

Writing Your First NSF-Style Proposal



Tessa Hill, UC Davis
tmhill@ucdavis.edu

Sarah Penniston-Dorland, U Maryland
sarahpd@umd.edu

Outline of topics



- Your Program Officer
- Elements of successful proposals
- Common pitfalls
- Resubmissions
- Myths debunked
- Strategies for proposal writing

Your Program Officer...



1. Is a scholar in your field (usually) who knows what everybody is doing & is formative in directing the scholarship of your field
2. Coordinates & runs the review process
3. Executes or makes funding decisions, depending upon agency policies
4. Advocates for your field in competition with other research areas and budget priorities.
5. Continues to work with you throughout your grant and is interested in your success!

Ask your Program Officer...



(After doing your homework)

1. Does your program fund this type of research?
2. What is the average program budget and success rate; how many proposals in a competition?
3. What is the typical size of a successful “new investigator” project in this program?
4. What is the review and decision-making process in this program?
5. Are there special programs for which I qualify and how can I be considered for them?
6. Are you aware of other agencies or organizations that fund this kind of project?

Exercise:

Short Professional Introductions



- Name
- Title
- Institution
- 1-2 sentences describing generally what you do.

Exercise:

Longer Professional Introductions



- Name
- Title
- Institution
- Briefly describe a research project you are considering writing a proposal to fund

A good source for information about Grant Writing: <http://serc.carleton.edu/NAGTWorkshops/earlycareer/research/funding.html>



On the Cutting Edge - Professional Development for Geoscience Faculty

Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career Topical Resources

Cutting Edge > Early Career > Developing a Research Program > Funding your Research

Search



Cutting Edge

Affective Domain

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Early Career

GSA 2011
Preparing for
Tenure

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more...

Efficient, Effective
Teaching

Developing a
Research
Program

Research Plan

Funding your
Research

Funding
overview

NSF grants

Collaborating
with Students

Setting Up
Your Lab

Making Time
for Research

Publishing Your
Work

Getting Tenure

International
Faculty

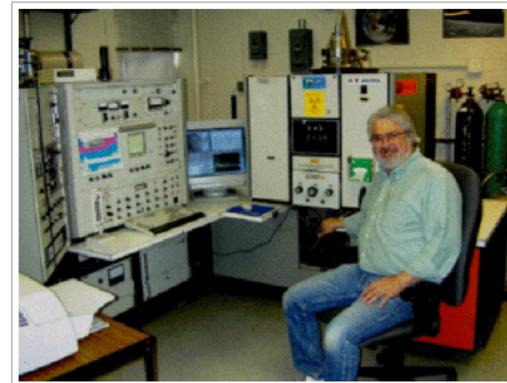
Previous

Funding Your Research

At most colleges and universities, your ability to find funding for your research program will be a major measure of your success. You need to be able to find fundable projects, identify possible sources of funding (internal and external), and then convince the people reading your proposal that you are just the person to tackle the research you propose.

Jump down to

- [Grant Writing](#)
- [Sources of Funding](#)
- [Recent, Successful Proposals](#), including (but not limited to) [NSF proposals](#)
- [Tips from Workshop Alums](#)



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Resources

Grant writing: identifying sources of funding and writing proposals

- [Tips on writing a grant proposal](#), [\(more info\)](#) from the U.S. EPA (Environmental Protection Agency), but applicable to the grant writing process in general. This page includes a detailed, extended discussion of **how to plan a budget**, with examples.
- [How to Get Started in Research](#), a booklet by the Council on Undergraduate Research, includes information on finding funding and advice on writing grant proposals.
- [Getting Your Research Ideas Funded](#). Cathy Manduca's overview of things to consider as you write your first grant proposal, including identifying the best source of funding for your project and writing a proposal aimed at that funding agency. Cathy is the director of the Science Education

Proposal strategic planning – Research significance



Pick a research topic you are considering writing a proposal to fund.

- Why is this topic important?
 - What is unique/transformational about the research?
 - What are the benefits of this research?
- How does this research fit with your overall career plan?

Components of an NSF proposal



- Project summary
- Project description
- Biographical Sketch
- Intellectual Merit & Broader Impacts
- Data Management Plan

Broader Impacts



- ~1-2 pages of 15-page proposal
- Should be related to research
- Can include education of graduate students, incorporation of research materials into courses taught, development of new courses...
- ...but think creatively!
- Be prepared and specific – think through details, make contact with experts and document their involvement in the project
- Include an evaluation plan

Elements of Successful Proposals: Big Picture and Hypotheses



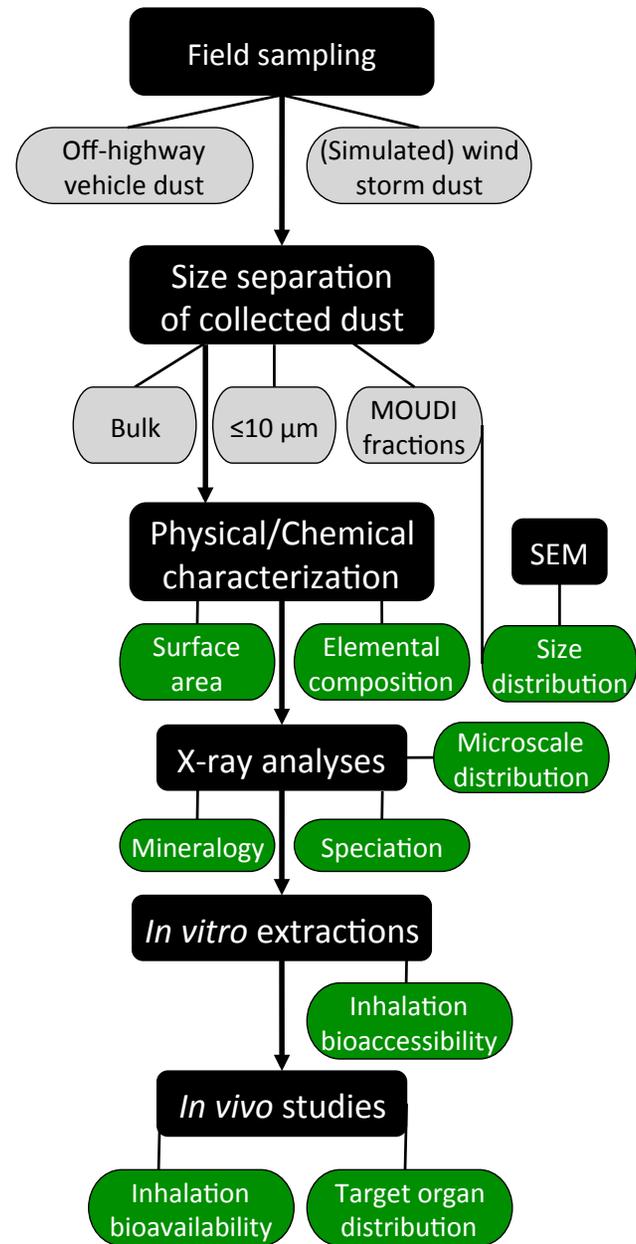
1. The relevance and importance of the proposed work should be clearly stated. Connect it to the 'big picture.'
2. Proposals should be **hypothesis or question driven**... objectives/hypotheses/questions appear on the first 1-2 pages
 - Hypotheses should be related to big picture questions
 - Outline tests of hypotheses and expected outcomes
 - Outline possible alternatives

Elements of Successful Proposals: Formatting and Writing Style



1. Use images – a picture is worth a thousand words.
2. Well organized, with underlining, **differences in type**, spacing, **TITLES**, to call attention to main points and structure
3. Written in appropriate size font. Smaller is not better!
4. Use active writing style rather than passive. This is not a research paper.
5. Describe new and exciting aspects of proposed research. Do not cast it as an extension of previous research.

Formatting Tip: The flowchart

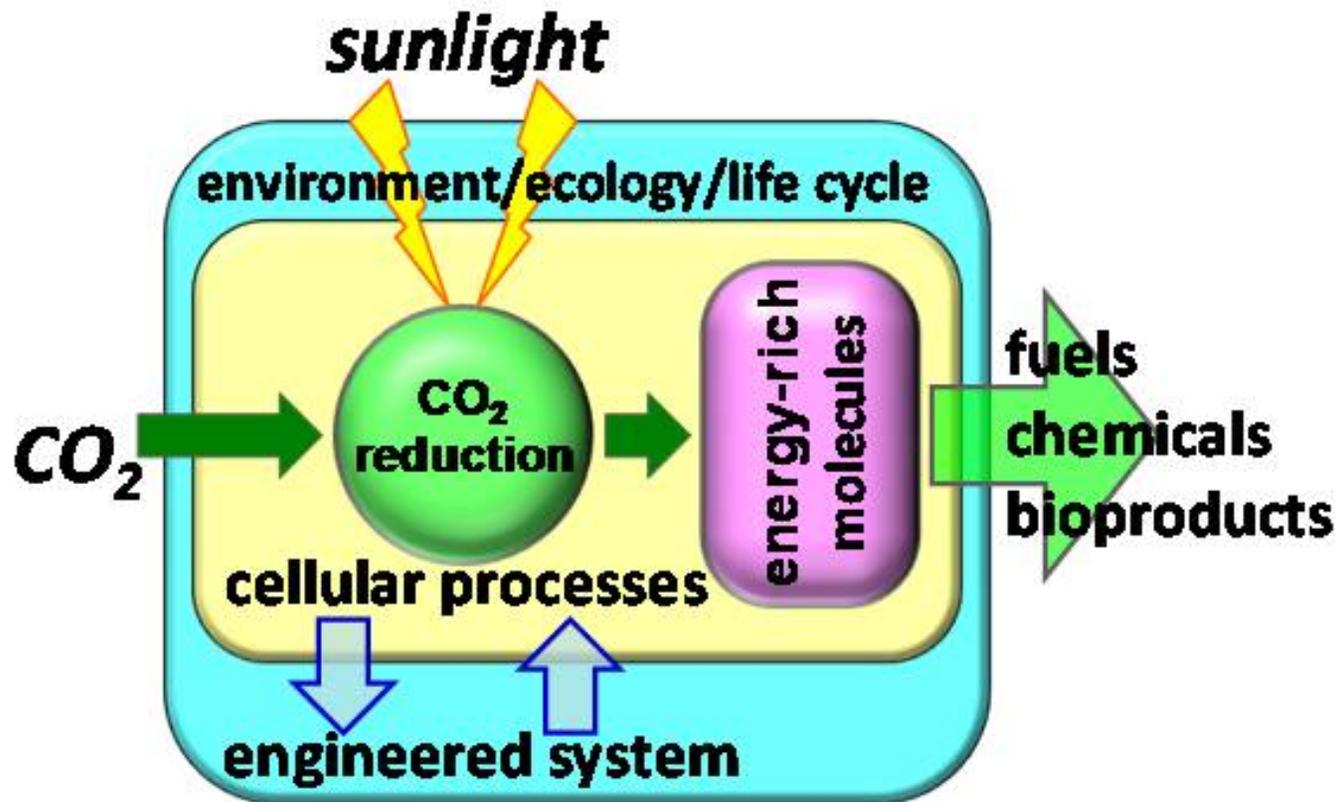


Formatting Tip: The timeline



Activity	Year 1		Year 2		Year 3	
Field sampling of bulk, size-fractionated airborne dusts	■	■	■			
Geochemical and physical characterization of collected dusts		■	■	■		
Synchrotron X-ray analysis of bulk and size-fractionated dusts		■	■	■	■	
<i>In vitro</i> PSF extraction experiments			■	■	■	
<i>In vivo</i> short-term exposure inhalation experiments		■	■	■		
<i>In vivo</i> long-term exposure inhalation experiments				■	■	■
Submission of characterization/synchrotron work for publication					■	
Submission of <i>in vitro/in vivo</i> work for publication						■

Formatting Tip: The Conceptual Diagram



Elements of Successful Proposals: Leave No Unanswered Questions!



1. Explain concepts clearly using concise language.
 - Don't use overly specialized terminology.
2. Provide preliminary data
 - Demonstrates ability to conduct proposed research
 - Makes expected outcomes clear
3. Demonstrate access to resources required for research
4. Address potential outcomes, possible pitfalls and alternative approaches
5. Demonstrate expertise
 - Use appropriate references (old and new)
 - Refer to your published work on similar topics
 - Consider potential reviewers when deciding upon references

Common pitfalls



1. Too ambitious - for proposed budget, for personnel, for time
2. Results too specific and not generalizable
3. Importance of proposed work not fully explained

The Review Process



- Who are/might be the reviewers?
 - You can suggest potential reviewers in your proposal.
- What are the review criteria?
- Become familiar with the review process
 - Offer to review grant proposals
 - Offer to serve on proposal review panel

Resubmissions



1. Specifically and directly addresses each review critique.
2. Substantially revise, rewrite, or remove sections that were critiqued in earlier reviews.
3. Update preliminary/pilot data and interpretations.
4. Incorporate new references that may have appeared since the previous submission (or were missed in the prior proposal).
5. Include a refined/revised list of potential reviewers based on reviews (some reading between the lines required).
6. Should appear noticeably stronger than the prior version.

NSF proposals – Some Facts



- EOS article, 18 Dec 2012 (data are from Ocean Sciences Program, which is part of Geosciences Directorate)

Junior investigators have just as good of a chance of getting funded as their senior colleagues

For Broader Impacts, it is better to do one thing well than to propose a multi-faceted program for many different groups

60-75% of proposals funded are first submissions (20-22% second submissions, 5-10% third submissions). Success rates of resubmissions were “generally close” to first submissions.

Complete your worksheet

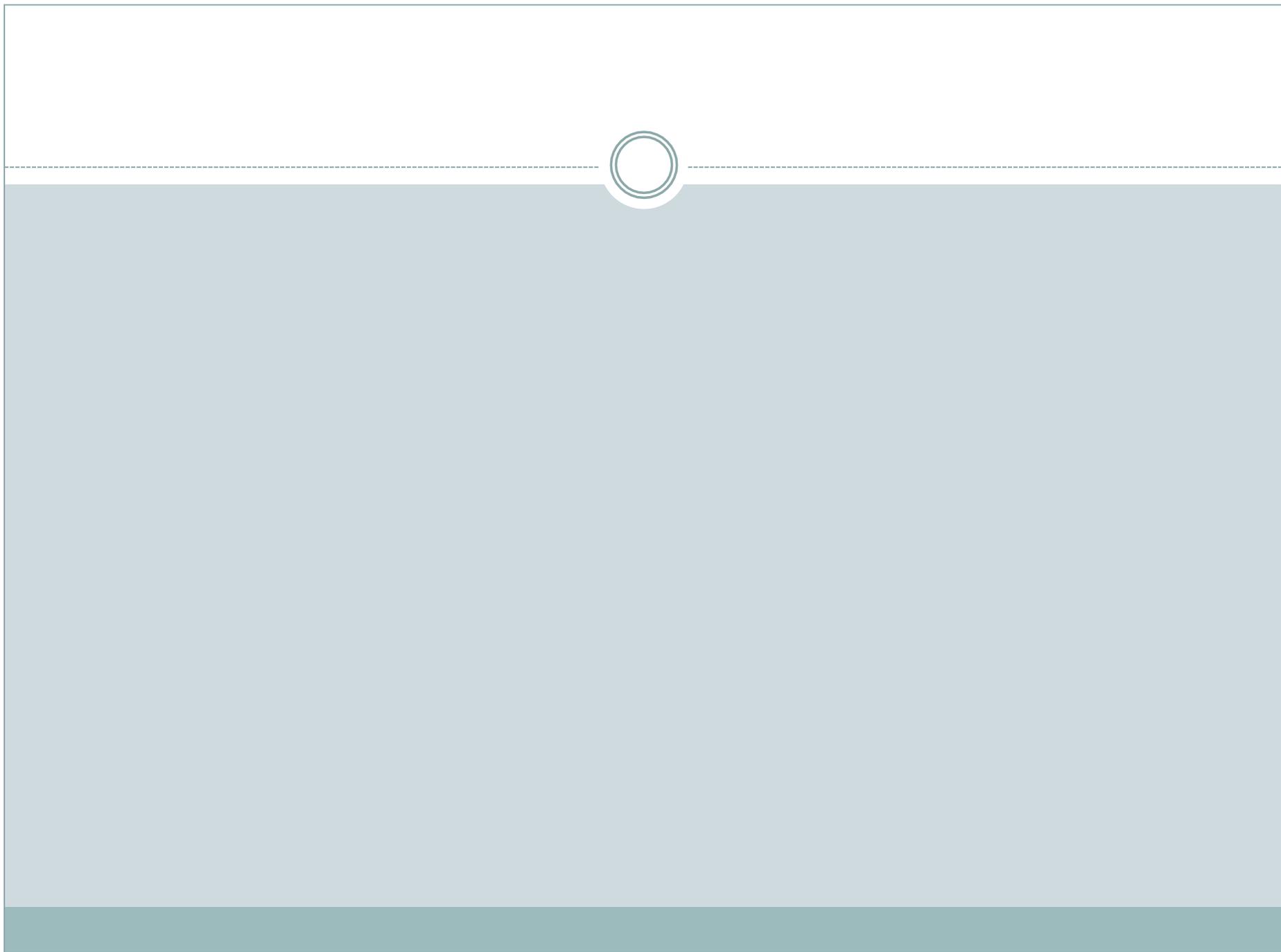


- What resources do you need to be successful?
- What is the timeline for this research, from proposal writing to what you do if it is funded?

Proposal-writing strategies



- Ask colleagues in the same field as you about expectations for proposals in your field
- Ask trusted colleagues to read through proposals
- Consider ideas on how you will deal with the revision (rejection) process



Take advantage of special opportunities



- Packard Fellowship
<http://www.packard.org/what-we-fund/conservation-and-science/packard-fellowships-for-science-and-engineering/>
- NSF CAREER/PECASE
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503214
- DOE Early Career Awards
<http://science.energy.gov/early-career/>
- HHMI Professorships (for undergrad research)
<http://www.hhmi.org/programs/society-of-hhmi-professors>
- Opportunities at your institution for early career faculty

NSF review criteria



- Intellectual Merit: The intellectual Merit criterion encompasses the potential to advance knowledge;
- Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
a. advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
b. benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or institution to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities?
society and contribute to the achievement of specific, desired societal outcomes.

Get funding calls for proposals to come to you



- Your Sponsored Projects Office
 - Meet your SPO contact, make him/her familiar with your work
- Individual Agency email lists
 - E.g. NSF (<http://nsf.gov/funding/>)
- Community of Scholars – Pivot
 - <http://pivot.cos.com> (Free 30-day trial)
- Discipline-specific listservs
- Acknowledgements sections at conference presentations
- Meeting with your program officers

Broader Impacts – Desired Attributes/Outcomes



- Full STEM participation of women, persons with disabilities and underrepresented minorities;
- Improved STEM education and educator development at any educational level;
- Development of a diverse, globally competitive STEM workforce;
- Enhanced [STEM] infrastructure for research and education;
- Increased public scientific literacy and public engagement with [STEM] science/technology;
- Increased partnerships between academia, industry and others;
- Improved national security;
- Increased economic competitiveness; and
- Improved well being of individuals in society

<http://cgi.stanford.edu/~dept-ctl/cgi-bin/tomprof/newsletter.php?msgno=1425>