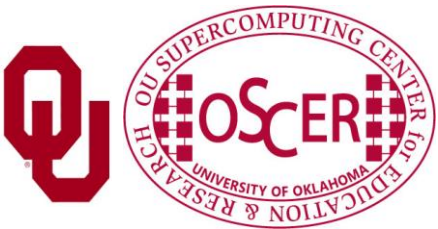# So You Want to Write an NSF Grant Proposal

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Marcus Bond
Southeast Missouri State University
(Cape Girardeau)

Content provided by Henry Neeman - OU

Acknowledgement

- Much of this material came from a talk by Greg Monaco and Kate Adams of the Great Plains Network, used with permission.

- And then from Henry Neeman to Dana Brunson and Brian Stengel.

- And then to your humble servant

Yet to come…

- "The Shifting Landscape of CI Funding Opportunities" Dan Voss, University of Kansas, today at 3:15

- "So You Want to Write a Cyberinfrastructure Proposal" Henry Neeman, Univeristy of Oklahoma, tomorrow at 3:30

Objectives

- Gain a working knowledge of the grant proposal process at the National Science Foundation.

- Have a clearer idea of what you hope to accomplish when writing an NSF grant proposal.

- Identify common elements for grant proposals.

- NSF Grants Conferences (next one is Nov. 13-14 in Phoenix)
  https://www.nsf.gov/bfa/dias/policy/outreach.jsp

The NSF Proposal Process

1. You write and submit proposal via NSF's Fastlane or grants.gov.
2. Proposal review process initiated
   - Proposals tallied by program director by category.
   - Panel dates set.
   - Reviewers selected.
   - Review criteria are furnished.
   - Assignments made to reviewers.
   - Reviewers submit reviews.
3. Review panel(s) assembled.

About the Reviewers

- The reviewers may be subject matter experts in an area relevant to your proposal -- or they may not be.
- You're writing your review for the review panel.
  - But you have no idea who they are: not when you're writing, nor when you find out the NSF's decision, nor ever after.
  - The panel has zero authority -- they recommend, not decide.
- More panel members than actual readers of each proposal.
  - Each panel member reviews multiple proposals, and each proposal has multiple reviewers, but usually no one reviews all of the proposals that the panel gets.
- You get to suggest reviewers in your proposal -- but the NSF program officer isn't bound by your suggestions.
- Become a reviewer! It's the best way to learn how they think.

Funny Stuff

Stuff Academics Say
@AcademicsSay
Following

Reviewer 2 walks into a bar complaining loudly of it being the worst library ever.

RETWEETS 363   LIKES 459

1:02 PM - 8 Feb 2016

Stuff Academics Say
@AcademicsSay
Following

Reviewer 2 walks into a bar that's not the one they would have built.

RETWEETS 337   LIKES 388

Stuff Academics Say
March 22 · 🌐

Reviewer 2 walks into a bar complaining immediately of this not being the joke they would have written.

👍 Like   💬 Comment   ➡ Share

The Proposal Process (cont'd)

- Panel recommendation made to the program officer.
  - "Highly Competitive," "Competitive," "Non-competitive"
- Program officer reviews recommendations from all panels.
  - There may be multiple panels for the same program.
- If the program officer selects your proposal to be funded, that doesn't mean you've won yet.
  - You may be contacted to respond to panel concerns, in which case you'll be expected to prove that you've got those concerns addressed.
  - The program officer makes the final decision for funding -- but they've got to be able to justify the heck out of their decision to their boss, and so on up the chain of command.
- Always make the program officer's job easy ….

The Proposal Process (cont'd)

1. Preliminary (non-binding) decision by program officer.
2. You probably will be asked to submit follow-up materials.
   - At least an abstract to be publicly posted after the official decision has been announced
   - Confidentially, because no official decision has been made.
3. Official decision publicly announced.

Before you begin, remember

- Sometimes you win, some times you lose.
- "You cannot close what you don't propose."
- Great proposals often don't get funded.
  - Sometimes they have too many great proposals to fund.
  - Sometimes your reviewers misunderstand your proposal.
    - That's your fault.
    - Which means, you can do better on the resubmit -- which means this is something you have a good deal of control over.
    - Resubmits are much more likely to get funded than the first time.
- Lousy proposals rarely get funded.
- It often takes more than one try to get funded (law of large numbers)..

ACI-REF Virtual Residency
July 30-August 4, 2017

Probability of Success

- National Science Foundation, FY2016/2015: 24.12/24.21% overall: of 49,306/49630 proposals, 11,893/12,016 funded with median award size $120,116/111,749. Average decision time 5.39/5.75 months
  - BIO 26/27%, CISE 23/24%, EHR 21/20%, ENG 20/20%, GEO 31/25%, MPS 26/28%, SBE 24/24%
  - EPSCoR jurisdictions: Palau/Northern Marianas Islands 0/0% (no PhD-granting), ND 17/12%, (AL,PR) (17,24)/15%, (AR,ID) (18,20)/16%, (KY,MS,NV) (21,18,16)/17%, (OK,SD) (20,16)/18%, (NE,NM,SC,VT) (19,24,18,18)/19%, (AK,MO,WV) (31,21,17)/20%, (IA,WY) (23,16)/21%, LA 20/22%, (DE,HI,KS) (27,28,18)/23%, MT 28/24%, (ME,NH) (25,26)/26%, (Guam/USVI) (0,30)/33%, RI 38/36%
  - Non-EPSCoR jurisdictions: FL 18/20%, (TN,TX) (24,20)/21%, (AZ,OH,VA) (22,21,22)/22%, UT 22/23%, (CT/IN/NJ/NC) (25,23,25,23)/ 24%, (CO,GA,MI,NY) (27,24,23,24)/25%, (MD,PA,WI) (28,25,29)/26%, (CA,MA,OR) (28,26,31)/27%, (IL,MN) (25,28)/28%, WA 28/30%, DC 35/37%

Probability of Success, continued

Active 'high performance', 'high-performance', 'computing cluster', 'computer cluster' NSF MRI grants 2014-2016

2014: 8 awards, $119,791-699,999, ave: $343856, median: $350885

2015: 6 awards, $150,000-951,570, ave: $548122 median: $485425

2016: 12 awards, $108524-920688, ave: $463,148 median: $456029

Probability of Success, continued

- Funding is governed by the <u>Law of Large Numbers</u>: You have to submit lots of proposals to get any funding.
  http://dellweb.bfa.nsf.gov/awdfr3/default.asp

Proposal Components

- Cover Page
- Project Summary
- Project Description
- References
- Budget
- Budget Justification
- Biographical sketches
- Current and Pending Support
- Conflict of Interest List
- Facilities and Equipment
- Data Management Plan
- Postdoc Mentoring Plan
- Supplementary Documentation (varies by program)

Note

- Each piece of the proposal is another opportunity to make your case.
- Think in terms of using each section to enhance your argument.

Pointers

- Read the solicitation.

- Ask the program officer about any questions you might have.

- Read the solicitation.

- Pay attention to

  - Section II: Program Description

    - Program-wide Criteria

    - Program Areas

  - Section V A: Proposal Preparation Instructions

    - Full Proposals

    - Program Areas

  - Section VI A: Review Criteria

    - There are Solicitation Specific Review Criteria

Pointers (cont.)

- Read the solicitation.

- Aim to make a compelling argument.

- Be satisfied with a competent argument.

- Demonstrate that you know what you don't know – and what you are going to learn…

- And who you will be contributing to greater knowledge and/or improving the state of the art.

What Are You Trying to Achieve?

- Give reviewers reasons to recommend your proposal for funding.
- Never give the reviewers an excuse to say no.
  - If they're going to say no, at least they should have to earn it.
- Consider what the reviewer will think after reading your proposal:
  - "I see where they're going with this."
  - "They really know their stuff."
  - "I didn't know they had all that going on over there!"
  - "Wow! This will mean a lot to that campus."
  - "They have their act together. (I wish we communicated as well on my campus.)"
  - "This is a GREAT investment!"
- Everything in your proposal should support this.

Proposal Beginning

- Cover Page
  - Title
  - PIs/Co-PIs

- Project Summary
  - One Page
  - Brief project description -- executive summary
  - Intellectual Merit statement
  - Broader Impacts statement
  - Make it easy for the reviewers and program officer to be able to tell what you plan to do, why it'll work, and how it'll help.

Project Description

- 15 pages long (usually)
- Introduction/Vision
  - This is a good place to quote from a major national report that says that the kind of work you're planning is very important.
- Project Objectives (typically 3 or 4)
- Intellectual Merit
- Implementation Plan
- Broader Impacts
- Management Plan
- Evaluating Progress

Broader Impacts

- Advancement of scientific knowledge
- Activities that contribute to achievement of societally relevant outcomes
- Full participation of women, persons with disabilities, and underrepresented minorities in STEM
- Improved STEM education and educator development at any level
- Increased public scientific literacy and public engagement with science and technology
- Improved well-being of individuals in society
- Development of a diverse, globally competitive STEM workforce
- Increased partnerships between academia, industry, and others
- Improved national security
- Increased economic competitiveness of the US
- Enhanced infrastructure for research and education
- Your broader impacts are judged on what you've already done.

Results from Prior NSF Support

- Every NSF proposal has to have a section on "Results from Prior NSF Support."
- If your team has lots of that, you can't fit it all. The solicitation and the NSF's Grant Proposal Guide provide useful guidelines on that.
  - The PI and each Co-PI should each provide the one most relevant grant.
  - Each should include explicit sections on Intellectual Merit, Broader Impacts and a list of publications (or "No publications were produced under this award.").
- If you don't have anything relevant, say that.
- If you do, is there a way that you can fit this proposal into a more coherent story?

Management Plan

- Who will do what?

- Decision making: Describe the procedure.

- Advisory committee(s)
    - External: one CI, one researcher, one broader impacts.
    - You can also have an Internal Advisory Committee.

- Timeline and milestones

- Sustainability plan: What happens when the grant ends?

Budget

- People: Start with salary, then add in fringe benefits and Indirect Costs (also known as Facilities & Administration).
  - For professionals, typically the "fully loaded" amount roughly doubles the salary amount.
- Things
  - Permanent equipment over $5000: not subject to IDC
  - Other: subject to full IDC
- Subcontracts: The first $25,000 of each subcontract may be subject to IDC by both the lead institution and the subcontracting institution.
  - You can do a Collaborative proposal, which waives that.
    - Submitting a collaborative proposal is painful.
    - The lead institution has zero control over the other institutions' budgets.

Budget (cont'd)

- Participant support: not subject to IDC
  - Travel, subsistence, stipends etc for participants in workshops and similar events.

Cost Share

Cost Share

- Either mandatory or forbidden
- Can only be done at exactly the level required.
- There is **<u>NO SUCH THING</u>** as voluntary cost share: if they don't ask for it, you can't include it.
  - Your proposal can be returned without review.
- Typically has to be items that could otherwise be funded on the grant budget.
- Typically has to be paid from non-federal funds.

Institutional Commitment

- Not the same as cost share.

- Not required nor prohibited.

- Strange rules:
  - **<u>CANNOT</u>** mention any dollar figures (or anything that can be straightforwardly translated into dollar figures).
  - **<u>MUST</u>** appear in the Facilities, Equipment and Other Resources section, because it's an "other resource" (preference for at the end).
  - **<u>SHOULD</u>** be confirmed in a letter of collaboration from someone who has the authority to commit.
  - **<u>MAY</u>** appear in the project description.
  - **<u>MAY</u>** be (and usually is) contingent on getting grant.

Everything Else

- Budget & Budget Justification
  - Many institutions provide a template
- Data Management Plan (dmptool.org)
- Letters of Commitment/Collaboration
  - Some solicitations put restrictions on these, others don't.
  - Letters of support ("This is a swell project") are FORBIDDEN unless explicit allowed by the solicitation.
- Biographical Sketches (PI, Co-PIs, Senior Personnel)
- Current & Pending Support (PI, Co-PIs, Sr Personnel)
  - You may not have any.
  - You **MUST** list this proposal.
- Conflict of Interest List (PI, Co-PIs, Sr Personnel) -- **NEW!**

Save the date:

PEARC18, July 22-27, Pittsburgh, PA

https://www.pearc18.pearc.org/

Thanks for your attention!

Questions?

hneeman@ou.edu