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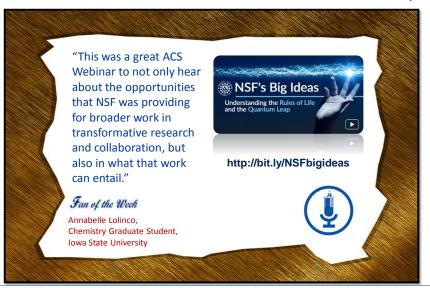


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3

An individual development planning tool for you!





ChemIDP.org

Peer-Review Training for Scientific Researchers





ACS Reviewer Lab™ is a free peer-review training course. Designed by ACS Editors, leading scientific researchers, and ACS Publications staff, this course provides real-life guidance on how to navigate tricky ethical situations, identify core criteria for evaluating manuscripts, and write a first-rate review. All you need to get started is an ACS ID.

MASTER PEER REVIEW WITH 6 INTERACTIVE MODULES



1 INTRODUCTION TO PEER REVIEW

What is peer review? Learn the basics of peer review and the critical role it plays in scientific publication.



2. ETHICS IN PEER REVIEW

Learn how to deal with difficult ethical issues, potential conflicts of interest, and personal biases in the peer review



3. PREPARING FOR REVIEW

Every Journal is unique, and the scientific literature is constantly evolving. Preparation before evaluating a manuscript will result in a more thorough review.



4. ASSESSING SIGNIFICANCE AND TECHNICAL QUALITY

Evaluating scientific soundness and potential impact is a key function of the reviewer. Learn how to effectively gauge impact and rate technical quality.



5. ASSESSING PRESENTATION AND READINESS FOR PUBLICATION

Presentation is key. Use these tools to evaluate manuscript presentation and identify potential issues related to safety and



6. WRITING YOUR REVIEW

what makes a good review? Learn how to write a quality review and convey your ideas with clarity.

www.acsreviewerlab.org





For Research

ACS awards more than \$20 million each year in research grants to support the study and advancement of the chemical sciences.

Fundamental Petroleum Research

ACS Petroleum Research Fund
Grants for faculty at non-profit institutions pursuing fundamental research directly related to petroleum or fossil fuels.

Green Chemistry

ACS GCI Pharmaceutical Roundtable Grants for institutions of higher education to spur impactful green chemistry research.



Chemistry - Biology

Irving S. Sigal Postdoctoral Fellowship
Postdoctoral fellowship for Ph.D. candidates pursuing research at the chemistry and biology interface.

Agricultural Chemistry

Herman Prasch roundation

Grants for tenured or tenure-track faculty at non-profit institutions pursuing research benefitting agricultural development in the United Grance

Organic and Medicinal Chemistry

Teva Pharmaceuticals Marc A. Goshko Memorial Grant Program Grant for academic researchers in the fields of organic and medicinal chemistry.

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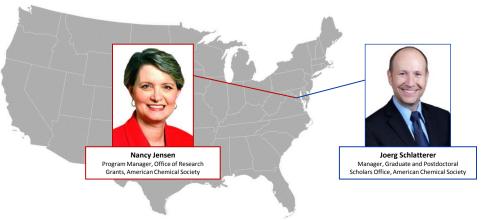
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10





Writing Competitive Research Proposals that Win Funding



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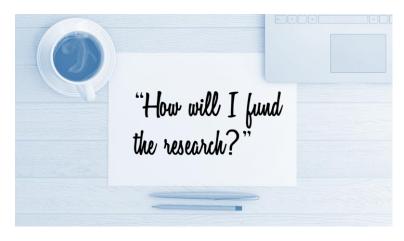


Nancy J. Jensen, Ph.D., J.D.

Program Manager, Office of Research Grants and ACS Petroleum Research Fund American Chemical Society

6

The Greatest Pragmatic Question in All Science is...









The Two Essential Elements of a Successful Grant Application



- A Great Research Idea
- Effective Presentation of the Idea







Outline of Topics

- Proposal Writing Rules
- ☐ Funding Sources and Agency Information
- Selecting a Topic
- ☐ Writing the Proposal
- Proposal Evaluation
- PRF as an Example
- ☐ Final Thoughts







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Good grant proposals take a lot of effort to write so writing a really good proposal text and then changing the cover letter/forms and sending it to several different agencies is a good approach.

- True
- False

17

#5: Know the Agency's Mission

- Every funding agency has ideas and rules about what it wants to fund.
- A proposal for one agency typically is not suitable to send to other agencies, because the overall goals are different.
- Don't attempt to contort the agency's mission to fit your research project.







9

#4: Read All Instructions Carefully

Be sure to follow the instructions.

A Common Reviewer's View:

If the PI can't follow instructions for the proposal, then the PI probably can't follow instructions to do elaborate research.







#3: Write with Confidence, But Don't Disregard Other Ideas

Your proposal should convey the attitude that:

- You have identified an important problem, and you are the right person to do the work.
- You will get the job done and find answers to the problem discussed.
- You are aware of previous relevant studies.







#2: Have A Great Scientific Idea

One that is novel, has relevance to an identified target and can be investigated thoroughly, within the context of the institutional resources available to the PI, and within a reasonable time-frame.

 Novelty often derives from detailed study or observation and understanding of a problem or challenge.







#1: If in Doubt, Contact the Program Officer

Preferably, **before** you spend the time writing an uncompetitive or non-compliant proposal.

 Always be polite, respectful, and honest when communicating with a program officer







Audience Challenge Question

Good grant proposals take a lot of effort to write so writing a really good proposal text and then changing the cover letter/forms and sending it to several different agencies is a good approach.

False







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Funding Resources





Finding the Right Agency



Make sure that your research fits the mission of the funding agency!







Information on Federal Grants

Federal funding sources, and application procedures at "grants.gov":





















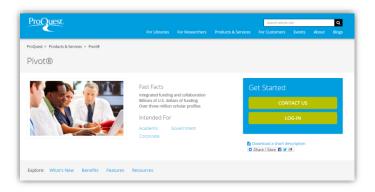






Information on Other Funding Sources

PIVOT – Web based subscription service with extensive information on funding sources.



http://www.proquest.com/products-services/Pivot.html















General Internet Searches



Agency Information



- Read the Request For Proposals (RFP) or the "Grant Proposal Guide."
- Believe and follow the instructions.
- Read them for **what they say**, not what you want them to say.
- Your chosen agency should not be the sole source of funding.







Agency Concerns

- Are you **eligible** to apply, or **qualified** to do the research?
- What is your approach?
- Why is this important to your research community?
- If successful, what will be the benefit to society?









If I have a question about how to interpret a rule in a grant form, the best person to ask is someone in my department.

- True
- False

31

Still Have Questions?



- Contact the Program Officer by email or phone
- Be Ready to Answer:
- What is your research objective?
- How does this meet the agency's mission?







If You Contact a Program Officer:

Be Prepared with Focused Questions:

- e.g. I have a new idea for a catalyst for converting methane to methanol. Is this within the scope of your program? If not, could you suggest where I might submit this?
- Listen (you don't learn by talking).
- Remember that the Program Officer is not the panel (or reviewer).







Framing Your Questions

Questions NOT to Ask a Program Officer:

- Will you fund my research?
- Is this a good research topic?
- What research topic should I work on?
- What are my odds of being funded?
- Who are the reviewers?







Audience Challenge Question

If I have a question about how to interpret a rule in a grant form, the best person to ask is someone in my department.

False







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I should only mention or discuss literature which fully supports my hypothesis or proposal.

- True
- False

37

Evaluating a Research Topic

Your Research Must Be:

- Methodical, repeatable and verifiable
- Not done before
- Significant
- Reasonable probability of success
- Amenable to a viable research plan

* Must have facilities to accomplish research and determine that the proposed research can comply with **SAFETY** and other legal requirements.







Know Your Field

- What is current state-of-the-art?
- What are the key research issues?
- What are the major unsolved challenges?
- What are the top ten researchers in the field doing now?
- What are the sources for funding?
- Who would likely review your proposal?







Build on Your Strengths



- Differentiate this proposal from Ph.D. thesis and other sponsored work
- Perform thorough up-to-date literature search and exploratory research before writing the proposal
- Establish and keep your contacts







Demonstrate Managerial Skills



- Set forth a clear pragmatic research plan
- Show wise use of resources people, money, and facilities
- Be well organized







Audience Challenge Question

I should only mention or discuss literature which fully supports my hypothesis or proposal.

False







Outline of Topics

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ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



I can freely copy from my own published work when preparing a proposal.

- True
- False

44

Now that you have an idea...



...how do you go about writing the proposal?





Reality Check: Heilmeier's Catechism



George H. Heilmeier

- How is it done today, and what are the limits of the current practice?
- What's new in your approach and why do you think it will be successful?
- Who cares?
- If you are successful, what difference will it make?
- What are the risks and payoffs?
- How much will it cost?
- How long will it take?
- What are the midterm and final "exams" to check for success?







Basic Concepts

- ✓ Write to be readable.
- ✓ Make the level of detail appropriate.
- ✓ Find out how much money is available, and follow the budget guidelines.
- ✓ Have clearly defined hypotheses, goals, and approaches.







Clear Presentation

- State:
- the problem or hypothesis.
- why the issue is significant.
- what you are going to do.
- Explain how you will carry out the proposed work.
- Address relevant potential challenges and alternatives.







State Your Research Objective

- Make clear in the **first paragraph** exactly what your proposal is about.
- The statement of your research objective should lead you directly to your methodology.







Exemplary Hypothesis

• The proposed research will test the hypothesis that a new xyz catalyst will oxidize compounds having AB functionalization.

OR

• We hypothesize that.....







Exemplary Objectives

- The first objective of the research is to construct the new catalyst xyz from metal x and ligands y and z.
- The second objective is to use the new xyz catalyst to oxidize compounds having AB functionalization including AB substituted aromatic compounds and AB substituted cyclohexene compounds.







Exemplary General Outline of a Proposal

- I. Abstract: Written in slightly more general terms, readable by non-experts.
- II. Background and Significance: Demonstrate that you know the field thoroughly.
- III. Specific Aims: 1-2 sentences on each point that you intend to investigate.
- IV. Experimental Plan: State work to be done, how it will be done and expected outcomes.
- V. Resources: Identify available and resources required to complete your research.







Exemplary Proposal Writing Process

- Create a topical outline.
- Develop subtopics and expand the outline.
- Draft main graphics.
- Develop the first draft of the text.
- Review, revise, and complete the draft.
- Submit a copy to administrators for approval.
- Critical review of graphics and text.
- Finalize text and graphics.
- Complete and submit to agency significantly ahead of the deadline.







Proposal Guidelines

Carefully follow all instructions provided by the funding agency

- Page Limit
- Word Limit
- Budget Limit
- Abstract Format
- Reference Format
- PI (Co-PI) Eligibility

- Font Size
- Minimum Resolution
- Table of Contents
- Research Objectives
- Tables/Figures
- Submission Method (file types, size, etc.)







Competitive Proposals

- Keep narrative focused on the project.
- Use tables, charts, and figures effectively.
- Mention role students will play in research or other agency secondary interests (if appropriate)
- Present **preliminary results** if you have them.







Avoid Plagiarism



- Cut and paste copying from published work
- Copying from your own published work
- ✓ Properly note and credit copied passages







Audience Challenge Question

I can freely copy from my own published work when preparing a proposal.

False







What **Not** to Do...



- Rush
- Put too much or too little in project description
- Wait until the last minute to contact P.O.
- Use tiny fonts or narrowed margins
- Ask for too much or too little money
- Make figures/tables small or low resolution
- Ignore instructions or proposal guidelines
- Cite papers "in prep" or "submitted" (unless instructed to do so.)







What to Do...



- ✓ Download completed proposal
- ✓ Proof read before submission
- ✓ Use correct format, and format correctly
- ✓ Make sure everything is legible
- ✓ Follow all instructions and submission procedures carefully!







Common Errors in Proposals

- Does not fit agency's mission.
- Violates one or more agency guidelines.
- Beyond capabilities of investigator, students, or institution (don't propose too much).
- Lack of proofing: grammar, spelling, formulas, numbering, math errors.







More Common Errors



- Missing pages, figures, tables, or signatures.
- Unfocused, poorly organized.
- Low personnel budget not enough people.
- Low impact No publishable results even if funding is obtained.





Same Idea in Different Proposals?

- A PI **may** submit multiple proposals, to different agencies, for similar research topics.
- You should show how each proposal is different.
- Keep each Program Officer informed of the status of the proposal to the "other" agency.







Multiple Proposal Submissions

- Agencies generally do not fund research already supported by another agency.
- It may not be legal to accept more than one grant for the same topic, even if the grants are from different agencies.







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- ☐ Final Thoughts







Proposal may be returned without review if you:

- Ignore "Do's and Don'ts" of previous slides
- Have unauthorized attachments or conditions (i.e., "the university reserves the right to negotiate terms and conditions if a grant is awarded.")



• Don't follow all the instructions in the RFP.







Reviewers Want to Know

- 1) What is it about (research objective)?
- 2) How will you do it (technical approach and methodology)?
- 3) Can you do it (you and your facilities), and is it worth doing?
- 4) Are there any secondary objectives that are relevant to the agency? (e.g., education of students, broader impacts)







Proposal Review Criteria

- √ Significance
- ✓ Approach
- ✓ Innovation
- ✓ Investigator capability
- ✓ Research Environment







Reviews of Uncompetitive Proposals



"The PI has failed to refer to important studies published in the past 2-3 years."



"Much important information on experimental procedures, and equipment for measurements is omitted. I can't really tell what is going to be done and how."



"This proposal is a simple extension of the PI's Ph.D. thesis."







Reviews of Uncompetitive Proposals



"The PI seems to feel only one outcome of these studies is possible and fails to consider others. If that were true, the studies would be unnecessary."



"This work can certainly be carried out, but it does not address any topic of broad current interest. I would probably not read a paper describing the results."







Outline of Topics

- **Proposal Writing Rules**
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- **Proposal Evaluation**
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In 2017, the ACS PRF awarded 177 research grants totaling approximately \$17.1 million!







History of ACS Petroleum Research Fund

- Founded 1944 in a Federal court order related to anti-Trust activities of seven oil companies. The PRF trust comprises stocks and investments generating income to ACS PRF for research grants.
- Currently the trust and grant program are administered by ACS but subject to the jurisdiction of a Federal Court.
- Current grants are "seed money" grants emphasizing novel research
 directions and allowing new investigators to launch careers and established
 researchers to develop worthwhile but risky ideas (proof-of-concept data).







Seed Money Grants



- Proposed work must be significantly different that previous work
- Preliminary results not necessary and if available modest in amount







Research Must be Petroleum Relevant

AND

- The relationship to the "petroleum field" should be obvious, not a stretch of one's reasoning.
- Proposed research must be in one of the specified disciplines
- Proposed research is not in one of the explicitly excluded research types









PRF Grant Types

- New Directions (ND) Research Grants
- Faculty in Ph.D.-granting departments
- Doctoral New Investigator (DNI) Grants
- New faculty within first three years of appointment
- Undergraduate Research (UR) Grants
- Faculty in non-Ph.D.-granting departments
- Undergraduate New Investigator (UNI) Grants
- New faculty within first three years of appointment







PRF Proposal Processing

- Proposal submitted on Internet Grant Application Manager (IGAM) Web server
- 2) Proposal transferred from IGAM Web server to ACS PRF proposal database
- 3) Proposal evaluated by Program Manager for relevance to ACS PRF (both "fundamental and petroleum-relevant" research)
- 4) Proposals within scope of PRF funding sent to reviewers (each reviewer does only 1 review per grant cycle)
- 5) Written reviews and proposals forwarded to PRF Scientific Committees for funding decision
- 6) Scientific Committees' decisions reviewed by ACS Board of Directors
- 7) PIs notified







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Impact of PRF Grants

- ACS PRF grants are known for launching careers. DNI/UNI "starter grants" have given many assistant professors their first peer-reviewed funding.
- "Seed money" grants emphasize novel research directions, and allow development of worthwhile but risky ideas (proof-of-concept data).
- To date, **28 Nobel laureates** have received ACS PRF funding for their research projects.







One Way to Learn About Grant Proposals:

No better way to see how the system works.



Not a major time commitment.



- Program Officers send out hundreds of review requests each year; dedicated reviewers are always needed.
- If you think the system is unfair, try being a part of it!
 Want to learn how to review? See ACS Reviewer Lab at https://www.acsreviewerlab.org







ACS Office of Research Grants: Additional Resources



Nancy J. Jensen: n jensen@acs.org Phone 202-872-6186



Additional Contact Information

Assistant Director Dean Dunn: d dunn@acs.org



Thomas C. Clancy: t_clancy@acs.org Polymer Science and Chemical and Petroleum Engineering



Askar Fahr: a fahr@acs.org

Physical Organic Chemistry and Physical Chemistry/Chemical







Fritz Theyer: f theyer@acs.org Geochemistry, Geology, geophysics



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81

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82





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43





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