

Student workshop:
Show me the money: how to write a successful grant proposal
2007 ESA/SER joint annual meeting
Thursday, August 9th, 11:30 am
San Jose Convention Center, room B3&4

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Members of the ESA Student Section will lead a student workshop on maximizing our chances of obtaining grants and other types of funding as graduate students. The discussion will cover issues such as how to write a successful grant proposal (grantsmanship) and what opportunities are available to students in ecological sciences (funding sources). We will also more briefly discuss postdoctoral funding opportunities.

Writing a successful grant proposal

Before starting

- Make sure your work matches the mission of the granting agency.
- Formulate your ideas.
- Consult your colleague's successful proposals.
- Start the process early.
- Note the deadline for application submission.
- If possible, conduct pilot studies.

The proposal (general)

- Read the proposal instructions carefully and follow them exactly.
- Use appropriate type size, font, spacing and margins.
- Do not go over the maximum number of pages allowed.
- Send the instructed number of copies.
- Make the proposal well focused and organized.
- Aim the proposal at both the expert in the field and at the generalist (depending on the funding agency).
- Do not only rely on the computer's spell checker.
- Get internal peer reviews.
- Get review from you advisor.
- Make sure all supplemental material (in addition to the proposal) is complete.

Contents of the proposal

- Brief background of the proposed research work. Avoid comprehensive literature reviews.
- Current state of knowledge.
- Rationale and justification (significance) for the proposed work.
- Specific objectives

- Hypothesis
- Research design and methods
 - Clearly describe your procedures, especially those that are new or unlikely to be known to the reviewer.
 - Discuss relevant control treatments or experiments.
 - Discuss the facility where the experiments will take place.
 - Explain the processes for data collection, analysis and interpretation.
 - Provide a brief tentative sequence and timetable for the project.
- Budget
 - Make sure the budget is well documented, realistic, appropriate and justified. Do not inflate, overbudget, or underbudget.
 - Do not request items that are not allowed.
 - Give sufficient details for each item.
- Curriculum vitae
 - List of publications

What NOT to put in a proposal

- Redundantly long literature review with few new ideas
- Ideas that have already been tested
- Descriptive research with no hypotheses tested
- “Have a solution, looking for a problem”
- Unfocused research with unrelated aims

Keep in mind that grant application is a competition, and that you are not the only deserving recipient. Funding agencies and committees endeavor to provide their money to further research they want to see done. A one in three chance of obtaining a grant is very good. Some grants have funding/proposal rates in the neighborhood of 1:100! So don't take it personally when you get rejected for an application. Remember that practice makes perfection, and that the more you try the better chances you have.

Graduate student funding opportunities (non-exhaustive)

NSF – Predoctoral Fellowship, Dissertation Improvement Grant

NIH

Sigma Xi – Grants-in-Aid

American Museum of Natural History – Roosevelt Memorial, Chapman Memorial, and Lerner-Gray Grants

American Society of Mammalogists – Grants-in-Aid

American Society of Ichthyologists and Herpetologists – Gaige and Raney Fund Awards

Society for the Study of Amphibians and Reptiles

Society of Systematic Biologists – Awards for Graduate Student Research

Animal Behavior Society – Student Research Grants

SWAN

Fulbright

Smithsonian

Explorer's Club

National Geographic

Field Museum of Natural History – visiting scholar grants

Association for Women in Science

*Check with YOUR local University, Graduate School, and Department

Postdoctoral fellowships

NSF

NIH

Smithsonian

Fulbright

AAAS

Information sources for this outline

The Art of Grantsmanship, by Jacob Kraicer, University of Toronto

<http://www.hfsp.org/how/ArtOfGrants.htm>

Grantsmanship: the Art of Proposal Craft, by Zoe Eppley, Indyne, Inc.

<http://www.sicb.org/meetings/2002/grantsmanship.html>

How to Write a Losing Proposal, by Alexander Scheeline, University of Illinois at Urbana-Champaign

<http://www.biology.eku.edu/RITCHISO/losingproposal.htm>

Zen in the Art of Grantsmanship, by Wade Black

http://www.mindspring.com/~bozartmt/zen_in.html

Other useful web-sites

Guide for Writing a Funding Proposal, by Joseph Levine, Michigan State University

<http://www.learnerassociates.net/proposal/>

NSF Guide for Proposal Writing

<http://www.nsf.gov/pubs/1998/nsf9891/nsf9891.htm>

Smithsonian Student Fellowships

<http://www.si.edu/ofg/fell.htm>

Fulbright

http://www.iie.org/FulbrightTemplate.cfm?Section=U_S_Student_Program

Michigan State University

<http://www.lib.msu.edu/harris23/grants/3science.htm>

Birdnet

<http://www.nmnh.si.edu/BIRDNET/Grants/>

Grants.gov

<http://www.grants.gov/FindGrantOpportunities?search=category>

Instituto Nacional de Ecología, México

www.ine.gob.mx

Comisión nacional para el conocimiento y uso de la biodiversidad

www.conabio.gob.mx

Consejo Nacional de Ciencia y Tecnología

www.conacyt.mx

Petróleos Mexicanos

www.pemex.com

Tips for preparing competitive NSF proposals

Ann Russell and Saran Twombly, Ecological Biology Cluster
Division of Environmental Biology

- ✓ Identify new, original, and **exciting** ideas – you need to hook your reviewers
- ✓ Begin with a strong conceptual basis or framework – research goals must be linked to questions of fundamental significance in environmental biology
- ✓ Outline a clear set of hypotheses or questions
- ✓ Proposed research must test stated hypotheses, and distinguish among competing hypotheses
- ✓ Include preliminary data
- ✓ Justify system, species, response variables chosen for study
- ✓ End by describing how results will advance theory / concepts / central questions
- ✓ Broader Impacts: Provide enough details to assure reviewers that proposed activities and impacts will occur
- ✓ Convince your peers to fund you
- ✓ Make sure you follow the ‘rules’ – check program guidelines
- ✓ Contact your program officer
- ✓ Revise and resubmit
- ✓ Seek alternative funding sources, both within and outside of NSF

Sharon Y. Strauss
Professor, Evolution and Ecology
Director, Biological Invasions IGERT

1) Consider what type of writer you are. Many classes in both high school and college are so big that teachers or professors do not assign papers! Moreover, when papers are assigned, extensive comments on stylistic aspects of essays are often lacking; content is more the focus of the feedback. As a result, many undergrads and grads are not well trained in the art of writing.

I HIGHLY RECOMMEND THAT STUDENTS AGGRESSIVELY PURSUE CLASSES, WORKSHOPS, ETC. THAT FOCUS SOLELY ON STYLISTIC/GRAMMATICAL WRITING WITH EXTENSIVE FEEDBACK. I am not necessarily talking about a scientific writing class, I am talking about ****basic writing skills****. Even if you have passed the writing requirement at your institution, ****you may not be a good writer****. You might be adequate, but for grants and papers, adequate may not cut it. Whether for papers or grants, a person who is an excellent writer will have great success at getting grants funded or papers accepted because she/he will effectively and fluently present thoughts and ideas. In addition, this skill will serve you well in almost any aspect of our profession, also the non-academic routes, and even, gasp, other careers. So, ****seriously**** consider taking a class on writing in your graduate career (pass/ fail is fine, just do it seriously!) - it's never too late! Your thesis writing will go faster and easier too! Grants will be much more likely to be funded if they are easy to read and if they effectively communicate the novelty and approach of the scientist. Consult with your advisor about taking a writing class.

2) Before starting to write a grant, make sure you have reviewed the existing literature well and have a sense of what contribution your new piece will make. Panelists are often harsh on proposals if proposals are not up to date on the latest developments in the field, and cite them!

3) This piece of advice is one of the hardest for students (and profs!), but it is really important: ****complete a full version of the proposal at least two weeks before the deadline!**** Proposals, like fine wine, are better after a bit of aging... Having a full and completed draft will allow you to get the most and best feedback on your presentation and ideas from your advisor and other persons whose intellect you respect (smart fellow grad students, etc.). I do this with my own grants. I also prepare my readers (three is about the max number) in advance. For example, I'll say: In about 2 weeks, I'll have a draft of a grant proposal that I was hoping you could give me feedback on. At that point, I won't have much time before deadline, so could you please give me a fairly rapid turnaround? Maybe put a spot in your calendar for the proposal? (Then, do these kind colleagues the courtesy of getting them the proposal on time). Having fresh eyes read your piece can greatly improve the chances for funding; diverse readers can see things as reviewers in their particular areas might. Also, having a chance to put your proposal away completely for a few days and to come back to it with a fresh brain will help you identify the weaknesses in your own proposal.

Always give your advisor a draft well in advance of the deadline. Remember, their name is on that proposal, and they don't want to look like a fool if you have done a hasty and slipshod job. My students and I will often go through 4 or 5 iterations of the proposal to get it right. Painful, yes, but usually very effective!

4) Try to anticipate objections of reviewers. The art of a good proposal is to communicate with readers that you have considered possible pitfalls, without pointing out so many pitfalls that readers will think the project isn't feasible (or pointing out a pitfall they hadn't fully appreciated). This is a bit of an art, admittedly.

5) Have preliminary data for procedures, methods (or even cite a previously published paper that used the same methods) to show feasibility.

6) Cite literature liberally and from a diversity of authors- you never know who your reviewer will be, and who will get miffed if you don't cite their work.

7) If your project is closely tied to that of your major professor's, look for ways to show your own innovations to the project. What will you bring to the table?

Top 10 Proposal Writing Tips

Steve Allison
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1. State explicitly why your proposed work is important and interesting
2. Near the beginning of your proposal, clearly and concisely state your objective(s)
3. Include only relevant background material; you do not need an extensive literature review
4. State hypotheses clearly and make sure your proposed experiments test them adequately
5. Say how your results will either prove or disprove your hypotheses
6. Use figures (or tables) to clarify complex concepts or experimental designs
7. Avoid jargon, define unfamiliar terms, and write so that someone outside your immediate field can understand what you are saying
8. Have trusted colleagues read your proposal with a critical eye
9. Read the proposal guidelines and follow them exactly
10. Carefully proofread and spell-check your proposal before submitting it

Ten tips for funding your post-doc

Mark Urban
Postdoctoral associate
National Center for Ecological Analysis and Synthesis

1. The early bird gets the grant. If you think you may want to pursue a post-doc, you should be starting your search 1-2 years before you expect to finish your Ph.D. The initial phase of your search includes recording the due dates of fellowship grant competitions, talking to researchers who might be looking for future post-docs, and deciding what it is you want to do with your (professional) life.

2. Explore your world. Post-docs provide great opportunities to learn new skills, explore different systems, and add significantly to your breadth of knowledge. For instance, if you worked on the ecology of forest ecosystems for your Ph.D., maybe you want to working on marine animals for your post-doc. Consider doing something new and exciting. Most post-docs last only a short time, so the post-doc can be a period of your career when you take risks and try out new things before moving on.

3. The gift of gab (and the internet). A lot of your search for post-doc positions can be completed online by searching government and academic institutions and publications with job listings. However, many jobs, especially those through individual labs, are discovered only by word of mouth. Talk to people in your field and be sure your advisor is talking to colleagues about your future prospects as well.

4. Make contact. The best source of information about a potential fellowship is often from post-docs currently on the grant. Consider contacting someone who has your dream post-doc position and similar research interests to ask him/her about the experience and perhaps even to share his/her original grant proposal and provide feedback on your proposal.

5. Show me the data. If at all possible, you should aim to include some preliminary data, a list of data sources, or a conceptual diagram of your proposed analysis. This information demonstrates to reviewers that you have already thought deeply about your project and that the project is feasible.

6. Be cool. Just because a proposal is fundamentally solid from a scientific perspective does not mean it will get funded. Reviewers are looking for creative projects that are truly novel. Think of it this way: if you read your proposal and don't say to yourself, "that's pretty cool," than you need to go back to the drawing board.

7. Be cutting edge. Grant reviewers want to see that you are applying the latest and greatest techniques to answer the questions you have posed. Make sure that you have read the latest research in your field and that you have consulted with experts on the particular techniques and statistics that you have proposed. Also make sure that what you are proposing can be completed in the time provided (a timeline of activities is often useful in this respect).

8. Feedback. You'll want the grant proposal to be basically finished at least a month or two in advance of the due date. Once your draft is ready, give it to advisors, other graduate students, scientists outside of your institution, and the post-docs who already have the position you want and ask for feedback. Allow plenty of time for friendly reviewers to do their work and for you to address their comments in the final draft. Consider presenting your grant proposal to a group of peers—often problems in communication or technique that might not be obvious on paper can be revealed through oral presentations.

9. Do your due diligence. Congratulations -- you've got an offer, maybe even more than one. Now you need to make a decision. Be sure to get the details on each position before making up your mind. Post-doc fellowships offer a range of salaries and benefits, and responsibilities vary among fellowships, institutions, and individual labs or research centers. Get the details regarding salaries, benefits, and lab expectations in writing before you commit. A potential point of contention is how much of your time is to be devoted to new work and how much can be devoted to finishing up that pesky thesis. If nothing formal exists, consider drafting something with your future mentor that you both agree to before accepting the position. Clarifying the details up front will prevent misunderstandings down the road.

10. Be a good loser. #\$\$%! You didn't get the grant. But at least you're in good company. Most grant proposals are rejected on the first try in today's competitive funding environment. Rejection is never easy, but you can learn a lot from reviewers' comments. Even comments that you think are incorrect may actually be pointing to areas where your ideas need to be communicated more clearly. Do not give up, but resolve to address the reviewers' comments and resubmit an improved proposal by the next deadline. Be sure to address all comments in some way—at least one of the original reviewers is likely to comment on your revised proposal.

Some common ecology postdoctoral fellowships to get you started:

NSF Postdoctoral Research Fellowships in Biological Informatics

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12720

AAAS Science & Technology Policy Fellowships

(http://fellowships.aaas.org/01_host_agencies/01_Partners.shtml)

The National Academies Research Associateship Programs (includes NOAA, EPA, USGS)

<http://www7.nationalacademies.org/rap/>

National Center for Ecological Analysis and Synthesis

<http://www.nceas.ucsb.edu/rfp>

Canon National Parks Science Scholars Program

<http://www.nature.nps.gov/canonscholarships/>

Smith Fellowship

<http://www.smithfellows.org/index.cfm>

WWF Fuller Science for Nature Fellowships

<http://www.worldwildlife.org/fellowships/fuller-fellow.cfm>

Santa Fe Institute

<http://www.santafe.edu/about/people-postdoctoral-fellows.php>

Institute of Ecosystem Studies

http://www.ecostudies.org/people_sci_post.html

UC President's Postdoctoral Fellowship Program

<http://www.ucop.edu/acadadv/ppfp/>

UC Berkeley Miller Postdoctoral Fellowship

<http://millerinstitute.berkeley.edu/>

Yale University Gaylord Donnelley Environmental Fellowship

<http://www.yale.edu/yibs/donnfellows.html>

University of Michigan Society of Fellows

<http://www.rackham.umich.edu/Faculty/sof/index.html>

Center for Population Biology Postdoctoral Research Fellowship

<http://cpb.ucdavis.edu/jobs.htm>

Woods Hole Oceanographic Institution Postdoctoral Programs

<http://www.whoi.edu/page.do?pid=7798>