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6. WRITING YOUR REVIEW

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#### www.acsreviewerlab.org

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If thought research, education, and community projects.



#### 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

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

Agricultural Chemistry

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

Organic and Medicinal Chemistry

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



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# The Proposal Writing Process: Practical Tips

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

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

#### Creating a Positive Impact – The Proposal



- A Great Research Idea
- Effective Presentation of the Idea







#### Creating a Positive Impact – Professionalism



#### **Develop a Positive Professional Reputation**

- Personal Integrity
- Responsible
- Capable
- Respectful of Others
- Positive Member of the Professional Community







#### Creating a Positive Impact – Good First Impression

- 1st paragraph of Proposal Narrative is Key
- Careful presentation of proposal critical







# Outline of Topics

- ☐ Selecting a Research Topic
- Developing the Presentation
- □ Common Errors
- Proposal Evaluation
- PRF as an Example
- ☐ Being a Reviewer and other Final Thoughts







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### 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 sources for funding?
- What are the top ten researchers in the field doing now?







### 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







# 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?







### Sources of Information on Successful Topics



For Petroleum Research Fund (see Annual Reports):

https://www.acs.org/content/acs/en/funding-and-awards/grants/prf.html



For Research Corporation for Scientific Advancement

(see Awards Database): http://rescorp.org/awards-database







#### Sources of Information on Successful Topics



**For NSF** (search for funded projects): https://www.nsf.gov/awardsearch

**NSF Award Search Guide:** 

https://www.nsf.gov/awards/award-search-guide.jsp



For NSF also see NSF Merit Review Report to the National Science Board (NSB): https://www.nsf.gov/nsb/publications/pubmeritreview.jsp



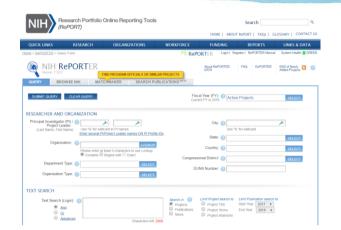






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#### Sources of Information on Successful Topics



#### For National Institutes of Health

(see Research Portfolio Online Reporting Tool - RePORTER):

https://projectreporter.nih.gov/reporter.cfm







#### 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







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### 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.







#### 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







#### Clear Presentation



#### Demonstrate Managerial Skills

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









Clear and Impactful Writing: Which of the following do you think is the **best way** to convey the **newness of your idea** to reviewers?

- A) The proposed research has never been done before and will revolutionize organic synthesis
- **B)** The proposed research provides a new method for functionalization of heterocyclic compounds in a one-pot synthesis using an iron catalyst
- C) The proposed research provides a novel approach to functionalization of heterocyclic rings
- D) All of the above
- E) None of the above

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## Tips for Stating Key Components

- 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.









Clear and Impactful Writing: Which of the following do you think is the **best way** to convey the **over-arching general nature** of your research?

- A) The proposed research is directed to the synthesis of analogs of dimethyl chicken wire a natural product known to have antimicrobial properties
- **B)** The proposed research includes building a library of compounds and testing them for antibiotic activity and cancer prevention properties
- **C)** The proposed research is directed to the synthesis of fluorinated analogs of dimethyl chicken wire, a natural product known to have antimicrobial properties. The analogs are projected to have better bioavailability and accordingly higher potency than the natural product
- **D)** All of the above
- E) None of the above

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### **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.









# Clear and Impactful Writing: Which of the following do you think is the **best way** to start the proposal section on **experimental plan**?

- A) In this project, we will study the functionalization of hydrocarbons and aromatic compounds and test their physical properties, bioactivity and shelf stability by a variety of methods.
- **B)** In this project, we will study the functionalization of sp3 carbon atoms of aliphatic alkanes, cyclic alkanes and alkenes.
- **C)** In this project, we will initially focus on the functionalization of sp3 carbon atoms in hexane molecules with an iron catalyst.
- D) All of the above
- E) None of the above

### Competitive Proposals

- Keep narrative focused on the project.
- Use tables, charts, and figures effectively.
- Mention agency secondary interests (as appropriate)
- Present **preliminary results** (if expected)







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### Avoid Plagiarism



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







#### 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.





# 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."







# Proposal may be returned without review if you:

- Send a proposal outside the agencies scope of funding and/or guidelines
- Don't follow all the instructions in the RFP.
- Have unauthorized attachments or conditions









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#### 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)







#### Reviewer Evaluation Process

- Address the agency's criteria set out in the reviewer guidelines
- Evaluate the significance and novelty of the proposed work
- Evaluate the approach including methods and resources available
- Evaluate Grantsmanship clear presentation, readable, well organized and free of typos
- · Evaluate potential safety concerns
- Evaluate the educational aspects and/or any other secondary agency interests







#### Reviewer Evaluation Process - continued

- Is the proposed research "do-able"?
- Has the PI realistically address potential challenges?
- Are preliminary results clearly presented and their relevance to the proposed work identified?
- Has the PI appropriately considered the relevant literature and state of the art in the field?







# Proposal Decision Criteria

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







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### 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 (US only)
   New faculty within first three years of appointment
- Undergraduate Research (UR) Grants
   Faculty in non-Ph.D.-granting departments
- Undergraduate New Investigator (UNI) Grants (US Only)
   New faculty within first three years of appointment







#### **PRF** Proposal Processing

- 1) 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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### 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!







#### Learn How: FREE Web-based Publication Review Training









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 Physics



Burt Lee: <u>b lee@acs.org</u>
 Surface and Materials Science



Fritz Theyer: <u>f theyer@acs.org</u>
 Geochemistry, Geology, geophysics

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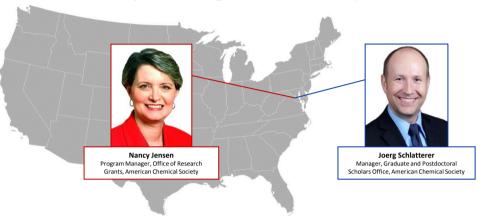
Lauren Wolf

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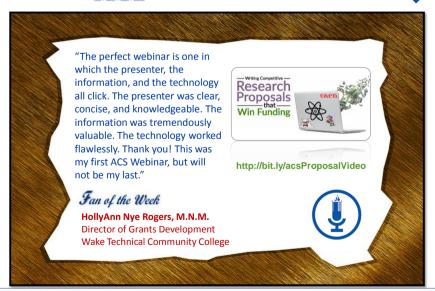
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