations, and institutions. SBE facilitates the Foundation's international activities by promoting partnerships between U.S. and foreign researchers, thereby enhancing access to critical research conducted outside the United States and increasing knowledge of mutually beneficial research opportunities abroad. SBE also supports science resources studies that constitute the nation's primary source of data on the science and engineering enterprise.

The **Office of Polar Programs (OPP)**, which includes the U.S. Polar Research Programs and U.S. Antarctic Logistical Support Activities, supports multidisciplinary research in the arctic and antarctic regions. These geographic frontiers—premier natural laboratories—are the areas predicted to be the first affected by global change. They are vital to understanding the past, present, and future responses of Earth systems to natural and human changes. OPP support provides unique research opportunities ranging from studies of Earth's ice and oceans to research in atmospheric sciences and astronomy.

The **Office of International Science and Engineering (OISE)** serves as the focal point, both inside and outside the Foundation, for international science and engineering activities and manages international programs that are innovative, catalytic, and responsive to its broad range of interests. OISE supports international collaborative research that provides U.S. scientists and engineers with access to the world's top researchers, institutions, and facilities. It also supports several programs that provide international research experiences to students and young investigators, preparing them for full participation in the global research enterprise.

The **Office of Budget, Finance, and Award Management (BFA)** is headed by the Chief Financial Officer, who is responsible for budget, financial management, grants administration, and procurement operations and related policy. Budget responsibilities include the development of the Foundation's annual budget, long-range

planning, and budget operations and control. BFA's financial, grants, and other administrative management systems ensure that the Foundation's resources are well managed and that efficient, streamlined business and management practices are in place. The Foundation has been acknowledged as a leader in federal research administration, particularly for its pursuit of a paperless environment that provides more timely, efficient awards administration.

The **Office of Information and Resource Management (OIRM)** provides information systems, human resource management, and general administrative and logistical support functions to the Foundation's community of scientists, engineers, and educators, as well as to the general public. OIRM is responsible for staffing and service requirements for personnel, including visiting scientists; the physical infrastructure; the dissemination of program information from NSF to the external community; and the administration of the sophisticated technological infrastructure that provides the hardware, software, and support systems to manage the Foundation's grant-making process and to maintain advanced financial and accounting systems.

Appendix 2

EXECUTIVE STAFF AND OFFICERS

Executive Staff

Office of the Director

Rita R. Colwell, Director
Joseph Bordogna, Deputy Director

National Science Board

Warren M. Washington, Chair
Michael P. Crosby, Executive Officer

Office of Equal Opportunity Programs

Ana A. Ortiz, Program Manager

Office of the General Counsel

Lawrence Rudolph, General Counsel

Office of Inspector General

Christine C. Boesz, Inspector General

Office of Integrative Activities

Nathaniel G. Pitts, Director

Office of Legislative and Public Affairs

Curtis Suplee, Director

Office of Polar Programs

Karl A. Erb, Director

Directorate for Biological Sciences

Mary E. Clutter, Assistant Director

Directorate for Computer and Information Science and Engineering

Peter A. Freeman, Assistant Director

Directorate for Education and Human Resources

Judith A. Ramaley, Assistant Director

Directorate for Engineering

John A. Brighton, Assistant Director

Directorate for Geosciences

Margaret S. Leinen, Assistant Director

Directorate for Mathematical and Physical Sciences

John B. Hunt, Acting Assistant Director

Directorate for Social, Behavioral, and Economic Sciences

Norman M. Bradburn, Assistant Director

Office of Budget, Finance, and Award Management

Thomas N. Cooley, Director

Office of Information and Resource Management

Anthony A. Arnolie, Director

Officers

Chief Financial Officer

Thomas N. Cooley
(Office of Budget, Finance, and Award Management)

Chief Information Officer

George Strawn
(Office of Information and Resource Management)

Affirmative Action Officer

Ana A. Ortiz
(Office of Equal Opportunity Programs)

Appendix 3

NATIONAL SCIENCE BOARD FY 2003

Warren M. Washington (Chair)
Senior Scientist and
Head, Climate Change Research Section
National Center for Atmospheric Research

Anita K. Jones (Vice Chair)
Quarles Professor of Engineering
and Applied Science
Department of Computer Science
University of Virginia

Diana S. Natalicio (Vice Chair)
President
University of Texas—El Paso

Barry C. Barish
Linde Professor of Physics
California Institute of Technology

Ray Bowen
Former President
Texas A&M University

Delores M. Etter
Professor, Electrical Engineering
U. S. Naval Academy

Nina V. Fedoroff
Willaman Professor of Life Sciences
Director, Life Sciences Consortium
Director, Biotechnology Institute
Pennsylvania State University

Pamela A. Ferguson
Professor of Mathematics
Former President
Grinnell College

Kenneth M. Ford
Director
Institute for Human and Machine Cognition
University of West Florida

Daniel E. Hastings
Associate Director
Engineering Systems Division
Massachusetts Institute of Technology

Elizabeth Hoffman
President
University of Colorado System

George M. Langford
Professor
Department of Biological Science
Dartmouth College

Jane Lubchenco
Wayne and Gladys Valley Professor
of Marine Biology
Distinguished Professor of Zoology
Oregon State University

Joseph A. Miller, Jr.
Executive Vice President
Chief Technology Officer
Corning, Inc.

Douglas D. Randall
Professor of Biochemistry
Director, Interdisciplinary Program on
Plant Biochemistry—Physiology
University of Missouri

Robert C. Richardson
Vice Provost for Research
Professor of Physics
Department of Physics
Cornell University

Michael G. Rossmann
Hanley Distinguished Professor of
Biological Sciences
Department of Biological Sciences
Purdue University

Maxine Savitz
General Manager
Technology Partnerships
Honeywell Corporation (Retired)

Luis Sequeira
J.C. Walker Professor, Emeritus
Departments of Bacteriology and Plant Pathology
University of Wisconsin—Madison

Daniel Simberloff
Nancy Gore Hunger Professor of
Environmental Science
Department of Ecology and Evolutionary Biology
University of Tennessee

JoAnne Vasquez
Past President, National Science
Teachers' Association
Consultant, McGraw-Hill Companies

John A. White, Jr.
Chancellor
University of Arkansas—Fayetteville

Mark S. Wrighton
Chancellor
Washington University

Rita R. Colwell (*member ex officio*)
Director
National Science Foundation

Michael P. Crosby¹
Executive Officer
National Science Board

Gerard R. Glaser
Acting Executive Officer
National Science Board

¹ From July 28, 2003

Photo Credits and Captions



Bioglyph

Turning on the lights reveals the secret behind the bioglyphs painting depicted here: Petri dishes coated with agar support colonies of bioluminescent bacteria. This piece was created by Angela Bowlds, a student at the Montana State University-Bozeman (MSU) School of Art. Bioglyphs—an exhibition of living bioluminescent paintings—brings science and art together in a collaborative project involving art students from the MSU School of Art and science and engineering students from the MSU Center for Biofilm Engineering, which was established in 1990 as an NSF Engineering Research Center to foster a new approach to university engineering and science education.

©2002 MSU-Bozeman Bioglyphs Project



Mongolian Frost Rings

Dee Breger's colorized scanning electron micrograph of cored tree rings from a Siberian pine in Mongolia won first place in the photography category of the NSF-*Science* Magazine 2003 Science and Engineering Visualization Challenge. The image spans the years 534-539 C.E, in which the central narrow, deformed rings corresponding to 536 and 537 graphically represent a catastrophic summer cooling in the Northern Hemisphere that froze sap in the tree's cells. This abrupt climate change has been attributed to a massive eruption of the volcanic precursor to Krakatoa, a cosmic impact, or possibly both.

Sample courtesy of Gordon Jacoby, Lamont-Doherty Earth Observatory
Dee Breger, Lamont-Doherty Earth Observatory



Owl Nebula

NSF-funded astronomers have assembled the first effective model for both the shape and evolutionary history of the Owl Nebula, the well-known planetary nebula in the Ursa Major constellation. Named for its ghostly similarity to an owl's face, the nebula boasts a faint outer halo, a circular middle shell, and a roughly elliptical inner shell. Using observations made with the William Herschel Telescope in La Palma, Spain, and the 0.6-meter Burrell Schmidt telescope at Kitt Peak National Observatory, researchers concluded that the halo was formed when the parent star first lost significant mass after fusion ceased in its core.

Karen Kwitter, Williams College; Ron Downes, STScI; You-Hua Chu, University of Illinois; the National Optical Astronomy Observatory, the Association of Universities for Research in Astronomy, and NSF



Antarctic Iceberg

Icebergs such as this one near the Antarctic Peninsula are being studied in research supported by NSF's Antarctic Glaciology Program. The program is concerned with the history and dynamics of the antarctic ice sheets, including near-surface snow and firn, floating ice shelves, glaciers, ice streams, and continental and marine ice sheets. NSF funds studies in ice dynamics, paleoenvironments (deduced from ice cores), numerical modeling, glacial geology, and remote sensing.

Jeffrey Kietzmann, National Science Foundation



Galileo and the Life of the Brain

At the 24th Annual News and Documentary Emmy Awards in September 2003, two NSF-funded television programs were awarded Emmys by the National Television Academy. WGBH Boston's *Galileo's Battle for the Heavens* was selected for one of two Emmys given for Outstanding Historical Programming. Thirteen/WNET New York's five-part series, *The Secret Life of the Brain*, also funded by NSF, was chosen as best program in the Outstanding Science, Technology, and Nature Programming category. Both programs succeeded in telling unique scientific stories that would otherwise have taken volumes of text and years of study to understand.

Galileo Project at Rice University
(http://es.rice.edu/ES/humsoc/Galileo/Villa/galileo_pictures.html)



Stormchasers Sail Plane

Sailplane pilot Bruce Miller guides the National Center for Atmospheric Research (NCAR)-operated Schweizer SGS 2-32 aircraft in search of storm electricity. NSF-funded researchers at NCAR are using the sailplane and other equipment to study and better predict events such as tropical cyclones, hurricanes, flash floods, tornadoes, and thunderstorms.

Photo courtesy of MacGillivray Freeman Films and NOVA/WGBH Boston



Giant Panda

A panda walks through the China Research and Conservation Center for the Giant Panda in the Wolong Nature Reserve in Sichuan Province in southwest China. Pandas are rare in the wild; it is estimated that less than 1,000 of them live in China's shrinking and fragmented habitats. NSF-funded researchers like Jack Liu, assistant professor of fisheries and wildlife at Michigan State University, work in conjunction with the Chinese to better understand challenges to the pandas' habitat and the impact of human interaction on biodiverse areas such as Wolong.

Sue Nichols, Michigan State University



Flattened Carbon Nanotube

A team led by NSF-funded researcher Vincent Crespi, professor of physics and materials science and engineering at Pennsylvania State University, has simulated carbon nanotubes that are smaller and stronger than any other nanotube. Using supercomputers to model the electronic states and total energies of various carbon molecules, Crespi and his colleagues discovered a tetrahedral carbon atom that creates tight, stable bonds to form tiny tubes only six atoms across—the smallest diameter theoretically possible. Crespi believes that these tubes may prove very useful in a variety of nanotechnology applications.

Vincent H. Crespi, Pennsylvania State University



Golden Gate Bridge

To improve our understanding of earthquakes and their effects on structures such as the Golden Gate Bridge, NSF is funding the development and operation of the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES). This is a shared national network of experimental equipment sites and tools, a centralized data repository, and an archive of earthquake engineering simulation software, all linked together by ultra-high-speed Internet2 connections. When NEES becomes fully operational in October 2004, these resources will provide the means for collaboration and discovery in the form of more advanced research based on experimentation and computational simulations of earthquakes and the way buildings, bridges, infrastructure, coastal regions, and geologic materials perform during seismic events.

National Information Service for Earthquake Engineering, William Godden
Structural Engineering Slide Library

4201 Wilson Boulevard
Arlington, VA 22230
Phone (703) 292-5111
TDD (703) 292-5090



www.nsf.gov

For additional copies of this
publication, please send an
e-mail request to
Accountability@nsf.gov.

NSF-04-011