

# Division of Mathematical Sciences (DMS)

## Mission

The Division of Mathematical Sciences supports research and education projects at the frontiers of discovery that achieve NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense." Modes of support include awards to individual investigators and small groups, workforce training grants, and a portfolio of national mathematical sciences institutes. The Division supports research in core areas of mathematics and statistics as well as interdisciplinary research that crosses traditional boundaries of the physical, biological, social, and engineering sciences.

## Discovery, Connections, Community

The influence of mathematical science 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. Melding of the banking, insurance, and finance industries turns on recent advances in probability and stochastic calculus. And improvements in weather prediction, search engines, and industrial design processes are predicated on advances in algorithms and computational mathematics. Investing in discovery in mathematics and statistics; exploiting interdisciplinary connections across fields of science, engineering and technology; and cultivating a diverse community of researchers, students, professionals, and citizens—these are essential components of the innovation engine that drives the Nation's economy, and they lie at the root of many DMS activities and programs.

## Mathematical Sciences Priority Area

FY 2007 marks the close of a six-year, NSF-wide activity that saw substantial growth in the Division's budget and mix of awards. The goal of the priority area was to advance frontiers in three interlinked areas: fundamental mathematical and statistical sciences, interdisciplinary research connecting the mathematical sciences with science and engineering, and critical investments in mathematical sciences education.

## Contact Information

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Credit: John Stembridge, University of Michigan.

The largest of the exceptional simple Lie groups is called  $E_8$ . It is realized as the group of symmetries of a 57-dimensional geometry and itself has dimension 248. The figure above is a two-dimensional projection of an eight-dimensional combinatorial object called the Gosset polytope 421, which describes much of the construction of  $E_8$ .

## Programs in Mathematical Sciences

### Disciplinary Programs

Algebra, Number Theory, and Combinatorics

Analysis

Applied Mathematics

Computational Mathematics

Foundations

Geometric Analysis

Mathematical Biology

Probability

Statistics

Topology

### Special DMS Programs

Collaboration in Mathematical Geosciences

Focused Research Groups in the Mathematical Sciences

Infrastructure

Joint DMS/National Institute of General Medical Sciences (NIGMS) Initiative in  
Mathematical Biology

Mathematical Sciences: Innovations at the Interface with Computer Sciences

Mathematical Social and Behavioral Sciences

*A Guide to Programs / Browse Funding Opportunities* is available at [http://www.nsf.gov/funding/browse\\_all\\_funding.jsp](http://www.nsf.gov/funding/browse_all_funding.jsp).

**Mathematical Sciences Research Institutes** are large scale projects that advance research in the mathematical sciences, increase the impact of the mathematical sciences in other disciplines, enable the mathematical sciences to respond to national needs, and expand the talent base engaged in mathematical and statistical research in the U.S.

The **Workforce** program offers competitions such as Enhancing the Mathematical Sciences Workforce for the 21st Century, whose goal is to increase the number of well-prepared U.S. citizens and permanent residents who pursue careers in the mathematical sciences and in other NSF-supported disciplines.

### Enhancing Diversity in Graduate Education (EDGE):

#### A Transition Program for Women in the Mathematical

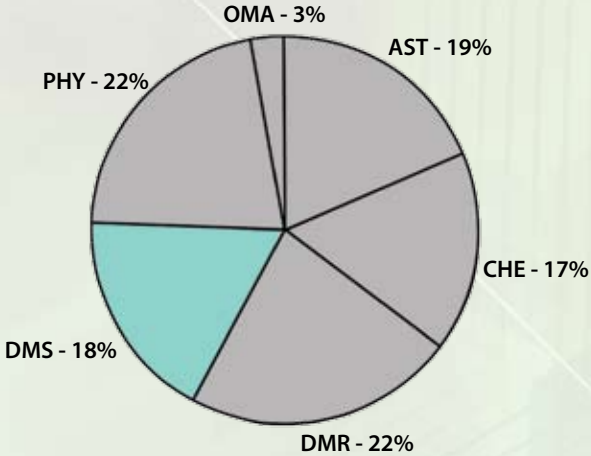
**Sciences** The EDGE Program, a DMS Workforce project funded jointly with The Andrew W. Mellon Foundation, is designed to strengthen the ability of women and minority students to successfully complete graduate programs in the mathematical sciences.



Participants and faculty in the 2005 EDGE Program held on the campus of North Carolina A&T State University, under the direction of Local Coordinators Dr. Janis Oldham and Patricia Shelton. The program, established in 1998, is co-directed by Dr. Sylvia Bozeman (Spelman College) and Dr. Rhonda Hughes (Bryn Mawr College).

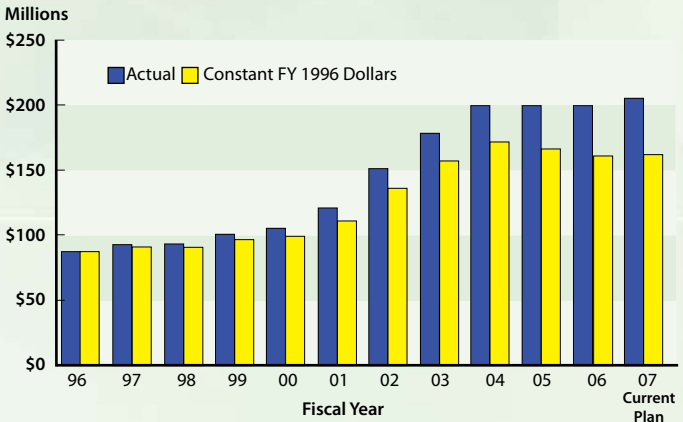
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## MPS Funding FY 2007 Current Plan



Pie chart showing divisional portions of MPS total budget for FY 2007. DMS will spend \$206 million in FY 2007, which is 18% of the total MPS budget. Totals may not add due to rounding.

## Budget in Actual and Constant FY 1996 Dollars

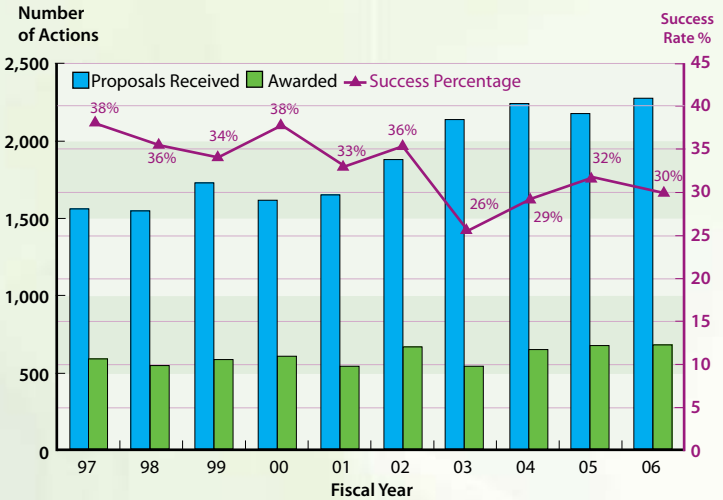


DMS annual budgets in actual and constant FY 1996 dollars. Constant dollars show the purchasing power of the DMS budget. Over this 12-year period, the constant dollar budget for DMS has increased 85%.

Data provided from FY 1998 to 2008 NSF Budget Requests to Congress, <http://www.nsf.gov/about/budget/>. Constant 1996 Dollar Deflator from Section 10 of the Gross Domestic Product and Implicit Outlay Deflators, Historical Tables of the U.S. Budget, FY 2005, <http://www.whitehouse.gov/omb/budget/fy2008/pdf/hist.pdf>.

# DMS

## Success Rates and Number of Actions

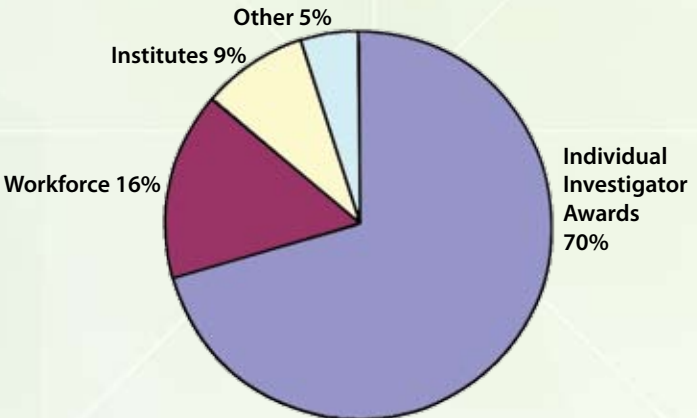


Graph shows number of proposals submitted versus awarded for Research Grants as defined by NSF and resultant success rates. Success rate is defined as the number of new or renewal proposals awarded funding divided by the total number of proposals received. The number of proposals received by DMS in 2006 was 45% higher than in 1997.

*Note: the distribution of success rates reflects the average for the Mathematical Sciences Division and may not represent success rates in individual programs.*

## Mathematical Sciences FY 2006 Budget

**\$200 Million**



Pie chart showing breakdown of FY 2006 DMS budget by funding categories. Individual Investigator awards refer to awards in Disciplinary Programs and Special DMS Programs.