How to Obtain Funding*

Rice ADVANCE

This work is produced by OpenStax-CNX and licensed under the
Creative Commons Attribution License 2.0†

Abstract

This information was compiled by Semahat Demir (NSF), Lydia Kavraki (CS), Rob Raphael (BIOE), and Joan Strassmann (EEB).

1 Funding is Important – Lydia Kavraki (CS)

- You need to be prepared to address the issue in the long run
- You need more than a great idea
- You need to understand the logistics

2 Funding - Logistics

1. Identify a funding agency and learn everything you can about this agency (the web and your colleagues are good sources)
2. Understand what is the mechanism for submitting a proposal from your institution ("Office of Sponsored Research")
3. Develop a time frame for writing and proofreading the proposal

2.1 1. Funding Opportunities

NIH - www.nih.gov[1]

- CRISP – Database of funded projects
  - http://crisp.cit.nih.gov/
- NIH Review Criteria
  - http://www.csr.nih.gov/guidelines/r01.htm[2]
- Article: How to get NIH funding

*Version 1.3: Feb 22, 2010 11:00 pm -0600
†http://creativecommons.org/licenses/by/2.0/
[1]http://www.nih.gov/
[2]http://www.csr.nih.gov/guidelines/r01.htm

- http://nextwave.sciencemag.org/cgi/content/full/2000/10/12/1[3]

NSF - www.nsf.gov[4]

- CAREER program
  - http://www.nsf.gov/home/crssprgm/career/start.htm[5]
- Engineering Division
  - http://www.nsf.gov/home/eng/
- Article: NSF grant writing
  - http://nextwave.sciencemag.org/cgi/content/full/2000/07/06/8[6]

- Private Foundations

- Office of Naval Research (ONR) and other federal programs

NIDRR - The National Institute on Disability and Rehabilitation Research

- http://www.ed.gov/fund/grant/apply/nidrr/index.html[7]

- Miscellaneous Funding links
  - GrantsNet - http://www.grantsnet.org/[8]
  - Science Magazine – search for articles
    - http://nextwave.sciencemag.org/[9]
  - Grant writing
    - http://www.research.umich.edu/proposals/PWG/pwgcontents.html[10]
    - Google search for articles
    - Book – Research Proposals: A Guide to Success (Ogden and Goldberg)
- Industry
  - SBIR mechanism (NSF, NIH)
  - Direct Funding from Companies

**modified from Kinney, Neptune and Wilson]*

2.2 2. Your University

- A proposal needs a budget and appropriate signatures
- Lead time is typically required
- Your colleagues can help you understand all that

[3] http://nextwave.sciencemag.org/cgi/content/full/2000/10/12/1
[4] http://www.nsf.gov/
[5] http://www.nsf.gov/home/crssprgm/career/start.htm
[6] http://nextwave.sciencemag.org/cgi/content/full/2000/07/06/8
[7] http://www.ed.gov/fund/grant/apply/nidrr/index.html
[8] http://www.grantsnet.org/
[9] http://nextwave.sciencemag.org/
[10] http://www.research.umich.edu/proposals/PWG/pwgcontents.html

2.3 3. Time Frame

- Allow time for many drafts
- Allow time for feedback
- Allow extra time

2.4 Funding is Important

You need to be prepared to address the issue in the long run

- How will you prepare yourself for the next grant?

You need more than a great idea

- You need to be able to communicate and support your idea

- You need to understand the logistics

3 Do not Let Funding Consume You

- Your "**growth**" as a researcher is essential
- Publish, collaborate, discuss your ideas, read, be brave and be prepared to fail

4 NSF, Funding Opportunities and Successful Proposal Writing – Semahat Demir (NSF)

4.1 Outline

- Overview of NSF
- Different NSF Funding Opportunities
- NSF's Priority Areas (NSF-Wide Investment Areas)
- NSF Merit Review Criteria
- Tips for Successful Proposal Writing

5 NSF Vision

NSF: Where Discovery Begins
Enabling the Nation's future through discovery, learning and innovation.

5.1 Overview

- Founded in 1950
- An independent federal agency
- Responsible for advancing science and engineering
- Makes merit-based grants and cooperative agreements
    - Individual researchers and groups
    - Colleges, universities,
    - Other institutions: public, private, state, local and federal
- Does not operate laboratories

- Peer-review and evaluation of 42,000 proposals (FY05) submitted by science and engineering research and education communities
  - 9,800 new awards (success rates are different for different programs)
  - 246,000 proposal reviews done

5.2 NSF Support as a Percent of Total US Federal Support for Academic Basic Research in Selected Fields

- Physical Sciences: 40%
- Engineering: 46%
- Social Sciences: 52%
- Environmental Sciences: 54%
- Biology (excluding NIH): 66%
- Mathematical Sciences: 77%
- Computer Science: 86%

6 Funding Opportunities at NSF

- Individual Programs
  - Research, education, center programs
- Priority Areas (Investment Areas for FY)
  - Cross-Programs and Cross-Directorates
- Cross Disciplinary Areas
  - Cross-Programs and Cross-Directorates
- Interagency Programs
  - NSF, and other government agencies

6.1 Award (Grant) Types

- Individual Investigator Initiated Awards
- CAREER Awards
- Center Awards
- SBIR/STTR awards
- SGER awards
- Supplements
- Workshops, conferences

6.2 NSF Disciplines & Structure

1. Biological Sciences (BIO)
2. Computer and Information Sciences and Engineering (CISE)
3. Education and Human Resources (EHR)
4. Engineering (ENG)
   - Biomedical Engineering Program
5. Geosciences (GEO)
6. Mathematical and Physical Sciences (MPS)

7. Social, Behavioral And Economic Sciences (SBE)
8. Polar Programs
9. Office of Cyberinfrastructure
10. Office of International Science and Engineering
11. Office of Integrative Affairs

7 NSF-Wide Investment Areas (FY 06)

- Nanoscale Science and Engineering
- Biocomplexity in Environment
- Human and Social Dynamics
- Mathematical Sciences
- Cyberinfrastructure

8 NSF-Wide Investment Areas (Request for FY 07)

- Biocomplexity in Environment
- Climate Change Science Program
- Cyberinfrastructure
- Human and Social Dynamics
- International Polar Year
- Mathematical Sciences
- National Nanotechnology Initiative
- Networking Information Technology R&D

9 NSF Merit Review Criteria

- Criteria include:

- What is the intellectual merit and quality of the proposed activity?

- What are the broader impacts of the proposed activity?

9.1 What is the intellectual merit of the proposed activity?

Potential Considerations:

- How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
- How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.)
- To what extent does the proposed activity suggest and explore creative and original concepts?
- How well conceived and organized is the proposed activity?
- Is there sufficient access to resources?

9.2 What are the broader impacts of the proposed activity?

Potential Considerations:

- How well does the activity advance discovery and understanding while promoting teaching, training and learning?
- How well does the activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?
- Will the results be disseminated broadly to enhance scientific and technological understanding?
- What may be the benefits of the proposed activity to society?

10 Tips for Successful Proposal Writing

Determine if your project is relevant to the program

- Get in touch with the Program Director
- Program Director:
  - Review Panels
  - Award/decline recommendation
  - Post management of the awards (progress report)

- Follow the instructions posted by the agency
  - Format, sections, project plan
  - Agency's Review Criteria (NSF Merit Review Criteria)
  - Priority Areas for the agency
- Respond to a solicitation
  - Deadlines (pre-proposal, letter of intent, full proposal)
  - Additional review criteria and requirements
- Read "successful" proposals of your colleagues
- Have your proposal reviewed by collaborators or colleagues before submitting
- Do not submit on the day of the deadline

11 How to Obtain Funding: An Assistant Professor's Guide – Robert M. Raphael

11.1 Spirit of the Fighting Irish

"To everyone who has ever faced adversity, whether in business, professional or personal life. I admire the person who says: Every day someone does something great. Today that person will be me." – Lou Holtz

12 Writing Great Grants: A Three Step Recipe

1) Choose a significant problem

- Bonus points if not much work has been done on the problem
- More bonus points if **you** have done the important work

2) Leave no question that you can accomplish your aims

- Established track record of publications
- Clear and convincing preliminary data

3) Write a clear, easy to read proposal

- "Calm down, understand the situation and communicate clearly" – We Were Soldiers

13 Big Hurdles and Pitfalls

Navigating the Scylla of building on your accomplishments and the Charybdis of creating new research problems and attacking new research areas, given your situation:

- Laboratory techniques not yet working
- Students not yet trained/busy with classes
- Teaching and other responsibilities

- Proposing to do too much

- Not making clear the points and connections that are obvious to you

14 Final Do's and Dont's

- Do not necessarily assume the person who reviews your grant will be an expert in your area or know why your research is novel

The response to a revised NIH grant is very important.

- Never appear to be angry or emotional. Just stick to the science. If a reviewer got something wrong (which often happens), just lay out the facts.
- This is hard because you have put so much effort into the grant it's easy to take comments personally
- Criticisms are of the science, not of you!

Get grants done in advance and have colleagues read them !

- Resist the thrill of pulling it off on "third and long"

14.1 Acknowledgements

Raphael Lab

- Emily, Yong, Ryan, Jeff, Imran, Jenni, Louise

Thanks for Believing in Us!

- NSF CAREER
- Whitaker Foundation
- Texas Advanced Technology Program
- National Organization for Hearing Research
- NIH NRSA (Greeson, Organ)
- NSF-IGERT
- Keck Center for Computational and Structural Biology
- DOE Computational Science Graduate Fellowship

15 So you want someone else to pay for your research? - Joan E. Strassmann (EEB)

1. Ask important, big questions.
2. Have several projects at once.
3. Write clear, well-researched proposals.
4. Collaborate.
5. Identify all possible funding sources and learn their cultures.
6. Don't let funding consume you. Keep publishing!

15.1 Ask important questions

- Do not redo your Ph.D. or postdoc work.
- Find a substantially new project if your proposal is rejected twice.
- Read deeply and broadly (at least 5 articles a day).
- Be creative.
- Do not be afraid to do something really different.
- Talk to lots of people about research.

15.2 Do several projects at once

- Keeps you excited.
- When one project faces problems, another could be blooming.
- Increases funding opportunities.
- Synergy in thinking about different things can suggest novel pathways.
- Increases your visibility.

15.3 Write clear, well-researched proposals

- The proposal must be impeccable, no typos, clear headers, clear flow from hypotheses to methods.
- Follow the format of the agency exactly.
- Include preliminary data and figures.
- Get sample funded proposals by asking people for them, preferably those not too close to your research.
- Have several people read your proposal.
- Leave enough time, at least 3 months.

15.4 Collaborate

- New ideas often come from collaboration.
- Techniques and approaches can be shared.
- This is the ONLY way to succeed without turning into a workaholic.
- Teamwork is fun!
- Find collaborators from a broader pool than is initially comfortable, and bridge the gaps with frequent meetings.
- Same-stage collaborators are often best.

15.5 Identify all possible funding sources and learn their cultures

- NSF and NIH are not the only sources of funding.
- Learn about those grants requiring nominations, and get them.
- Take advantage of your sponsored research office in learning about private funding.

15.6 Keep Publishing

- The search for funding can be discouraging.
- Keep trying, but don't forget to keep publishing anyway.
- Write up your research quickly.
- Write a minireview, review, perspective etc. at least every 2 years.

16 Have fun! It's a great life!