Demystifying the Funding Process at the National Science Foundation

“Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.”
Thoughts from a Former NSF Program Officer…

Thanks to Jim Hendler for some tips and to George Hazelrigg for other materials.
Unique Features of NSF

- Emphasis on integrating research and education
- Rotator System: About 50% Program Directors are on loan from universities, labs, or industries
NSF & CISE (Computer and Information Science and Engineering) Organization and Core Research Programs

Advanced Cyberinfrastructure (ACI)
- Data
- High Performance Computing
- Networking/Cybersecurity
- Software

Computing and Communications Foundations (CCF)
- Algorithmic Foundations
- Communication and Information Foundations
- Software and Hardware Foundations

Computer and Network Systems (CNS)
- Computer Systems Research
- Networking Technology and Systems
- Software and Hardware Foundations

Information and Intelligent Systems (IIS)
- Cyber Human Systems
- Information Integration and Informatics
- Robust Intelligence

CISE Cross-Cutting Programs
NSF Proposal & Award Process

1. NSF Announces Opportunity
2. Research & Education Communities
   - Submit
3. NSF Program Officer
4. Program Officer Analysis and Recommendations
   - Ad Hoc
   - Panel
   - Combination
   - Internal
5. Division Director Concurrency
   - Award Via Division of Grants and Agreements
   - Decline
6. Organization
7. Proposal Receipt at NSF
   - 90 Days Proposal Preparation
   - 6 Months Proposal Receipt to DD Concurrency of PO Recommendation
   - 30 Days DGA Review & Processing
8. Award
Review Criteria

- **Intellectual Merit**
  - Technical aspects
  - Advancing knowledge and understanding within own or other fields
  - Potentially transformative concepts

- **Broader Impacts**
  - Societal benefits
  - Significance beyond the Intellectual Merit
  - Outcome of the research (i.e. health impact, infrastructure)
  - Or from additional activities (i.e. education, dissemination)

- **Both Criteria are reviewed for:**
  - Originality, creativity
  - Description of project plan with well-justified assessment
  - Qualification of teams
  - Adequacy of resources
I. What Makes a Good Proposal?*

1. *Respond to the call*
   - Ensure the fit is there
   - Read and follow the requirements
     - Program announcement and GPG; solicitation

2. Back up what you propose to do with what you’ve already done
   - However, too much overlap = incremental = bad!

3. Show enthusiasm for your work

   ✤ *Rule of Thumb*
   - *Someone on the panel must think yours is THE BEST!*

*see Jim Hendler, “How to get that first grant: A young scientist’s guide to (AI) funding in America and Adopted from David Mendonca
What Makes a Good Proposal?

4. Know your audience
   - NSF reviewers will want to know:
     - What is the proposal about?
     - How will you do it? (technical approach)
     - Can you do it? (you/team and facilities)
     - Is it worth doing? (Intellectual Merit and Broader Impacts)

5. Readability is important

6. Be visible! A reputation as someone who “gets things done” looks great on a review form
Common Pitfalls: Proposal

- Submitting good science to the wrong program
- Resubmitting without major revisions
- Hiding the punch line on page 14 of 15
- Readability
- Not finding the most appropriate collaborations for interdisciplinary research
  - Collaborations need to feel truthful but relevant (your best friend may not be the right one)
Common Pitfalls: Review

- Not writing to the panel
  - Assume diverse areas of expertise and backgrounds
- Thinking that the panel will not check your references
- Thinking that the panel will not read in between the lines of budgets and letters (particularly partnership letters)
- Not publishing enough when you get an award: past performance is important
II. Serving on a Review Panel

- Why?
  - Service to your community
  - Learn the system
  - Improve your future proposals—avoid pitfalls!

- How to volunteer?
  - Note and CV to your PD—maybe once per year
III. Should I Meet My Program Officer?

- Why?
  - What do you intend to gain?
  - Social visits don’t help

- If you do…
  - Prepare by reviewing portfolio of current grants
  - Provide advance written summary of your idea
    - e.g., NSF format *Project Summary*
  - Bring questions (e.g., fit, budget, review process)
  - Listen
  - *Remember that PD is not the panel!*
How Could a Meeting Help?

- Your program director can:
  - Give advice on proposal submission
  - Help you understand the review of a previous proposal
  - Point you to resources you can use to help write a better proposal next time
  - Give general guidance on good proposal writing

Program officers look forward to constructive meetings with PIs
Summary

- There is no magic to writing a good proposal, it is a skill that can be learned.
  - Learn from mentors
  - Learn from your mistakes
  - Learn from good examples

- Becoming familiar with the NSF system can help.
  - Identify opportunities
  - Serve on panels
  - Interact with Program Officer
Sample Programs to Support Early-Career Researchers & Students

- Faculty Early Career Development (CAREER) Program
- Computing Research Initiation Initiative (CRII) *Enabling early research independence*
- Graduate Research Fellowship Program (GRFP)
- Research Experiences for Undergraduates (REU)

For a comprehensive list of CISE funding opportunities, visit: http://www.nsf.gov/funding/pgm_list.jsp?org=CISE
Computing Research Initiation Initiative (CRII)

Enabling early research independence

- Aims to contribute to the growth and development of future generations of scientists and engineers who will dedicate their careers to advancing CISE research and education.
- Provides the opportunity for individuals who are in their first academic position post-PhD to recruit and mentor their first graduate students.
  - Allows for a full budget for grad student salary only (and some travel, equipment) but no PI salary.
- Deadline: September 2017 (Fourth Wed in Sept Annually)
The RAPID funding mechanism is for projects 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.
RAPID

• Requests may be for up to $200K and for one year of duration
• The project description is expected to be brief; no more than five pages
• Only internal merit review is required for RAPID proposals. Under rare circumstances, Program Officers may elect to obtain external reviews. If external merit review is to be used, then the PI will be informed
The EAGER funding mechanism may be used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches.

This work is considered especially "high risk-high payoff" because it involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives.
• Requests may be for up to $300K and for two years of duration

• Only internal merit review is required. Under rare circumstances, Program Officers may elect to obtain external reviews. If external merit review is to be used, then the PI will be informed

• No-cost extensions, and requests for supplemental funding may be requested but are subject to full external merit review
Dear Colleague Letter: Supporting Research Advances in Smart and Connected Communities

September 14, 2015

Dear Colleagues:

The National Science Foundation’s (NSF) Directorates for Computer and Information Science and Engineering (CISE), Education and Human Resources (EHR), Engineering (ENG), Geosciences (GEO), and Social, Behavioral and Economic Sciences (SBE) wish to notify the community of their intention to support, foster, and accelerate fundamental research that addresses challenges in enabling Smart and Connected Communities (S&CC).

Advances in the effective integration of networked information systems, sensing and communication devices, data sources, decision making, and physical infrastructure are transforming society, allowing cities and communities to surmount deeply interlocking physical, social, behavioral, economic, and infrastructural challenges. These novel sociotechnical approaches enable increased understanding of how to intelligently and effectively design, adapt, and manage Smart and Connected Communities. Through this Dear Colleague Letter (DCL), NSF aims to accelerate fundamental understanding and stimulate basic research on frameworks that integrate and operate on data from multiple sources and at multiple temporal and spatial scales, new sociotechnical systems that are interconnected and interdependent, and new technologies for innovative applications and services to enable more livable, workable, sustainable, and connected communities. Beyond supporting isolated efforts deemed as “islands of successes,” NSF seeks to develop the scientific and engineering foundation and underlying environment that enables and spurs innovations of technologies and systems that can be integrated into the overall S&CC vision.

Principal investigators interested in submitting supplemental or EAGER proposals (or with other questions pertaining to this DCL) must first contact the program director most closely aligned with the research activities to be proposed:

- David Corman, CISE/CNS, Program Director for Cyber-Physical Systems, at dcorman@nsf.gov;
- Wendy Nilsen, CISE/IIS, Program Director for Smart and Connected Health, at wnilsen@nsf.gov;
- Sushil Prasad, CISE/ACI Program Director for Learning and Workforce Development, at sprasad@nsf.gov;
- Rahul Shah, CISE/CCF Program Director for Algorithmic Foundations, at rrahah@nsf.gov;
- Laura Stanley, CISE/IIS, Program Director for Cyber-Human Systems, at lstanley@nsf.gov;
- John C. Cherniavsky, EHR/DRK, Program Director for Critical Techniques and Technologies for Advancing Foundations and Applications of Big Data Science & Engineering (BIGDATA), at jchernia@nsf.gov;
- Radhakisan Baheti, ENG/ECCS, Program Director for Energy, Power, Control, and Networks, at rbaheti@nsf.gov;
- Bruce Hamilton, ENG/CBET, Program Director for Environmental Sustainability, at bhamillo@nsf.gov;
- Elise Miller-Hooks, ENG/CMMI, Program Director for Civil Infrastructure Systems, at elisemh@nsf.gov;
- Massimo Ruzzene, ENG/CMMI, Program Director for Dynamics Control and Systems Diagnostics, at mruzzene@nsf.gov;
- Chengshian Xiao, ENG/ECCS, Program Director for Communications, Circuits and Sensing Systems, at cxiao@nsf.gov;
- Nicholas Anderson, GEO/AGS, Assistant Program Director for Major Research Instrumentation, at nanderso@nsf.gov; and/or
OVERVIEW

Welcome to the 2017 NSF CISE CAREER Proposal Writing Workshop, to be held at the Hilton Arlington near the NSF headquarters on Monday, March 20, 2017. This event will introduce junior faculty to the NSF CAREER program, and help them prepare their CAREER proposal. The NSF CAREER program serves a critical role in the National Science Foundation's efforts to identify, foster and support the nation's most promising junior faculty in both research and education.

Junior professors who are just starting their careers often have limited experience with grant writing and evaluation. They also have little or no interaction with the program directors at NSF. In this workshop, early-career faculty members will have the opportunity to improve their skills in proposal writing, as well as interact with NSF program directors from different divisions (ACI, IIS, CNS, and CCF) as well as recent NSF CAREER awardees. The workshop is also open to multidisciplinary researchers with a CISE-specific focus, including cyberinfrastructure. The major components of the workshop include presentations on proposal writing, experience sharing, mock panels, and proposal clinic.

The workshop has been designed to accommodate up to 200 junior faculty members.

REGISTER NOW

IMPORTANT DATES

Jan 30: Registration Deadline
Feb 5: Notification of Acceptance
Feb 19: Schedule Announcement for day-after meeting with CISE PDs
Mar 20: CAREER Workshop

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