National Science Foundation
WHERE DISCOVERIES BEGIN

2015

Directorate for

Mathematical & Physical Sciences

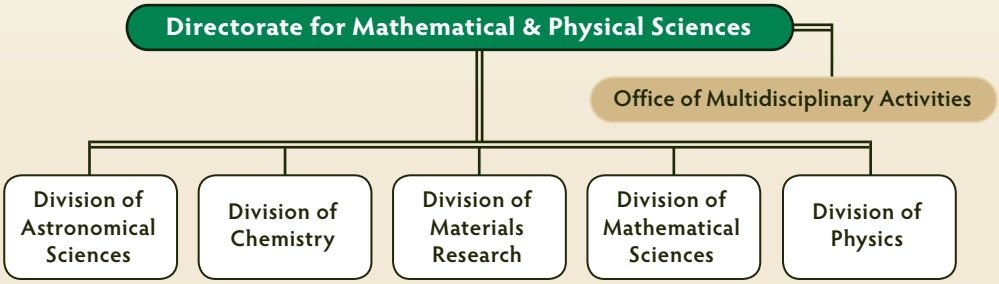
Directorate for

Mathematical & Physical Sciences

The NSF Directorate for Mathematical and Physical Sciences consists of the Divisions of Astronomical Sciences, Chemistry, Materials Research, Mathematical Sciences, and Physics, as well as the Office of Multidisciplinary Activities. These organizations constitute the basic structure for MPS support of research and workforce development. The MPS Divisions support both disciplinary and interdisciplinary activities and partner with each other and with other NSF Directorates to promote basic research across the scientific disciplines.

MPS MISSION STATEMENT

The mission of MPS is to harness the collective efforts of the mathematical and physical sciences communities to address the most compelling scientific questions, educate the future advanced workforce, and promote discoveries to meet the needs of the Nation.



National Science Foundation
WHERE DISCOVERIES BEGIN

NSF MISSION

To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.

NSF VISION

A Nation that creates and exploits new concepts in science and engineering and provides global leadership in research and education.

Dear Reader:

The Mathematical and Physical Sciences Directorate (MPS) of the National Science Foundation supports fundamental research in astronomy, chemistry, materials, mathematics, and physics. This research excites our imaginations and changes our lives, expanding the frontiers of knowledge and providing a foundation that supports economic growth, public health, and national security. Fundamental discoveries in the mathematical and physical sciences are the bedrock of technological innovation. MPS investments rest on the long march of transformative ideas: some come to fruition in a few years and some take many decades.

The MPS budget request of almost $1.4 billion for FY 2016 will fund research covering a large intellectual space. It will support projects ranging from exploration of the connections between the life sciences and the mathematical and physical sciences to discovery of the very nature of matter, space, time, and the physical laws governing the universe. These investigations also encompass a vast range of distances and duration. They explore lengths as short as the size of the smallest particles and as large as the observable universe, and they probe rates as fast as the motion of an electron and as slow as the evolution of the cosmos.

MPS-funded research propels the nation's investments in a host of important areas such as sustainable energy and food supplies, cyberinfrastructure, and new materials. Just a few illustrations of the practical consequences of research in mathematical and physical sciences are the invention of medical imaging technology, the development of ultrasensitive biological and chemical detectors, advances in alternate fuel technologies, and transformations in electronics, photonics, and optics. The President's announcement of the initiative for Brain Research through Advancing Innovative Neurotechnologies (BRAIN) illustrates the consequences of such research. MPS investments in fundamental research on imaging, sensors, optics, photonics, and complex simulations all contribute to that initiative.

This brochure provides an introductory taste of the research we support at universities and in laboratories throughout the nation, and we invite you to learn more about MPS on our web site at www.nsf.gov/MPS.

Best regards,

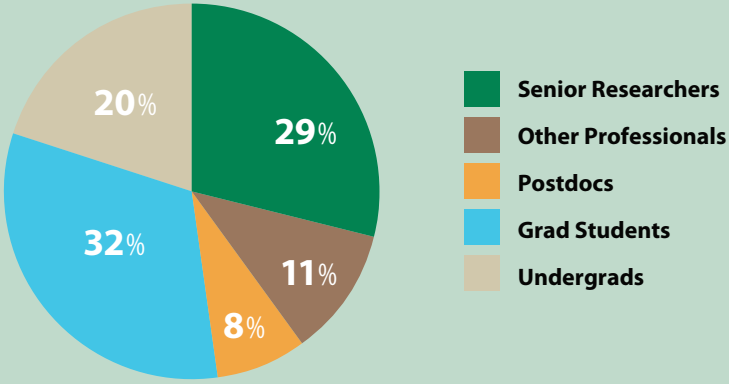
F. Fleming Crim

Assistant Director
Directorate for Mathematical and Physical Sciences

Directorate for Mathematical & Physical Sciences

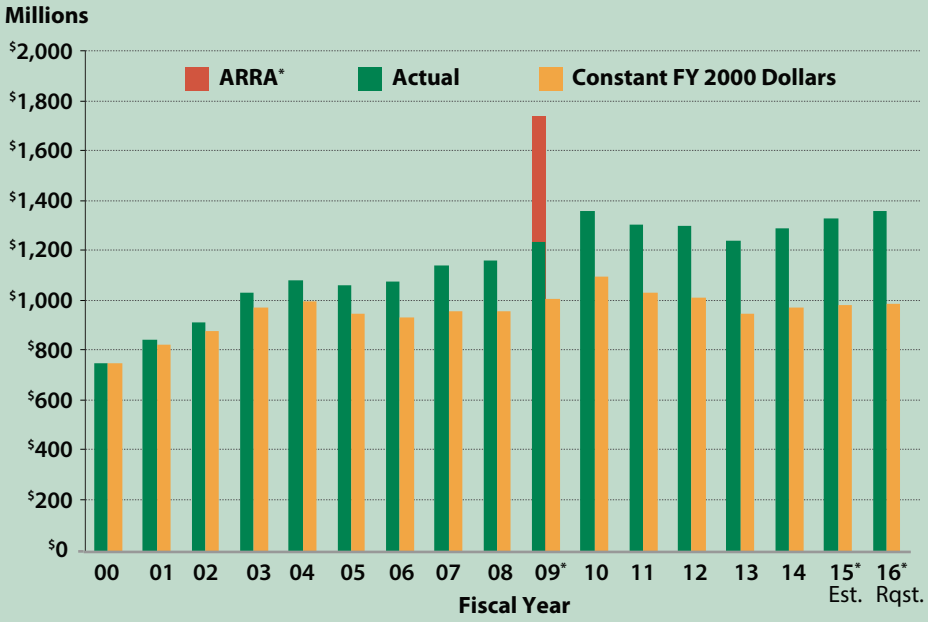
Grant Personnel FY 2014

Distribution of people supported by MPS.



Budget in Actual Dollars and Constant FY 2000 Dollars

Constant dollars show the purchasing power of the MPS budget.

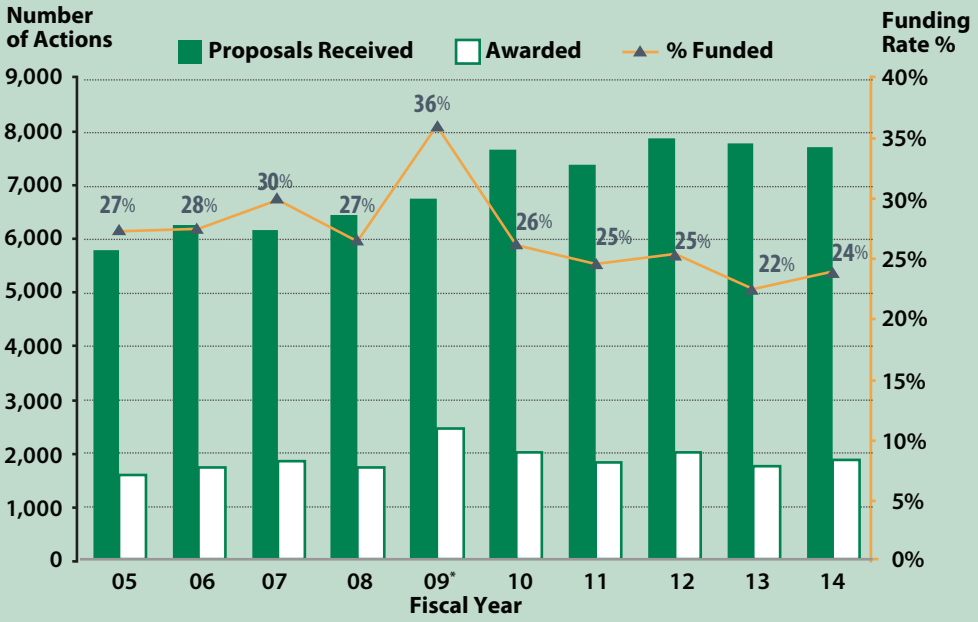


* ARRA - American Recovery and Reinvestment Act of FY 2009. Est.= Estimate, Rqst. = Request.

Data provided from NSF Budget Requests to Congress, www.nsf.gov/about/budget

Funding Rates and Number of Actions

Graph shows number of proposals submitted and awarded Research Grants (as defined by NSF) and resultant funding rates. Funding rate is defined as the percentage of new or renewal proposals awarded funding.



** FY 2009 funding rate includes awards made with ARRA funds.*

Note: The funding reflects the average for the Directorate and may not represent funding rates in individual Divisions or programs

Division of Astronomical Sciences (AST)

Mission

The mission of the Division of Astronomical Sciences is to support forefront research in ground-based astronomy; to help ensure the scientific excellence of the U.S. astronomical community; to provide access to world-class research facilities through merit review; to support the development of new instrumentation and next-generation facilities; and to encourage broad understanding of the astronomical sciences by a diverse population of scientists, policy makers, educators, and the public at large.

The Division supports research in all areas of astronomy and astrophysics as well as related multidisciplinary studies. Because of the scale of modern astronomical research, the Division engages in numerous interagency and international collaborations. Areas of emphasis and the priorities of specific programs are guided by community recommendations, which have been developed by National Research Council decadal surveys and by federal advisory committees.

Credit: Scott Schnee and NRAO/AUI/NSF

Orion Molecular Cloud Complex: Radio/optical composite of the Orion Molecular Cloud Complex showing the star-forming orange filament. Green Bank Telescope data show uncommonly large dust grains, which may kick-start planet formation.

Astronomical Facilities

Through the national observatories and international partnerships, AST provides support for a system of multi-aperture research-class telescopes that enable transformational capabilities in both radio and optical/infrared astronomy. In FY 2014, AST accomplishments include continued early science observations with the Atacama Large Millimeter/submillimeter Array (ALMA). Construction progress continues for the Daniel K. Inouye Solar Telescope (DKIST), the largest solar telescope in the world, atop Haleakala peak on Maui, Hawaii, which will be operational in mid-2019. Also the Division initiated construction of the Large Synoptic Survey Telescope (LSST), scheduled to begin observations in 2022. The Division is proud of the unique capabilities and recent discoveries provided by all of our observatories.

AST invested 59% of its FY 2014 research appropriation in the management and operation of national, ground-based astronomical facilities. The researchers using these facilities made a large number of important discoveries, which are reported both in scientific journals and the popular press. Also in FY 2014, AST awarded the first Mid-Scale Innovations Program grants, which enable investigators to build bigger collaborations to address scientific questions beyond the cost limitations of the individual investigator programs. By building LSST and creating the Mid-Scale Innovations Program, AST has addressed two top priorities of the 2010 Astronomy decadal survey recommendations.

Contact Information

Dr. James S. Ulvestad
Division Director

Dr. Patricia Knezek
Deputy Division Director

National Science Foundation
Division of Astronomical Sciences
4201 Wilson Boulevard
Room 1045
Arlington, VA 22230

Phone: **(703) 292-8820**
Fax: **(703) 292-9034**
Web: **www.nsf.gov/AST**

Individual Investigator Programs

- Astronomy and Astrophysics Research Grants (AAG)
- Enhancing Access to the Radio Spectrum (EARS)
- Faculty Early Career Development Program (CAREER)
- NSF Astronomy and Astrophysics Postdoctoral Fellowships (AAPF)
- Partnerships in Astronomy and Astrophysics Research and Education (PAARE)
- Research Experiences for Undergraduates (REU)
- Research at Undergraduate Institutions (RUI)
- Theoretical and Computational Astrophysics Networks (TCAN)

Astronomical Instrumentation Programs

- Advanced Technologies and Instrumentation (ATI)
- Major Research Instrumentation (MRI)
- Mid-Scale Innovations Program (MSIP)

Large Facilities

- Arecibo Observatory
- Atacama Large Millimeter/submillimeter Array (ALMA)
- Gemini Observatory
- National Optical Astronomy Observatory
- National Radio Astronomy Observatory
- National Solar Observatory

Credit: T. Abbott and NOAO/AURA/NSF

CTIO Evening Panorama: A long-exposure evening panorama of Cerro Tololo Inter-American Observatory (CTIO) in Chile.

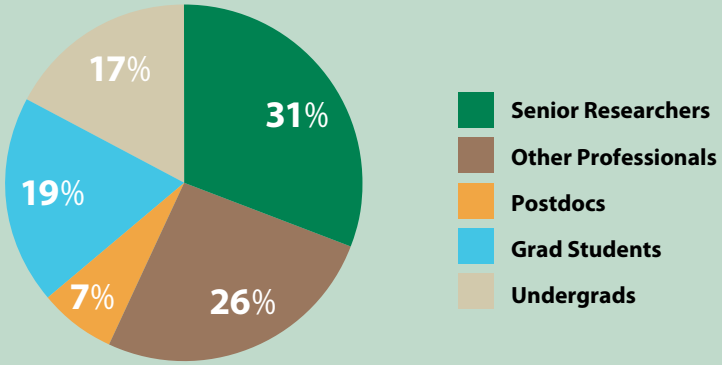
Electromagnetic Spectrum Management (ESM)

AST represents the interests of NSF and the scientific community in protecting access to the electromagnetic spectrum needed for research purposes. The sensitivity of telescopes can be compromised by electromagnetic interference from sources such as airborne and satellite radio transmissions and light pollution. ESM personnel protect scientific capabilities by participating in the establishment of regulations, operating procedures, and technical standards related to government, private sector, and international uses of the spectrum. The ESM unit also is the home of the research program Enhancing Access to the Radio Spectrum (EARS), which seeks to optimize the use of the radio spectrum for both scientific and societal needs.

Division of Astronomical Sciences (AST)

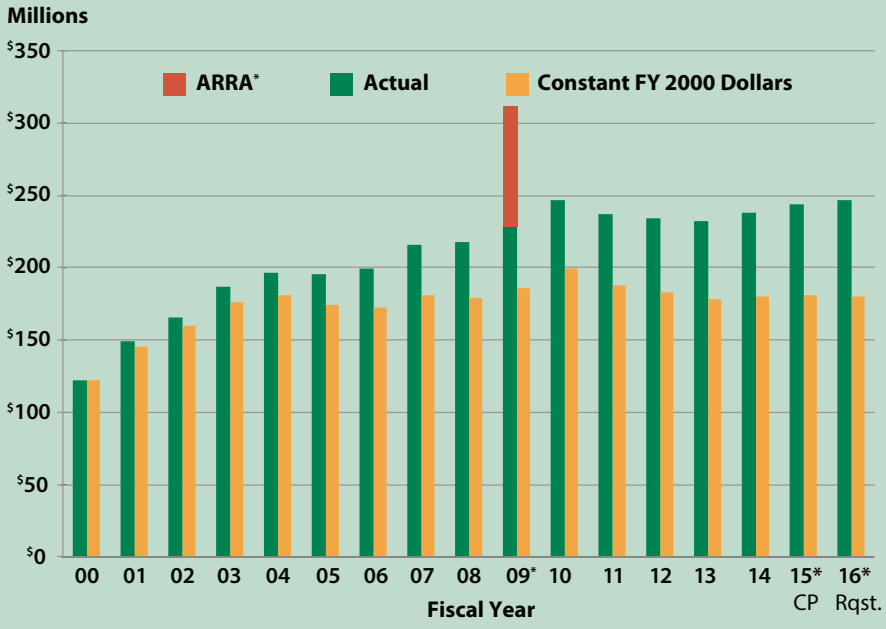
Grant Personnel FY 2014

Distribution of people supported by AST.



Budget in Actual Dollars and Constant FY 2000 Dollars

Constant dollars show the purchasing power of the AST budget.



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Data provided from NSF Budget Requests to Congress, www.nsf.gov/about/budget

Funding Rates and Number of Actions

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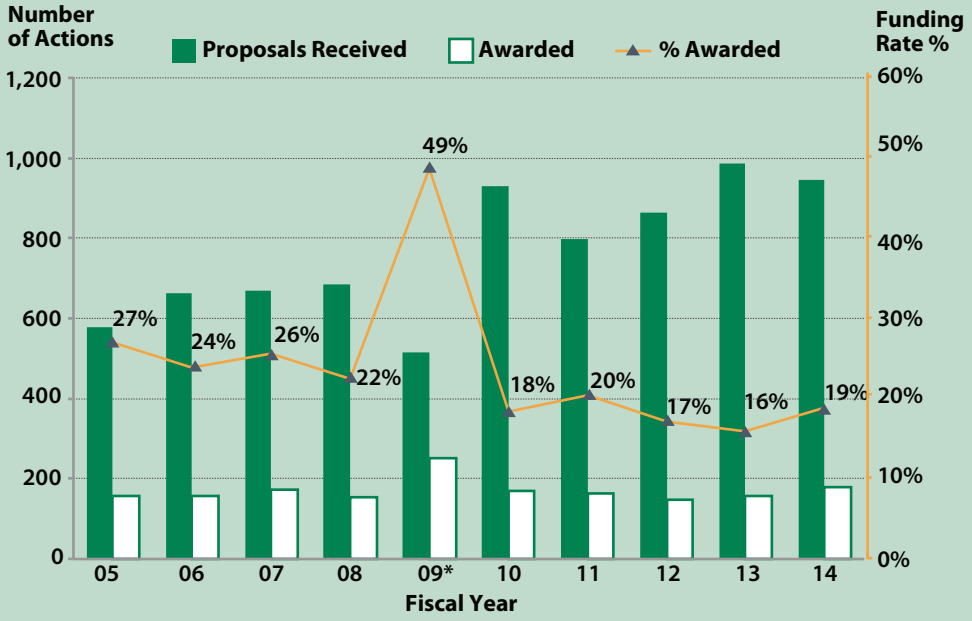
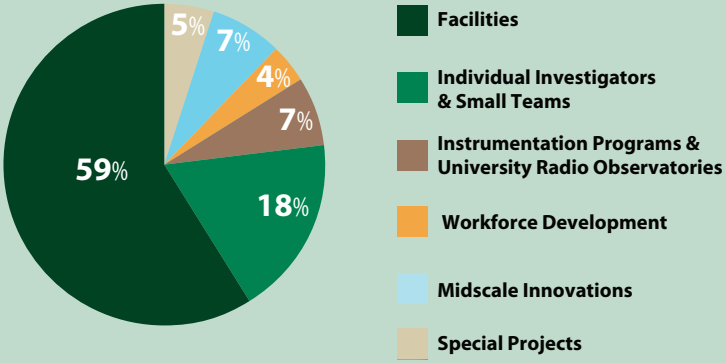


** FY 2009 funding rate includes awards made with ARRA funds.*

Note: The funding reflects the average for AST and may not represent funding rates in individual programs

Modes of Support FY 2014



Division of Chemistry (CHE)

Mission

The mission of the NSF Division of Chemistry (CHE) is to support innovative research in chemical sciences, integrated with education, through strategic investment in developing a globally engaged U.S. chemistry workforce reflecting the diversity of America.

Funding Modalities

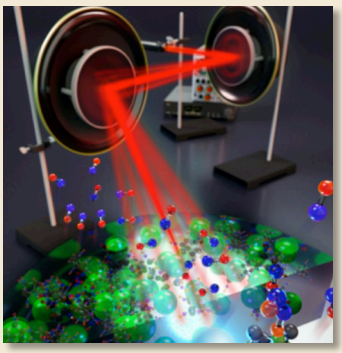
Research projects (individual investigators and small teams) remain the dominant funding modality in CHE, accounting for approximately 76% of the Division's budget in FY 2014. CHE also invests in research centers (14%), shared instrumentation (6%), and workforce development (4%).

Workforce Development and Broadening Participation

The Division of Chemistry supports roughly 75 Research Experiences for Undergraduates (REU) sites, which represent many different models of undergraduate research. An exciting part of the portfolio is the international REU Sites, where U.S. undergraduate students have the opportunity to live and conduct research abroad for eight to ten weeks. CHE supports international (iREU) sites in Europe and Asia.

Chemistry and the Global Community

The Division of Chemistry continues to develop strategic partnerships with a broad range of stakeholder communities to support discovery and innovative research in chemical sciences that reflect national priorities. CHE has partnered with programs across NSF, other Federal agencies, and international organizations to develop collaborative research projects. Such strategic opportunities may be supported through a variety of mechanisms including as supplements to current awards, integration into research proposals, targeted programs by disciplinary research area, or seed funding for new efforts.



Credit: Peter C. Ford, University of California, Santa Barbara

Therapeutic NO delivery using light: Depiction of a photolysis system using speaker-mounted mirrors to scan a NIR laser beam across a polymer disk containing upconverting nanoparticles and photochemical NO precursors. With this scanning device, the laser light can be directed through tissue and focused on an implantable polymer disk target to trigger NO (an important mammalian signaling agent in immune response) release without burning. This research could lead to enhancements in radio-therapy of tumors.

Contact Information

Dr. David Berkowitz
Division Director

Dr. Carol Bessel
Deputy Division Director (Acting)

National Science Foundation
Division of Chemistry
4201 Wilson Boulevard
Room 1055
Arlington, VA 22230

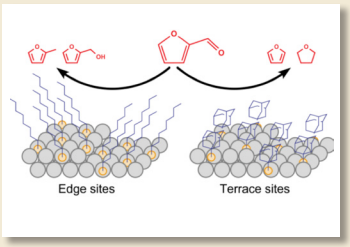
Phone: **(703) 292-8840**
Fax: **(703) 292-9037**
Web: **www.nsf.gov/CHE**

Individual Investigator Programs

- Chemical Catalysis
- Chemical Measurement and Imaging
- Chemical Structure, Dynamics and Mechanisms
- Chemical Synthesis
- Chemistry of Life Processes
- Chemical Theory, Models and Computational Methods
- Environmental Chemical Sciences
- Macromolecular, Supramolecular and Nanochemistry

Integrative Chemistry Activities

- Centers for Chemical Innovation
- Facilities and Research Infrastructure
  - National High Magnetic Field Lab
  - Chemistry and Materials Center for Advanced Radiation Sources (ChemMatCARS) at the Advanced Photon Source
- Research Experiences for Undergraduates (NSF-wide)
- Major Research Instrumentation (NSF-wide)



Credit: Will Medlin, University of Colorado

Selective Catalysis: The hydrogenation of furfural (top) is more selective on surface "edge" sites that remain exposed after modification with linear alkyl ligands. Other types of bulky ligands also leave other types of sites (terraces) exposed, allowing undesired C-C scission reactions. This research helps to develop a deep understanding of how catalysis selectivity relates to the structure of the surface, and is of general importance in designing better catalysts for many applications.

SusChEM

CHE leads the Sustainable Chemistry, Engineering, and Materials (SusChEM) activity as part of the NSF-wide Science, Engineering, and Education for Sustainability (SEES) investment. Proposals are supported by all modalities including multiple or single investigators. CHE supports basic research in SusChEM to:

- Discover new chemistry that will replace rare, expensive and/or toxic chemicals with earth abundant, inexpensive, and benign chemicals
- Discover new chemistry to economically recycle chemicals that cannot be replaced, such as phosphorus and the rare earth elements
- Discover new chemistry to convert non-petroleum based sources of organics to feedstock chemicals
- Discover new environmentally friendly chemical reactions and processes that require less energy, water, and organic solvents than current practice.

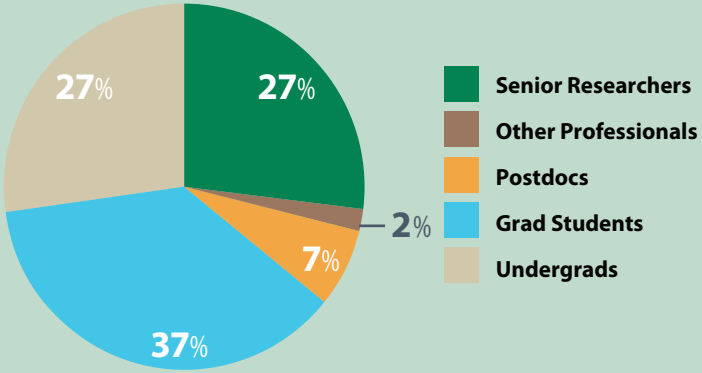
DMREF

CHE also has major investments in the NSF-wide CEMMSS (Cyber-Enabled Materials, Manufacturing, and Smart Systems) framework through DMREF (Designing Materials to Revolutionize and Engineer our Future), along with CIF21 (Cyberinfrastructure Framework for 21st Century Science, Engineering, and Education), and Clean Energy Technology.

Division of Chemistry (CHE)

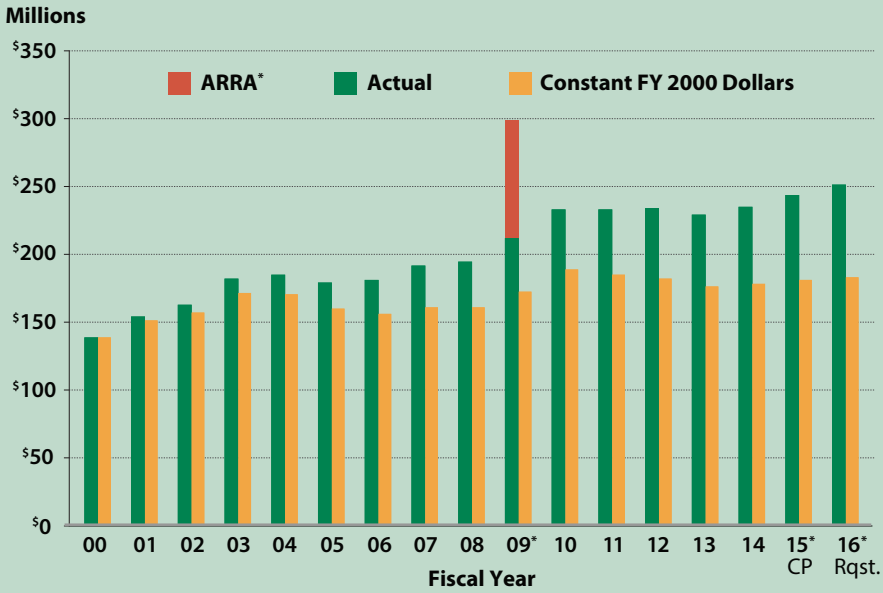
Grant Personnel FY 2014

Distribution of people supported by CHE.



Budget in Actual Dollars and Constant FY 2000 Dollars

Constant dollars show the purchasing power of the CHE budget.



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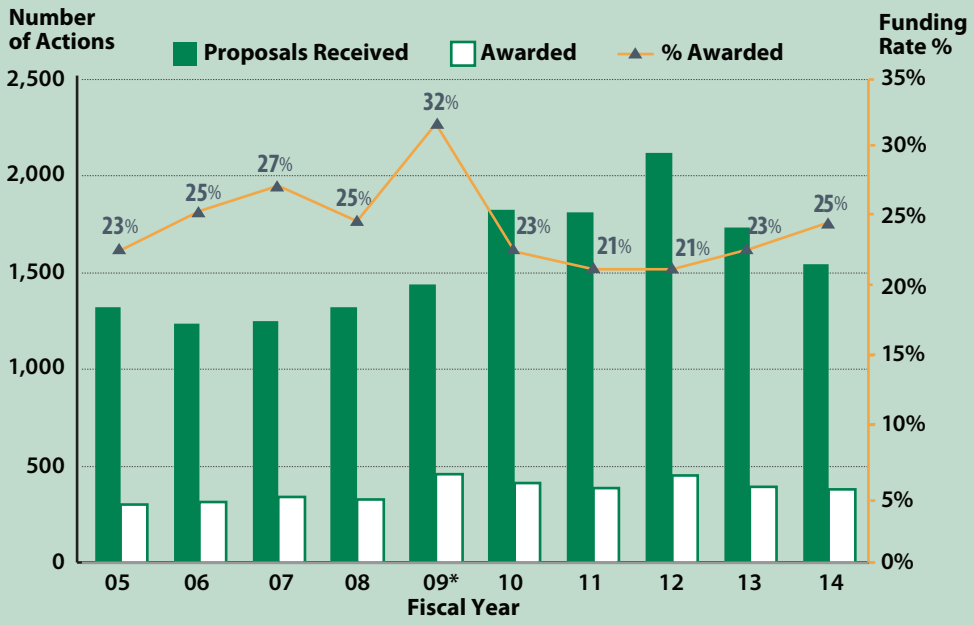
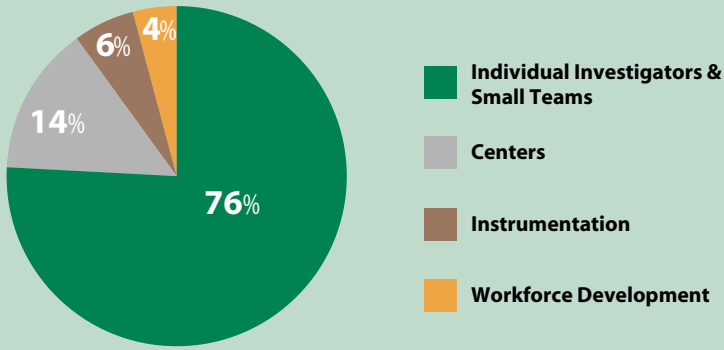


** FY 2009 funding rate includes awards made with ARRA funds.*

Note: The funding reflects the average for CHE and may not represent funding rates in individual programs

Modes of Support FY 2014



Division of Materials Research (DMR)

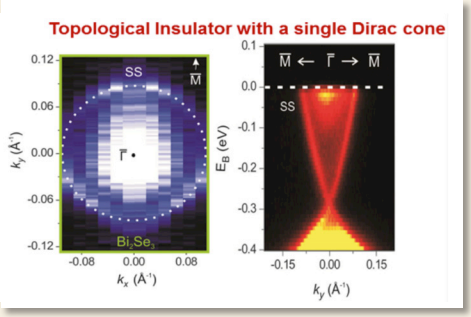
Mission

The mission of the Division of Materials Research is to discover new knowledge about the behavior of matter and materials phenomena; to address fundamental materials questions that often transcend traditional scientific and engineering disciplines and may lead to new technologies; to prepare the next generation of materials researchers; to develop and support the instruments and facilities that are crucial to advance the field; and to share the excitement and significance of materials science with the general public.

DMR supports experimental and theoretical research, their interplay with each other and with data, over a broad range of subfields. These include condensed matter and materials physics, solid state and materials chemistry, electronic and photonic materials, metals and metallic nano-structures, polymers, ceramics, and biomaterials. Funding modes range from awards to individual investigators, small groups, and centers to support for instrumentation and major facilities.

Workforce Development and Broadening Participation

DMR strives to broaden the participation of women and underrepresented minority groups in science and engineering at all academic levels. One outcome of this vision is the Partnerships for Research and Education in Materials (PREM) program, which develops and supports long-term partnerships between academic institutions serving underrepresented groups and DMR centers and facilities, such as MRSECs. PREM was started in 2004 and currently supports 14 awards.



Credit: Nai Phuan Ong, Princeton University

Photoemission Intensity at the Fermi Level (Left):
The photoemission intensity at the Fermi level reveals a single circular feature formed by the topological surface state.

Dirac Cone at the Single Fermi Level (Right):
The underlying surface band dispersion of Bi_2Se_3 reveals a Dirac cone as well as a single Fermi level crossing, confirming that it is a strong topological insulator.

Contact Information

Dr. Mary Galvin
Division Director

Dr. Linda Sapochak
Deputy Division Director

National Science Foundation
Division of Materials Research
4201 Wilson Boulevard
Room 1065
Arlington, VA 22230

Phone: **(703) 292-8810**
Fax: **(703) 292-9036**
Web: **www.nsf.gov/DMR**

Programs for Individual Investigators and Groups

- Biomaterials
- Ceramics
- Condensed Matter and Materials Theory
- Condensed Matter Physics
- Electronic and Photonic Materials
- Metallic Materials and Nanostructures Polymers
- Solid State and Materials Chemistry

Crosscutting DMR Programs

Materials Research Science and Engineering Centers (MRSECs): MRSECs address fundamental materials research whose scope and complexity require the scale and interdisciplinarity provided by a center. The MRSEC program currently supports 21 centers. For more information, visit www.mrsec.org.

National Facilities

DMR is the steward of the Cornell High Energy Synchrotron Source (CHESS) and the National High Magnetic Field Laboratory (NHMFL). In addition, DMR supports the Center for High Resolution Neutron Scattering (CHRNS) at NIST and the National Nanotechnology Infrastructure Network (NNIN).

Research Experience for Undergraduates (REU) and Teachers (RET)

DMR supports REU Sites that focus on research in materials science and related areas, including condensed matter physics, materials chemistry and physics, and materials engineering. REU projects involve students in meaningful ways in ongoing research or in projects specifically designed for the REU program. Most DMR-supported MRSECs and National Facilities offer REU opportunities each summer. Some sites also offer RETs which provide research experiences and career development programs for high school science teachers.

Designing Materials to Revolutionize and Engineer our Future (DMREF)

DMR leads in the DMREF initiative, which encourages proposals that involve a collaborative and iterative process integrating experimental, theoretical, and data-driven efforts to achieve more rapid materials discovery.

Sustainable Chemistry, Engineering and Materials (SusChEM)

DMR also participates in the SusChEM activity for research that extends natural resources, replaces materials for a safer and more secure future, and designs materials for zero waste.

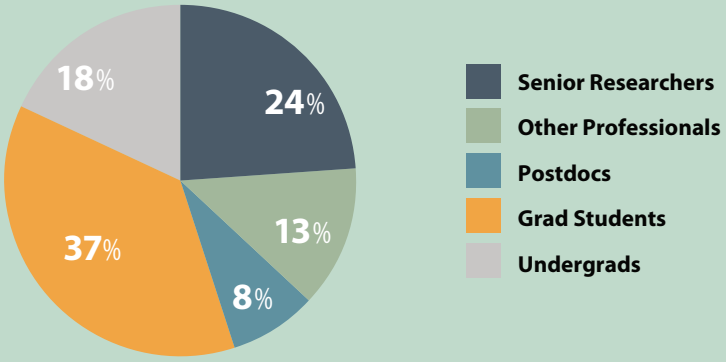
Credit: Michael Rubinstein, University of North Carolina at Chapel Hill

Illustration of the Airway Epithelial Cell Surface: The airway surface is lined by arrays of 7 micrometer long and 0.2 micrometer diameter cylindrical cilia (yellow projections). The cilia and airway surface are covered by tethered bio-macromolecules (blue hairs) that form dense brush-like structures. This epithelial brush protects the airways from infectious agents and ensures efficient flow of mucus from healthy lungs.

Division of Materials Research (DMR)

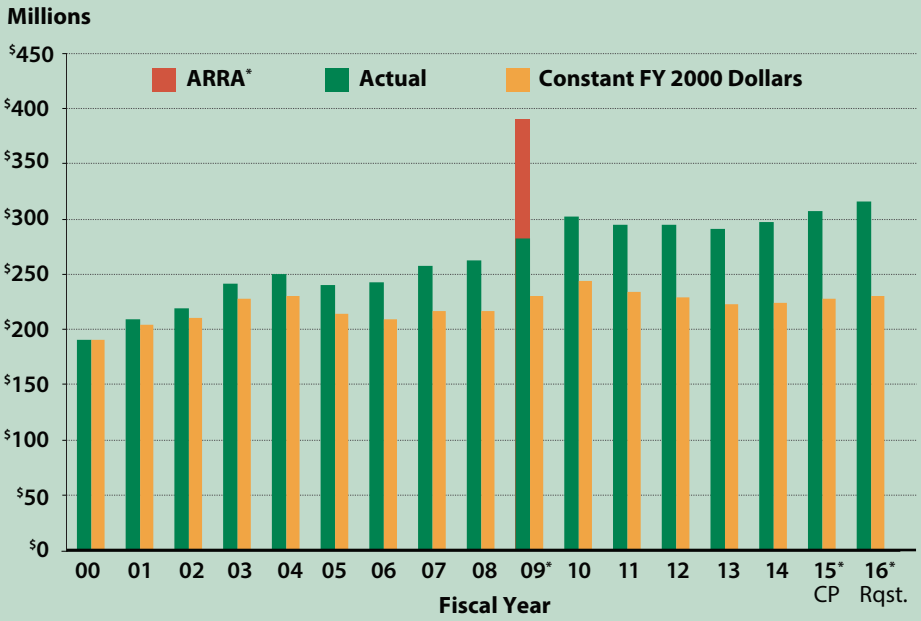
Grant Personnel FY 2014

Distribution of people supported by DMR.



Budget in Actual Dollars and Constant FY 2000 Dollars

Constant dollars show the purchasing power of the DMR budget.



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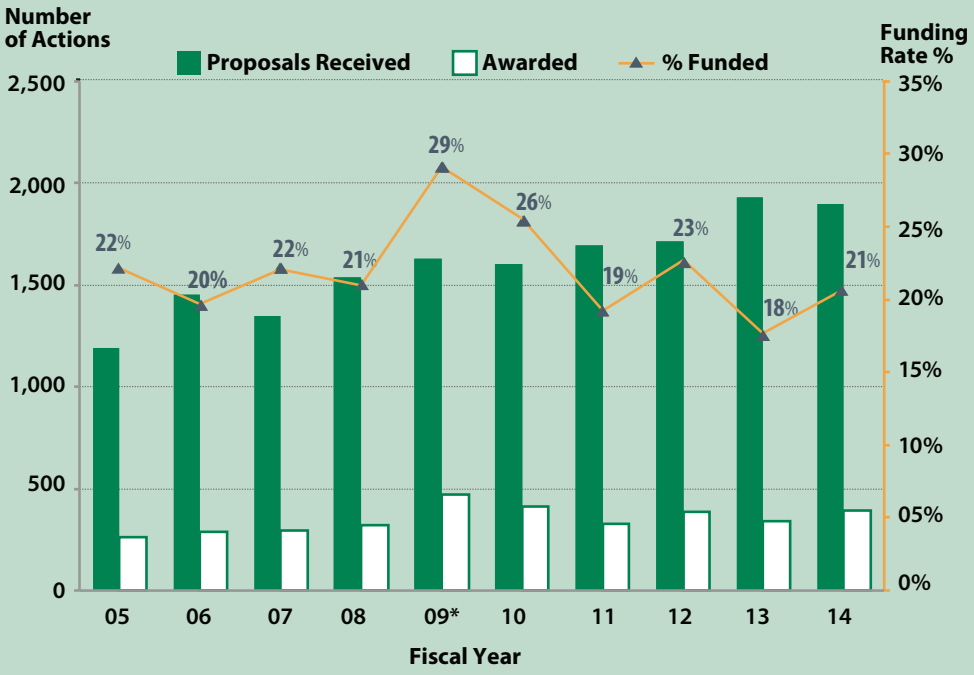

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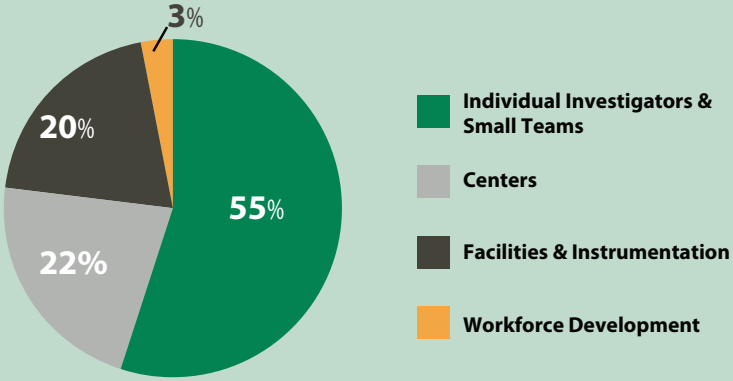
Modes of Support FY 2014



Division of Mathematical Sciences (DMS)

Mission

The mission of the Division of Mathematical Sciences is to support research at the frontiers of discovery in mathematical sciences and to support training of the next generation of mathematical sciences researchers. DMS is responsible for programs with a total annual budget of over $220 million. These programs support research and training that expand the knowledge base of the mathematical sciences through awards to individual investigators and small groups, workforce training grants, and a portfolio of national mathematical sciences research institutes.

Discovery, Connections, Community

The influence of mathematical sciences on our daily lives is fundamental and pervasive. For example, every secure commercial transaction on the Internet is an application of research in number theory and algebraic geometry. Additionally, improvements in weather prediction, search engines, and industrial design processes rest on advances in algorithms and computational mathematics. DMS invests in discovery in mathematics and statistics; promotes interdisciplinary connections across fields of science, engineering, and technology; and cultivates a diverse and capable community of researchers, students, and professionals. The Division's top investment priorities – discovery, connections, and community – are essential components of the innovation engine that drives the nation's economy in the 21st century.

New Initiatives

DMS continues to develop interdisciplinary activities that reflect national priorities. Successful multi-agency programs such as the Joint DMS & National Institute of General Medical Sciences Activity in Mathematical Biology are continuing, and newer DMS activities such as the Mathematical Sciences Innovation Incubator and the Computational and Data-Enabled Science and Engineering in Mathematical and Statistical Sciences program are attracting broad interest from the mathematical sciences community. The DMS Workforce Program in the Mathematical Sciences offers funding opportunities, including the Enriched Doctoral Training in the Mathematical Sciences program, that support efforts to increase the number of well-prepared students who pursue careers in the mathematical sciences and in other NSF-supported disciplines. NSF-wide programs in Cyberinfrastructure Framework for the 21st Century; Materials Genome Initiative; and Science, Engineering, and Education for Sustainability are also providing opportunities for engagement of the mathematical sciences community.

Contact Information

Dr. Michael Vogelius
Division Director

Dr. Henry Warchall
Deputy Division Director

National Science Foundation
Division of Mathematical Sciences
4201 Wilson Boulevard
Room 1025
Arlington, VA 22230

Phone: **(703) 292-8870**
Fax: **(703) 292-9032**
Web: **www.nsf.gov/DMS**

Core Programs

- Algebra and Number Theory
- Analysis
- Applied Mathematics
- Combinatorics
- Computational Mathematics
- Foundations
- Geometric Analysis
- Mathematical Biology
- Probability
- Statistics

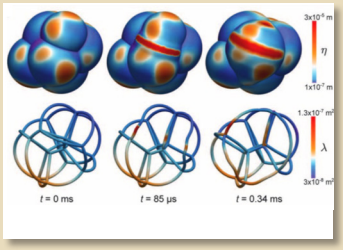
Special DMS Programs

- Mathematical Sciences Innovation Incubator
- Computational and Data-Enabled Science and Engineering in Mathematical and Statistical Sciences
- Focused Research Groups in the Mathematical Sciences
- Mathematical Sciences Infrastructure Program
- Joint DMS/NIGMS Initiative in Mathematical Biology
- Algorithms for Threat Detection
- Workforce Program in the Mathematical Sciences

The Mathematical Sciences Research Institutes program supports a portfolio of projects that advances research in the mathematical sciences, increases the impact of the mathematical sciences in other disciplines, enables the mathematical sciences to respond to national needs, and expands the talent base engaged in mathematical and statistical research in the United States.

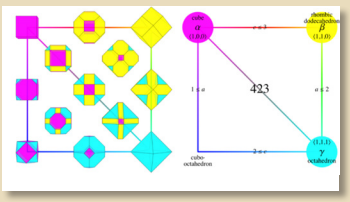
Mathematics Research Communities

The Mathematics Research Communities (MRC) Program, run by the American Mathematical Society and supported by DMS, helps cement new research collaborations through targeted summer conferences, Special Sessions at the Joint Mathematics Meetings, private online discussion networks, and mentoring by senior mathematicians. Ongoing collaborations of MRC alumni include small groups of MRC participants working together, individual participants working with senior mentors from the MRC program, and groups of MRC participants and organizers getting together for workshops to share ideas and explore new avenues.
www.ams.org/programs/research-communities/mrc



Credit: James Sethian and Robert Saye, University of California, Berkeley

Evolution of a Bubble Cluster During Rupture of Internal Membrane: Applied mathematicians James Sethian and Robert Saye described mathematically the successive stages in the complex evolution and disappearance of foamy bubbles, a feat that could help in modeling industrial processes in which liquids mix or in the formation of solid foams such as those used to cushion bicycle helmets.



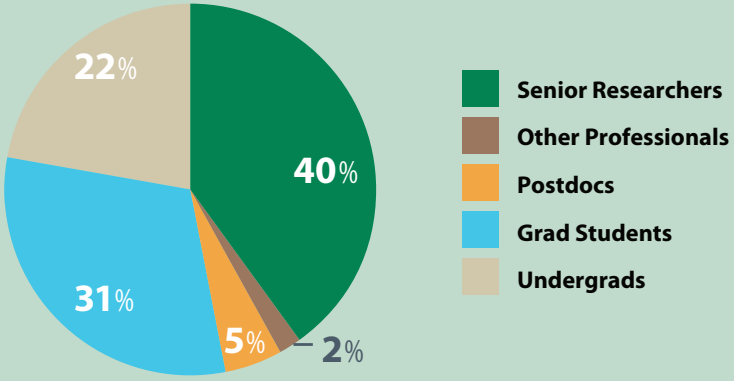
Credit: Elizabeth R. Chen, Harvard University

Two Parameter Families of Polyhedra: Elizabeth R. Chen conducted research on packing polyhedra as part of her Mathematical Sciences Postdoctoral Research Fellowship. She and collaborators studied the optimal packing of three-dimensional geometric solids and discovered that minor shape deformations can have a significant effect on packing density. They examined two-parameter families of polyhedra created by truncating the edges and vertices of shapes, such as the cube and octahedron in the corners of the figure above.

Division of Mathematical Sciences (DMS)

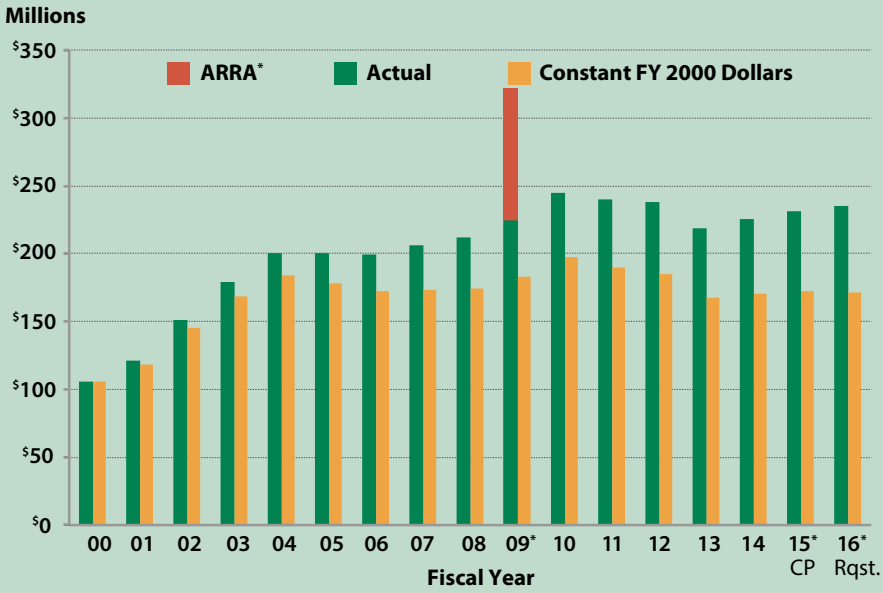
Grant Personnel FY 2014

Distribution of people supported by DMS.



Budget in Actual Dollars and Constant FY 2000 Dollars

Constant dollars show the purchasing power of the DMS budget.

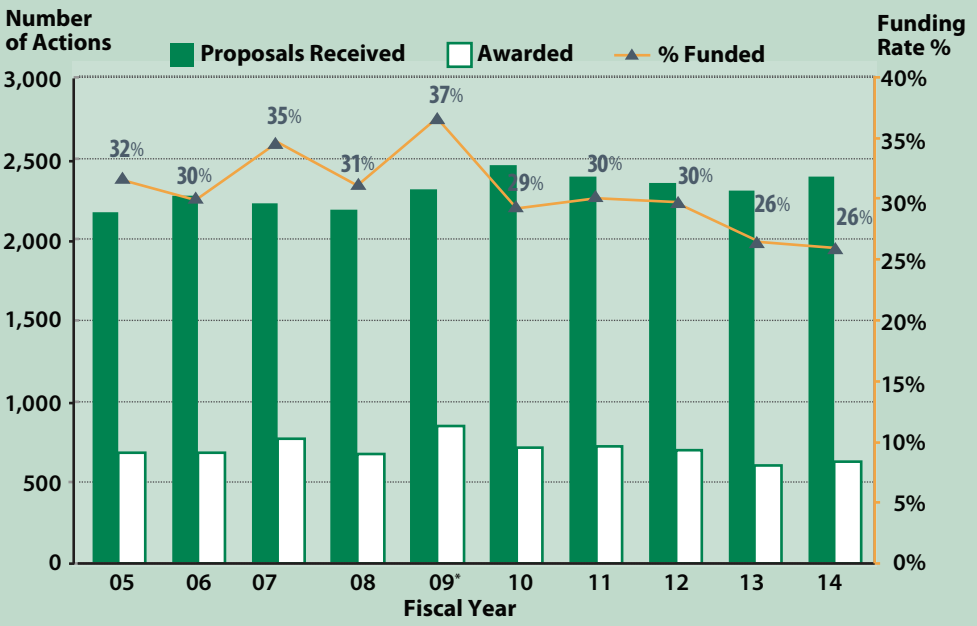


* ARRA - American Recovery and Reinvestment Act of FY 2009. CP = Current Plan, Rqst. = Request.

Data provided from NSF Budget Requests to Congress, www.nsf.gov/about/budget

Funding Rates and Number of Actions

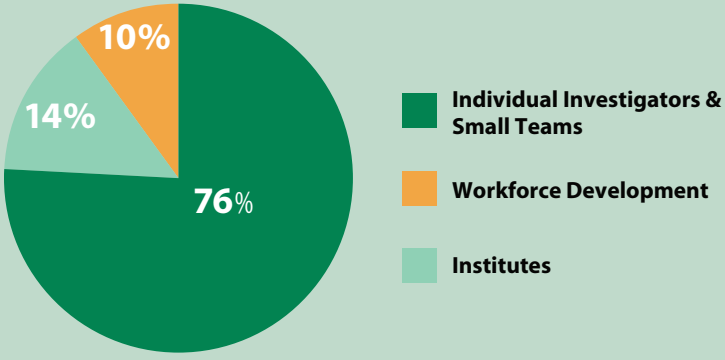
Graph shows number of proposals submitted and awarded Research Grants (as defined by NSF) and resultant funding rates. Funding rate is defined as the percentage of new or renewal proposals awarded funding.



** FY 2009 funding rate includes awards made with ARRA funds.*

Note: The funding reflects the average for DMS and may not represent funding rates in individual programs

Modes of Support FY 2014



Division of Physics (PHY)

Mission

The mission of the Division of Physics is to support fundamental research across the intellectual frontiers of physics; to support research that has broader impacts on other fields of science and on the health, economic strength, and defense of society; to share the excitement of science with the public through integration of research and education; and to maintain the intellectual capital essential for future advances in physics.

Physics research probes the properties of matter at its most fundamental level, the interactions between particles, and the organization of constituents and symmetry principles that lead to the rich structure and phenomena that we observe in the world around us. Physics seeks a deep understanding of processes that led to the formation of the cosmos, to the structure of matter at the very shortest distance scales where quantum effects dominate, and to the structure of atomic and molecular systems that shape and control the everyday world of chemistry and biological systems.

Workforce Development and Broadening Participation

PHY strongly supports workforce development and broadening participation at all levels. This includes outreach efforts in large facilities and centers, a variety of opportunities for undergraduates through the REU program, large-scale projects such as QuarkNet, and individual PI awards. Students of all backgrounds involved in these projects gain skills and knowledge to become members of the nationally critical, technology-centered workforce.

Programs for Individual Investigators and Groups

- Accelerator Science
- Atomic, Molecular, Optical, and Plasma Physics
- Elementary Particle Physics, Astrophysics, and Cosmology
- Gravitational Physics
- Nuclear Physics and Nuclear Astrophysics
- Particle Astrophysics
- Physics of Living Systems
- Quantum Information Science

Contact Information

Dr. C. Denise Caldwell
Division Director

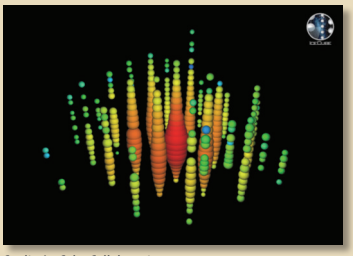
Dr. Bradley D. Keister
Deputy Division Director

National Science Foundation
Division of Physics
4201 Wilson Boulevard
Room 1015
Arlington, VA 22230

Phone: **(703) 292-8890**
Fax: **(703) 292-9078**
Web: **www.nsf.gov/PHY**

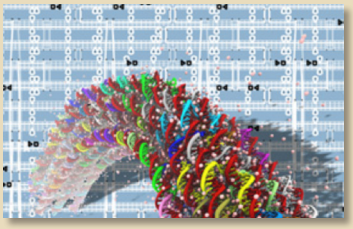
Crosscutting Physics Programs

- Physics Frontier Centers
- National Facilities
  - National Supercomputing Cyclotron Laboratory (NSCL)
  - Laser Interferometer Gravitational Wave Observatory (LIGO)
  - Large Hadron Collider (LHC), a joint NSF-DOE-CERN project
  - IceCube Neutrino Observatory
- Midscale Instrumentation
- Intergrative Activities in Physics
- Physics at the Information Frontier
- Research Experience for Undergraduates (REU) and Teachers (RET)



Credit: IceCube Collaboration

Representation of Highest Energy Neutrino Ever Observed (Top): A graphic representation of the highest energy neutrino every observed, detected by the IceCube Neutrino Observatory with an estimated energy of 1.14 PeV.



Credit: University of Urbana-Champaign, on behalf of the Center for the Physics of Living Cells

Multiple Strands of DNS folded into DNA Origami (Bottom): A model of multiple strands of DNA folded into a coherent structure through a process called DNA origami. Physicists at the Center for the Physics of Living Cells, a Physics Frontiers Center at the University of Illinois at Urbana-Champaign, were the first to understand how the DNA origami structure behaves in the solution used to create it.

The Physics Frontier Centers

The Physics Frontiers Centers (PFC) program advances the intellectual frontiers of physics by supporting university-based centers and institutes where the collective efforts of a larger group can enable transformational research. Each PFC has a strong emphasis in educating students and postdoctoral researchers and outreach to both the scientific community and general population.

The PFC program supports activities in many subfields of physics; these include theoretical and experimental research in: Atomic, Molecular, and Optics Physics; Condensed Matter Physics; Information Sciences, Nuclear Astrophysics, Cosmology, Biophysics, Gravitational Physics, Astronomy, Particle Astrophysics, and Quantum Information Science. Partnerships with other NSF Divisions allow for support of interdisciplinary activities in related and emerging areas.

Physics and the Global Community

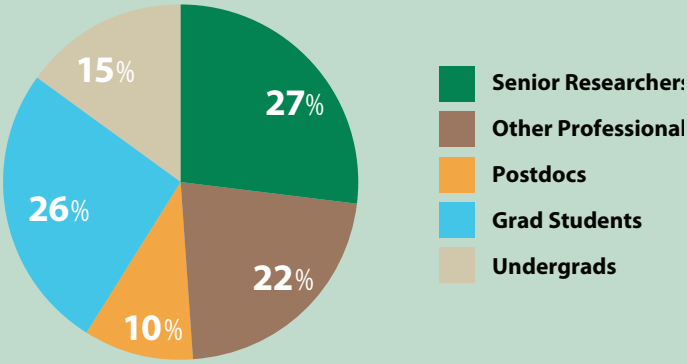
PHY participates in numerous international efforts, including large scale facilities such as the LIGO, LHC, and IceCube facilities, and large astrophysics detectors such as HAWC and the Pierre Auger Observatory.

Additionally, PHY participates in the Open Science Grid, a distributed shared cyberinfrastructure which provides computing and storage resources for large NSF supported international projects.

Division of Physics (PHY)

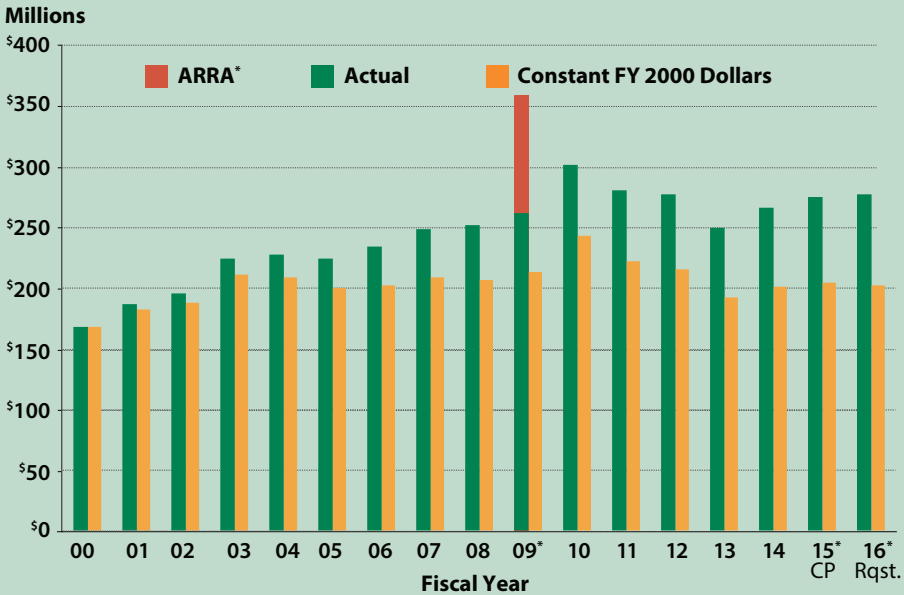
Grant Personnel FY 2014

Distribution of people supported by PHY.



Budget in Actual Dollars and Constant FY 2000 Dollars

Constant dollars show the purchasing power of the PHY budget.



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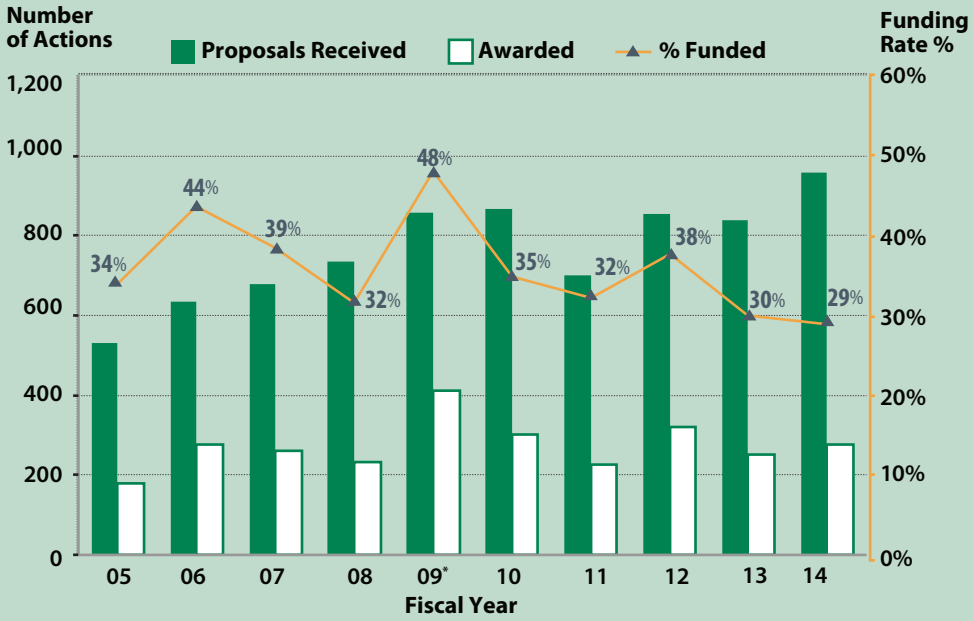

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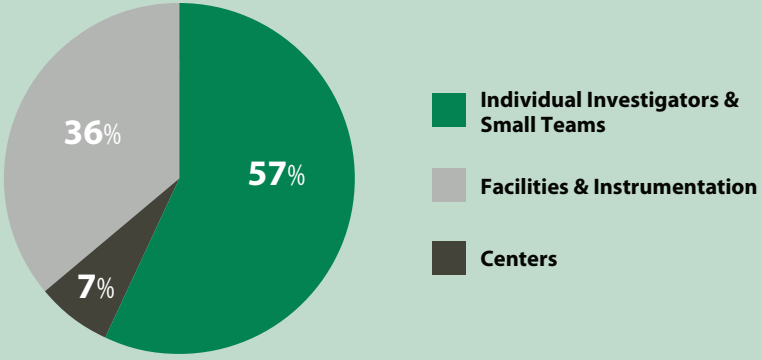
Modes of Support FY 2014



Directorate for

Mathematical & Physical Sciences

PHONE: **(703) 292-8800** | FAX: **(703) 292-9151** | ROOM: **1005N** | **www.nsf.gov/MPS**

Proposal Review: MPS maximizes the quality of the proposals it supports through the use of a competitive, merit-based review process. In FY 2014, 95% of research funds were allocated to externally reviewed projects.

Committee of Visitors (COV): MPS convenes Committees of Visitors, composed of qualified external evaluators, to review each program periodically. These experts assess the integrity and efficiency of the processes for proposal review. COV reports and relevant Directorate responses are available at www.nsf.gov/od/oia/activities/cov/covs.jsp.

MPS Advisory Committee (MPSAC): The Mathematical and Physical Sciences Advisory Committee advises MPS on issues such as: the mission, programs, and goals that can best serve the scientific community; priority investment areas in MPS-supported research; promoting workforce development in the mathematical and physical sciences. Minutes from MPSAC meetings are available at www.nsf.gov/mps/advisory.jsp.

Office of Multidisciplinary Activities (OMA)

OMA seeds crosscutting research in areas of strategic emphasis for MPS as well as areas that might develop into strategic importance; facilitates, partnerships with other agencies, national laboratories, industries, state and local governments, and international organizations; and supports innovative experiments in developing the workforce and broadening participation. The purpose of OMA investments is to initiate, but not sustain indefinitely, these activities.

OMA does not accept external proposals; rather it encourages submission from MPS Divisions of initiatives and projects that are multi-investigator, multi-disciplinary, and strategic to MPS, as well as innovative projects that contribute to a diverse, technical workforce.

Contact Information

Dr. Clark V. Cooper
Head of OMA & Senior Advisor for Science

National Science Foundation
Division of Physics
4201 Wilson Boulevard
Room 1005
Arlington, VA 22230

Phone: **(703) 292-8800**
Fax: **(703) 292-9151**
Web: **www.nsf.gov/OMA**

MPS Staff

Dr. F. Fleming Crim
Assistant Director

Dr. Celeste M. Rohlfing
Deputy Assistant Director

Ms. Zita R. Barnett
Directorate Administrative Coordinator

Mr. Keith Bennett
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Dr. Clark V. Cooper
Senior Science Advisor/Head, OMA

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Dr. G. Wayne Van Citters
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Stanford University

Dr. Emily Carter
Princeton University

Dr. George Crabtree
Argonne National Laboratory

Dr. Juan de Pablo
University of Chicago

Dr. Juan Meza
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Term Expires 9/30/2016

Dr. Emery Brown
Massachusetts Institute of Technology

Dr. Robert Bryant
Duke University

Dr. Bruce Elmegreen
IBM Watson Research Center

Dr. Melanie Sanford
University of Michigan

Dr. William Zajc
Columbia University

Directorate for

Mathematical & Physical Sciences

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Division of Chemistry (**CHE**)

www.nsf.gov/CHE

Division of Materials Research (**DMR**)

www.nsf.gov/DMR

Division of Mathematical Sciences (**DMS**)

www.nsf.gov/DMS

Division of Physics (**PHY**)

www.nsf.gov/PHY

Office of Multidisciplinary Activities (**OMA**)

www.nsf.gov/OMA

NSF 15-038