National Science Foundation
NSF - Our major source of funding

- Annual budget of $7.03 billion
- Funds non-medical biology, engineering and mathematics research
- Responsible for about 20% of all federally funded research
Organization

- Research Directorates
  - Biological Sciences
  - Computer and Information Sciences
  - Engineering
  - Geosciences
  - Mathematical and Physical Sciences
  - Social, Behavioral and Economic Sciences
  - Education and Human Resources
Other Research Offices

- Office of Cyberinfrastructure
- Office of Polar Programs
- Office of Integrative Activities
- Office of International Science and Engineering
History

- Founded in 1950 as a response to lack of formalized scientific infrastructure in World War 2
- The Manhattan project showed what government funding of scientific research could bring about
- Competition during the cold war helped inflate NSF’s coffers
The NSF funds many different kinds of projects

- Observatories
- Synthesis Centers
- Multi-Institution research projects
- Graduate Students and Postdocs
Long Term Ecological Research
Synthesis Centers

National Center for Ecological Analysis and Synthesis

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National Ecological Observatory Network
Graduate Research Fellowship Program

- Past fellows include Secretary of Energy Stephen Chu, Google Founder Sergey Brin, *Freakonomics* author Steven Levitt
- Fellows receive 30,000 a year for three years and 10,500 towards tuition expenses
- As important, the prestige of winning an NSF award
1. Start early, taking significant time to compose essays, and rewrite.
2. Demonstrate your personal motivation and excitement for research.
3. Spend time to thoroughly research your topic.
4. Integrate essays to create singular theme, link the content together.
5. Keep essays clear and simple to read.
6. Give essays to many people for review.
7. Get input from professors or university administration.
8. Get input from previous applicants or winners.
9. Thoroughly address both Intellectual Merit and Broader Impacts.
1. Be sure you adequately address the **Broader Impacts** criterion.
2. Be sure to include all volunteer, leadership, and extracurricular activities.
3. Highlight the significance of your research and how it will impact society.
4. Pay close attention to language in the **Program Solicitation**.
5. Focus on getting strong recommendation letters.
6. Mention what sets you apart from a typical applicant - be unique!
Columbia and the GFRP

- 36 of 2067 applicants (1.7%) are at Columbia including two in our department
- I would like to see 2-3 winning applications in this room.
Parts of the GFRP

- Personal Statement Essay
- Previous Research Experience Essay
- Proposed Plan of Research Essay
- 3 Reference Letters
- Academic Transcripts
Personal Statement

Why are you fascinated by your research area?

What examples of leadership and or unique characteristics do you bring to the field?

What are your personal strengths and how do they make you a qualified applicant?

How will the fellowship advance your goals?

How does this statement address the Intellectual Merit and Broader Impacts Criteria?
Previous Research Experience

- What experience do you have - technical and academic
- What are the key findings and conclusions of each
- How do you work in team and independent settings
- How do you assist in result analysis
- How did your activities address the Intellectual Merit and Broader Impacts Criteria
Proposed Plan of Research

- What are the issues in the scientific community you feel most passionate about
- What skills do you have, can you address those issues with them
- Is the plan feasible given time
- How will this research contribute to the big picture outside academia
- How can you draft a plan using the guidelines in the essay instructions
- And everyone say it with me now “how will this address Intellectual Merit and Broader Impacts”
Reference Letters

- Choose people who actually know you, not just with fancy titles
- Give them time to write a good letter (2 wks min)
- Discuss the application with them
- Oh surprise, ask them to talk about Intellectual Merit and Broader Impacts
- Track letters with FastLane, don’t be afraid to remind them
- Get a back up letter writer
Intellectual Merit

- How important is the project in advancing understanding within and across fields
- How well qualified is the proposer
- To what extent does the proposed activity suggest creative, original or transformative concepts
- How well conceived and organized is the project
- Are there sufficient resources
Broader Impacts

• How well does the activity advance discovery, while promoting teaching, training and learning

• Does it broaden the participation of underrepresented groups (broadly defined)

• How does it enhance learning infrastructures

• How will the results be disseminated broadly

• What societal benefits will the activity produce
How are they evaluated?

- Sent to two to three external reviewers (for full grants you can request and block reviewers)

- NSF Panel
  - People are sequestered away in DC
  - Each panel member is assigned 10-15 proposals she is in charge of
  - She then makes the case for proposals
  - Full panel votes with input from program officer
What makes a successful GFRP

- A reasonable plan of action
- Prior experience a plus but not necessary
- Clear indicators of success
Reasonable plan of action

* With all NSF grants you want to ask an interesting question

* You want your results to have the potential to be ‘transformative’ - that is, work which will help further the field

* The best grant is one where no matter how the results come out, they inform our knowledge of the natural world.
Prior experience

- You need to prove to the committee you know how to do the work.
- Publications a huge plus (prob. not at this level)
- Experience as a tech or in classes
- Failing that talk specifically about the techniques you will learn in grad school
Clear indicators of success

- Here you have to show the panel that if they give you money you know what to do with it.
- A history of results from other grants useful.
- In your case talk about very clear outcomes. I will produce XX data, publish in YY journal, use these data as preliminary for ZZ grant etc.
Final thoughts

- Link your essays together - draw a theme among them to help guide the readers into knowing who you are

- Draw from your past experiences for both IM and BI, show how this grant will be a natural progression based on what you’re doing

- Most importantly though be excited about your work and strive to make that come through