Workshop on Grant Proposals

Department of Mathematics
UCLA
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Which grants can postdocs apply for?

Some choices:

- AMS-Simons Travel Grants
- Math. Sciences NSF Postdoctoral Fellowships (US citizens and permanent residents; at most years past PhD)
- Individual NSF research grant from DMS (=Division of Mathematical Sciences)

AMS-Simons Travel Grants

- Funding: $5,000 for a two-year period (about 70 grants per year).
- Eligibility: Recent PhDs (up to four years past PhD). Applicants must be employed by U.S. institutions, have U.S. home addresses, or be U.S. citizens working abroad. Excluded are applicants who have another major funding source (such as an NSF grant).
- Application materials: CV, statement of research (2.5 pages), two letters of reference (including one from mentor). Applications through: `https://www.mathprograms.org/`
- Applications accepted: February 1, 2022–March 31, 2022.
- Web-page: `http://www.ams.org/programs/travel-grants/AMS-SimonsTG`

Math. Sciences NSF Postdoctoral Fellowships

- Funding: $150,000 total (intended for 2 years without teaching or for 3 years with teaching).
- Eligibility: U.S. citizens or permanent residents. Recent PhDs (up to 2 years past PhD as of Jan. 1 of year when fellowship starts). This means: usually, applicants apply in the fall before the graduate (typically, in the spring of the following year). Applicants can still apply in the fall of their first postdoc year.
- Applications: through FastLane. Cover sheet, project summary (1 page) project description (up to 5 pages), bio-sketch. 3–4 letters of reference+ statement of sponsoring scientist.
- Deadline: October 20, 2021.
- Web-page: `https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5301`

The National Science Foundation

- The National Science Foundation (NSF) is a United States government agency. It supports fundamental research and education in all the non-medical fields of science and engineering. With an annual budget of about $8.3 billion (fiscal year 2020), the NSF funds approximately a quarter of all federally supported basic research conducted by the U.S. colleges and universities. In mathematics the NSF is the major source of federal funding. (Wikipedia)
- DMS (Division of Mathematical Sciences) within the Directorate of Mathematical and Physical Sciences (MPS) of NSF has a yearly budget of about $210–240 million.
- Web-page: `https://www.nsf.gov/`

Individual NSF research grants I

- Funding: This varies. Typically about \$60,000–\$400,000 for a three-year period. Mostly for summer salary (up two summer ninths), but also for graduate students, REU projects, travel support, and equipment.
- Eligibility: All researchers with an academic affiliation in the U.S.

Individual NSF research grants II

- To apply for funding, you have to submit a research proposal through FastLane. This is processed through the Department's Finance Office: Rochelle Garcia (Finance Manager), Aileen Tong and Nicole Strosaker (individual NSF grants).
- Proposals are evaluated by a panel of experts in the area (faculty from universities in the U.S. and abroad) in a "merit review process" under the guidance of NSF Program Officers. Typically, a dozen panelist evaluate 50–60 proposals in an in-person meeting during 2–3 days.
- NSF receives about 42,000 proposals a year and funds about 12,000.
- There are currently 133 active NSF awards at UCLA. See `https://www.nsf.gov/awards/award_visualization.jsp?org=MPS`

Individual NSF research grants III

- Deadlines: Depends on the research area. Typically, late September/early October. Program areas are:
  - Algebra and Number Theory
  - Analysis
  - Applied Mathematics
  - Computational Mathematics
  - Probability, Combinatorics, & Foundations
  - Statistics
  - Topology & Geometric Analysis
  - Mathematical Biology

  For example: for proposals in Analysis the deadline is September 30, 2021. See `https://www.nsf.gov/funding/pgm_list.jsp?org=mps`

Important: Our Finance Office needs the full proposal two weeks before the deadline. Has to be processed through OCGA.

Proposal preparation I

Full details can be found in the Proposal & Award Policies & Procedures Guide (PAPPG):
`https://www.nsf.gov/pubs/policydocs/pappg20_1/`

Components of the proposal:

- Title and Project Summary: 1 page addressing the Merit Review Criteria explicitly: Intellectual Merit and Broader Impacts.
- Project Description:
  - Formatting requirements: up to 15 pages. Font no smaller than 11 pts. Margins, in all directions, must be at least an inch. No url-addresses.
  - Narrative in the third person: the PI ("principal investigator") proposes such and such intended research.
  - Very important: Merit Review Criteria (Intellectual Merit and Broader Impacts) have to be addressed explicitly.

Proposal preparation II

- List of cited references (with separate pagination; requires some tricks in Latex).
- Biographical Sketch (2 pages according to a standard format)
- Budget (drafted with help of Finance Office) and Budget Justification (for example, a couple of sentences about travel plans or about purchasing equipment)
- Current and Pending NSF Support (if any)
- Facilities, Equipment and Other Resources (if any special needs and requirements)
- Data Management Plan (a couple of sentences how you plan to disseminate research results: publication in journals or postings on your web-site)
- COA: Potential conflicts of interests (PhD advisors and collaborators; standard template provided by Finance Office).

Merit Review Criteria I

Important

Project description and project summary have to explicitly address NSF's "Merit Review Criteria": Intellectual Merit and Broader Impacts.

- Intellectual Merit: the potential to advance knowledge. This is easy to address within the overall narrative of the project description: background for the proposed research, problems that will be studied, why these problems are important, how they will be approached, how the proposed research fits into a bigger research landscape.

Merit Review Criteria II

- Broader Impacts: potential benefits to society. The expectations in this category for junior researchers are modest. Mention some activity in the past or a planned activity in the future that goes beyond the standard professional duties in teaching and research. Tell them what they want to hear! Examples:
  - (Co-)organization of seminars, workshops, or conferences.
  - Research or learning projects with undergraduate students (such REU) or PhD students.
  - Activities to increase equity, diversity, and inclusion.
  - Outreach activities for K–12 students (MathCircle, Curtis Center).

Important: Broader Impacts are often a tie-breaker for high-quality proposals!

How to write a good Project Description I

- Make it reader friendly! A common mistake is that PIs think that everything they learned in their academic careers is well known. Include a page or two with an introduction and general background to the subject area.
- Try to include some basic definitions and results absolutely relevant for the discussion. If this is too technical, give a few good pointers to the literature and try to provide some intuitive way how to think about some concepts.
- Include important literature citations, but do not go overboard with this. You are not expected to give a comprehensive survey of the literature.

How to write a good Project Description II

- State specific goals for the project, for example open problems that you want to solve. This should be a mixture of problems that you know how to solve (or maybe have already solved, but have not yet published the result), harder problem that are within reach, and maybe very hard problems that you may not be able to solve, but give guidance for future directions.

- If your proposal gets funded, it is at your discretion what you want to work on. You have to write a yearly project report, but no one will hold you accountable if your research takes a different turn.

- Try a mixture of depth (maybe something that you know better than anybody else) and some breadth to avoid the impression of being too narrowly focused.

How to write a good Project Description III

- Ask your senior faculty mentor for some advice and feedback about scientific content and presentation. Ask them to read your proposal draft. This is an expected duty of faculty mentors, but you have to give them enough time (maybe a week or two). Ask postdoc colleagues in your area to read your proposal: they can give you valuable feedback about readability.

- Carefully proofread the final draft and make sure that you adhere to all formatting requirements. A well-crafted proposal leaves a good impression with the panelists.

How to get started?

- Let the our Finance Office know that you intend to submit an NSF proposal in the fall.
- Choose a title for your proposal (this doesn't have to be fancy and can be fairly generic) and get the more technical things (budget, biosketch, etc.) out of the way quickly.
- Allow plenty of time for drafting the project description. Now is a good time to get started with this: the sooner, the better!
- The project summary can be left to the very last, once the project description is written.