Grant Proposals
Grant proposals ...

- Which funding agency?
- AMS/Simons Foundation grants
- AWM travel grants
- NSA grants (on pause)
- NSF grants
  - What should be contained in an NSF proposal?
  - How are NSF proposals reviewed?
  - How to write a proposal narrative?
  - What can be supported by grants?
Funding agencies …

- **AMS / Simons Foundation**: Travel and Collaboration grants
- **AWM**: Travel grants
- **National Science Foundation (NSF)** provides 65% of the funding for academic research in the mathematical sciences, most of it through the Division of Mathematical Sciences (DMS)

Other funding agencies that provide funding for pure or applied mathematics are

- **Department of Defense**
  - Air Force Office of Scientific Research (AFOSR)
  - Army Research Office (ARO)
  - Office of Naval Research (ONR)
  - Defense Advanced Research Projects Agency (DARPA)
  - National Security Agency (NSA)
- **Department of Energy**
- **National Institutes of Health (NIH)**

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<th>FY 2010 Actual</th>
<th>FY 2012 Budget</th>
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<td>Imaging &amp; Bioengineering</td>
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<td><strong>Total Mathematical Sciences</strong></td>
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¹SciDAC: Scientific Discovery through Advanced Computing

Source: Agency budget justifications and other agency communication.

All figures rounded to the nearest million. Changes calculated from unrounded figures.
AMS-Simons Foundation and Simons Foundation grants

- **AMS-Simons Travel Grants: two years duration**
  - Provides $2K per year to early-career mathematicians for research-related travel
  - Eligibility:
    - PhD completed within the last four years
    - Employed by US institution or be US citizen working abroad
    - Not currently in residence at an NSF Mathematics Institute, and not receiving external funds with substantial support for research or travel
  - Application deadline in late March

- **Collaboration Grants for Mathematicians: five year duration**
  - $5K per year for collaboration, travel, and research expenses
  - $1K per year in discretionary funds for the awardee's department to enhance the research atmosphere within the department, plus $1K per year in indirect costs
  - Eligibility:
    - Must have a tenure-track or tenured position at a US institution
    - Current record of active research and publication in high-quality journals
    - Not hold any other grants of over $3K per year that include support for travel or visitors during the Collaboration Grant award period
  - Application deadline in late January
Association for Women in Mathematics (AWM) grants

- **AWM Travel grants:**
  - Provides up to $2,300 for domestic travel and of $3,500 for foreign travel
  - Goal: Funds travel and subsistence for a meeting or conference in the applicant’s field of specialization.
  - Eligibility:
    - Not receiving more than $2,000 in external governmental travel funds
    - Work address in the US
    - Applications due February 1, May 1, and October 1

- **AWM Mentoring Travel grants:**
  - Provides up to $5K
  - Goal: Funds travel and accommodation for an untenured woman mathematician to travel to an institute or a department to do research with a specified individual for one month.
  - Eligibility:
    - Work address in the US
    - Applications due February 1
National Security Agency (NSA)

- **Mathematical Sciences Program**
  - Support research in Algebra, Number Theory, Discrete Mathematics, Probability, and Statistics (but not cryptology)
  - Young Investigator, Standard, Senior, Conferences/Workshops/REUs grants
  - Young Investigator grant: up to $20K per year for two years
  - Eligibility: US citizen or permanent residents
  - Application deadline is 15 October (awards are made in the following fall)

- **Sabbaticals Program**
  - Work with NSA scientists on analysis of data sets, cryptology, discrete mathematics, signals analysis, number theory, probability, statistics ...
  - Eligibility: US citizen
NSF Division of Mathematical Sciences:

- NSF Postdoctoral Fellowships
- Standard PI grants in disciplinary programs: Algebra and Number Theory, Analysis, Applied Mathematics, ...
- CAREER grants ...
- Conference grants ...
and many other types of grants ...

Most universities require that proposals are submitted internally to the Office of Sponsored Projects some time before the NSF deadline: at Brown, 6 business days before the deadline!
Budget in Actual and Constant FY 2000 Dollars

The DMS budget. Over this 11-year period, the constant dollar budget for DMS has increased 82%.

DMS annual budgets in actual and constant FY 2000 dollars. Constant dollars show the purchasing power of

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**Pie chart showing total number of people involved in DMS.**

- Senior Researchers - 23%
- Other Professionals - 1%
- Postdoctorates - 6%
- Graduate Students - 41%
- Undergraduate Students - 28%
- K-12 Students - 1%

Total may not add due to rounding.

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**Modes of Support FY 2009**

- Individual Investigator Awards - 72%
- Workforce - 17%
- Centers/Institutes - 8%
- Other - 3%

Total may not add due to rounding.

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**Funding Rates and Number of Actions**

Graph shows number of proposals submitted versus awarded for Research Grants as defined by NSF and includes awards made with ARRA funds. Note: the distribution of success rates reflects the average for the Mathematical Sciences Division and may not represent success rates in individual programs. Success rate is defined as the number of new or renewal proposals awarded funding divided by the total number of proposals received.

Funding Rates:

- FY 2000: 38%
- FY 2001: 33%
- FY 2002: 36%
- FY 2003: 26%
- FY 2004: 29%
- FY 2005: 32%
- FY 2006: 30%
- FY 2007: 35%
- FY 2008: 31%
- FY 2009: 37%

Number of Actions:

- FY 2000: 1,000
- FY 2001: 1,500
- FY 2002: 2,000
- FY 2003: 2,500
- FY 2004: 3,000
- FY 2005: 3,500
- FY 2006: 4,000
- FY 2007: 4,500
- FY 2008: 5,000
- FY 2009: 5,500

Totals may not add due to rounding.
NSF postdoctoral fellowships

- Eligibility: US citizen, national or permanent resident
- Competitive and prestigious awards (around 30-33 awards made per year)
- Support for 2 years (but can be spread over 3 years and combined with teaching)
- Affiliated with US or international institutions and organizations
- Research program for 2-3 years
- Fit with career goals
- Match with sponsoring scientist and with host institution

Proposal consists of
- Summary (1 page)
- Description (3-5 pages)
- Biosketch (2 pages)
- Sponsoring scientist statement
- 3-4 letters of reference (including one from PhD advisor); sponsoring scientist cannot write

Applications due in mid October
NSF standard grants (usually 3 year duration)

- Proposal narrative (≤15 pages)
- Proposal summary (1 page)
- Biosketch (2 pages)
- Budget
- Budget justification
- Current and pending support
- Data management plan
- Facilities, equipment, and other resources

The NSF Grant Proposal Guide outlines the rules for each of these sections: there are rules regarding format, font size, margins, content, ...
Proposal review ...

- Two kinds of reviews:
  - mail reviews
  - panel reviews: reviewers may not be in your immediate or even broader field!
- Reviewers and panels make recommendations to program officers
- Program officers make recommendations to the Division of Mathematical Sciences
- Only NSF’s Grants and Agreements Division can award grants

Two review criteria:

- Intellectual merit: Scientific merits and your qualifications as researcher
- Broader impacts: (must now be addressed in separate section in proposal narrative)
  - Integration of research and education/training/mentoring
  - Plans to broaden participation of underrepresented groups?
  - Plans for broad dissemination?
  - Benefits to society?

It takes 6-8 months before you might hear from your program officer with a tentative decision
How to write the proposal narrative (≤15 pages) ...

- **Follow the guidelines!**
- **Start early:** You may need 4-6 weeks to write a proposal.
- **Get feedback:** Ask mentors and colleagues to read your proposal (well before the deadline!)
- **Write well:** Do not assume that reviewers will be familiar with your area.
- **Be persuasive:** Why should NSF fund this research? Why is your research important and why are you the person to carry out the proposed work?

- Choose some projects that you know how to address and others that are more open-ended; illustrate your vision; avoid being incremental or too open-ended.
- **Two bad extremes:**
  - Long list of projects without any details (criticism: Do you have a plan for addressing them? What difficulties do you anticipate?)
  - Very short list of projects with many details (criticism: Is this enough for a 3-year grant?)
- **Motivate your projects:** why are they important, what outcomes do you expect, how do you plan to approach them?
- **Give background and review your recent work in the area.**
- **Address broader impacts explicitly in your proposal;** also mention which projects will be worked on by undergraduate or graduate students.
Budget ...

- Salary (for up to two months)
- Support for graduate students and undergraduate summer research
- Travel to conferences
- Support for visitors
- Equipment such as computers
- Supplies

Key is to justify requests (name graduate students if known, list conferences you plan to attend, name visitors, justify need for new computers, justify requests for software, ...