NSF Funding: How to...

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What is NSF?

- The National Science Foundation
  - Funds research and education in most fields of science and engineering
  - $9.49B in FY2009 ($3B from ARRA)
  - Funded roughly 14,641 out of 45,228 proposals reviewed in FY2009 (32%)
    - Everything goes through Fastlane
How is NSF organized?

- Several different **directorates** cover different disciplines
  - e.g., Directorate for Computer & Information Science & Engineering (CISE)
- Within directorates, there are **divisions**
  - e.g., Division of Computing and Communication Foundations (CCF) within CISE
- Each division is further subdivided into different areas with **program directors**
NSF Directorates

- BIO: Biological Sciences
- GEO: Geosciences
- CISE: Computer and Information Science & Engineering
- MPS: Mathematical & Physical Sciences
- EHR: Education & Human Resources
- SBE: Social, Behavioral, & Economic Sciences
- ENG: Engineering
Some suggestions

• Get to know your program director
  – Contact him/her via email, phone, and **in person** if possible—i.e., wander the halls of NSF

• Volunteer to be on a review panel
  – Get first-hand experience of the review process to see/understand what reviewers look for
  – See examples of ‘good’ vs. ‘not-so-good’ proposals
The Proposal

• Identify a funding opportunity
  – Look through the NSF website
  – Directorate/division in your area typically has regular, annual funding opportunities
  – Recent/new opportunities often announced by the Office of Sponsored Research (OSR) at your school/department

• Besides the CAREER award, most proposals are collaborations
  – Assemble a good team that you feel comfortable working with
Before you write...

• Develop a clear vision of what you want to propose
• Do some preliminary work that demonstrates the feasibility of your ideas
• Read through the Grant Proposal Guide and the funding announcement
  – May have specific requirements
• Get hold of and read funded proposals, preferably in your area
What goes into a NSF proposal?

• Project Summary (1 page)
• Project Description (15 pages)
  – Plan out how many pages you will dedicate to each of the required pieces
• Budget, budget justification
• Bio sketch and other miscellaneous documents
Project Summary

• 1-page summary that is public
• Should (must?) include:
  – Intellectual merit
  – Broader impacts
Project Description (1)

• 15 pages is not a lot of space
  – Must adhere to rules for font size, line spacing, margins, etc.

• Provide clear and concise explanation of what you propose to do
  – Intellectual merit: What new contributions you would be making to the field
  – Broader impacts: How your contributions will affect both your immediate area and the general public
Project Description (2)

• Background/motivation section often useful to
  – Set the context of your work and the current state of the art
  – Reiterate key research challenges
  – Provide some preliminary results to demonstrate that you can do the work

• Description of proposed work
  – Remember the adage: A picture is worth a thousand words... pretty pictures are worth even more!
  – Emphasize important concepts and research components using bulleted lists
Project Description (3)

• Research plan and milestones
  – Reviewers like to see what you plan to do and when
  – Use graphical illustrations such as timelines to show major components of work and dependencies
Project Description (4)

• Outreach (educational and under-represented minorities)
  – Proposals often get dinged for having a weak educational component (especially CAREER proposals)
  – Should not be boiler plate fluff, but have a concrete plan in place
  – Talk to your colleagues about what is available at your institution
    • e.g., SEAS has an office dedicated to outreach
Project Description (5)

• Prior NSF funding
  – Keep this concise
  – Intention is to show that you have a good track record of delivering on your promises
Other stuff

• Get an early start on the easy, misc documents
• Work with your finance rep to get the budget in place early
  – It doesn’t have to be perfect since you will most likely get less than what you ask for
  – You can anticipate and factor in the reduction, but don’t over do it
• Know your OSR deadline!
Example: RoboBees

- NSF Expeditions in Computing
- $10M over 5 years
- Proposed to build ‘body’, ‘brain’, and ‘colony’ with collaboration and integration across many disciplines
- Showed Rob Wood’s flapping wing robot can take off
- 12-person team all in the Boston area (except for 1)
- Exciting education plan in collaboration with Museum of Science Boston
Closing Thoughts

• NSF is a great source of funding for scientific and engineering research
  – Relatively low oversight and reporting
  – You can take your research into different directions if needed (within reason) as long as you generate good/interesting results

• Rejection is common (usually ~25% funding rate)
  – Read the comments/feedback and see how to improve the proposal, but remember reviewers are different each time
  – Try try again