Funding Opportunities at NSF

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NSF AS A FUNDING AGENCY

• What distinguishes NSF from other federal/state funding agencies?
  – NSF is not a “Mission” Agency like DoD, EPA, DoT, etc.
  – NSF Core Programs do not restrict proposals to very specific objectives, or the solution of specific problems
  – Unsolicited proposals on any topic covered by the Program’s description can be submitted
  – Solicitations do restrict the topic, but generally it is a broad description
Proposal Ideas for NSF

• Unlike Mission Agencies, the research community determines what is submitted, and provides the major input to the decision on what to fund.

• Program Directors can provide advice, let you know what the Program’s priorities are, but their job is not to tell you what topic to choose for your proposal.

• The primary focus of NSF is basic research.

• Solutions for specific, local problems that cannot be generalized are a very low priority.
NSF Proposal Review Criteria

- What is the intellectual merit of the proposed activity?
  - Hypothesis–driven research is the norm

- What are the broader impacts of the proposed activity?
  - Who benefits other than the PI, students, and institution?

- BOTH must be addressed in the proposal
- BOTH must be separately addressed in the proposal summary
Sources of Funding from NSF

- Individual Investigator Awards
- Solicitations
  - CAREER
  - Various SEES (Science, Engineering and Education for Sustainability)
  - Major Research Instrumentation (MRI)
  - Many others announced throughout the year
- EAGER
- RAPID
- Workshops
- Fellowships and other awards to individuals
- Supplements to Existing Awards
  - REU, RET, ROA, international travel, etc
• IIA - Individual Investigator Awards
  – You choose the topic within the scope of a specific core program
  – Deadlines vary – CMMI has 2 windows (September 1 – October 1 and Jan 15-Sept 15)
  – typically 3 years in duration, $75-150k per year
    » but varies considerably e.g.; in my programs from about $40k to $2,000k, 1 yr to 5 yrs
    » Your budget should be determined by what you need to accomplish the work
  – can include more than one named investigator
    » collaborative proposals with 2 or more institutions encouraged
  – Must address both intellectual merit and broader impacts
  – Reviewed by panel and/or mail reviewers
    » Panels make recommendations; Program Directors make final decision
    » PIs receive all written reviews and the panel summary (if any)
  – Success rate approximately 5-20%
SOLICITATIONS

• Solicited Research means (in general)
  – NSF defines the topic areas
  – NSF defines budget/duration limits
  – NSF defines who may submit, and may limit the number of proposals per institution, per person, etc.
  – NSF may set other rules

• Solicitations can be NSF wide or limited to researchers in specific disciplines

• Solicitations can present significant opportunities for research funding

• Solicitations often have different levels of funding
  – i.e., from single investigators to large multi-campus groups
FINDING OUT ABOUT SOLICITATIONS

- **DO NOT RELY ON YOUR SPONSORED PROJECTS OFFICE!!**

- **Subscribe to NSF Update**
  - Information on everything from solicitations to job announcements to research results
  - You select topics that you want to hear about (via e-mail)

- **Talk to NSF Program Directors**
  - Get your department/dean to fund a trip to NSF and other federal agencies
Solicitations – Critical Issues

• READ THE SOLICITATION! THEN READ IT AGAIN!
  – Know the requirements!

• Many proposals submitted to solicitations are not compliant and are either returned without review or are dead on arrival; i.e., panel doesn’t even discuss the proposal because it didn’t meet one or more requirements.

• Many Solicitations, especially to the SEES program, require interdisciplinary teams
  – SEP requires that environmental, social and economic issues be addressed
    » A research team composed of all engineers virtually guarantees the proposal will be unsuccessful
• The requirement for social sciences to be addressed is common
  - Just having a social scientist named in the proposal is not sufficient
  - The work must be coordinated and budgeted!
  - There will be social scientists on the review panel

• Resist the pressure to submit to every solicitation
  - Success rates can be very low (<3%) and if you only start thinking about the topic when the solicitation comes out, you are already behind the competition

• IF you have a good team, participation, even with a small role can be very rewarding and lead to new opportunities
• Faculty Early Career Development Program (CAREER) NSF05-579

  – For untenured faculty only
  – Research topic selected by PI
  – Must include integrated research/teaching plan
  – 5 yr duration, $400k minimum budget
    » May not be good to have a budget much > $400k
  – Individuals limited to three tries (max) while untenured
  – ENG uses a significant portion of its budget to support CAREER awards
    » Overall, success rate is approximately 15% in ENG
    » But success rate per individual is >15% because you have up to three tries
• Faculty Early Career Development Program (CAREER) NSF05-579

  – The education plan is very important
    » Most successful proposals have references from the engineering education literature
    » An evaluation plan is important
    » Outreach can be to any group
      • K-12, UG, Grad, Profession, Females, etc

  – Put together a “Study” Group
    » Other faculty writing CAREER proposals (any discipline)
    » Try to find help from current/past awardees

  – START EARLY!!!!
SOLICITATION EXAMPLES

• Major Research Instrumentation
  – $100,000 - $4,000,000 (PUI request can be < $100k)
  – Can be for “off-the-shelf” purchase or for development of new instrumentation/equipment
  – Institutions are limited to no more than 2 proposals for purchase of equipment and no more than 3 proposals total per year (can be VERY competitive within your school)
  – Success rate of submitted proposals typically about 30%
  – CMMI funding varies, but is around $3-4 million/yr
  – A significant portion of the money must go to Predominately Undergraduate Institutions (PUI) and Minority Serving Institutions (MSI)
  – DO NOT start working on an MRI without knowing how your institution selects the proposals it will submit
    » Competition usually very tough internally
    » Institutions often know what areas they want to support
• Early Concept Grants for Exploratory Research (EAGER)

  – You choose the topic

  – Proposals accepted throughout the year
    » Must discuss with Program Director before submission

  – <$300k, up to 2 years (typically much less)

  – Supports exploratory research in its early stages on untested, but potentially transformative, research ideas or approaches

  – High risk/high return research

  – Internal review only
Grants for Rapid Response Research

proposals having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events

Up to $200k, 2 years

Must obtain NSF Program Director approval for submission
• Workshops

– Typically directed toward identifying research needs/opportunities in a sub discipline

– Reviewed by Program Director if <$50k

– May be US only or international

– Discuss with Program Director before submitting

– For young researchers, participation in a workshop, rather than organizing a workshop is more common

– Must have diverse organizing committee and participants
  » Institution, geography, professional age, gender, ethnicity
Fellowships & Other Awards to Individuals

- **Predoctoral**
  - Disciplinary Program Directors do not participate in review/award recommendations
  - Limited to US citizens & Permanent Residents

- **Postdoctoral**
  - Availability varies over time
    » SEES and International examples of what is available now

- **East Asia & Pacific Summer Institutes for U.S. Graduate Students (EAPSI)**
  - China, S. Korea, Japan, Taiwan, Singapore, Australia, New Zealand
  - Limited to US citizens & Permanent Residents
If You Already Have NSF Funding

- Supplements to Existing NSF Grants
  - Equipment, expansion of work, travel, etc.
  - International Collaboration
  - REU - Research Experience for Undergraduates
  - RET – Research Experience for Teachers (ENG only)
  - ROA - Research Opportunity Award
    » for support of faculty from non-Ph.D. granting Institution to work with faculty holding an NSF grant
• There is a Research in Undergraduate Institutions (RUI) Solicitation (NSF 00-144)
  – Institutions self-certify
  – The Solicitation implies there is a separate pot of money for undergraduate institutions
    » Except for MRI, there is none
  – The Solicitation does not make it clear that proposals under RUI have the same deadlines/submission windows as all unsolicited proposals
  – RUI proposals can have up to a 5-page Educational Impact Statement in addition to the 15 page Project Summary

• New RUI Solicitation should be out soon
Suggestions

• For most people, it is not a good idea for their first submission to be to CAREER proposal.

• Consider a 1 or 2 year proposal if you have an idea that:
  – can be explored in the requested time
  – should result in a refereed paper
  – should logically lead to a 3-year research proposal

• Do not submit too many proposals
  » This is not a lottery
  » Part of being successful is knowing when not to submit a proposal
• Find someone in another field of research (doesn’t have to be engineering) who is also writing NSF proposals
  – Review each others proposals
    » Not for technical content

• Volunteer to be on an NSF review Panel
  – If you submit a proposal every cycle, it’s difficult to get on a panel
  – A reminder a few weeks after the submission window closes is a good time – once or twice a year
QUESTIONS?
Reasons for Declining Proposals (con’t)

• Questionable Reasoning in Experimental Approach
• Absence of Acceptable Scientific Rationale
• Unrealistically Large Amount of Work
• Lack of Sufficient Detail
• Uncritical Approach
• Lack of Funds
Reasons for Declining Proposals

- Lack of New or Original Ideas
- Diffuse, Superficial, or Unfocused Research Plan
- Lack of Knowledge of Published, Relevant Work
- Lack of Experience in Essential Methodology
- Uncertainty Concerning Future Direction
- Failure to Adequately Address Broader Impacts