Presentation Outline

I. NSF CAREER program info (overview)

II. Broader Impacts Criterion What does it mean?

III. Developing a CAREER proposal Some tips

IV. Educational Component

V. Crafting the proposal budget

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III. Developing a CAREER proposal

Some tips

How to begin

- Come up with a research idea
- Find a fit with an NSF directorate and specific program
- Become fully acquainted with the RFA or grant solicitation

Coming up with a Research Idea

- Select an area to study that builds upon your expertise and skills but is not a direct continuation of your PhD or postdoctoral work
- Begin thinking about potential CAREER award topics well in advance of the submission date. A year ahead is not too early.
- Choose a research area. Find out all you can about it every day (Google is your friend). After having done this for many months you will find some question(s) that you will be passionate about answering.

Coming up with a Research Idea

- What do you want to do?
- Does it address important questions in your field?
- Is it novel and cutting-edge?
  - Not an incremental improvement
  - Where is your field going in the next 20 years?
- Do you have the background and resources to accomplish your goals?
  - If moving into a new but related area, be sure you discuss collaborations to fill any gaps
- Will it contribute to your career goals?
- Will it contribute to your department's goals?

Finding a Fit

Learn as much as you can about NSF

- Periodically visit the NSF web site (www.nsf.gov) – to learn about the goals and priorities of the directorates
- Get to know the programs to find out where your research fits:
- Use the funded programs database to find out what has been funded recently http://www.nsf.gov/awardsearch/index.jsp

Finding a Fit

- If you think you have a fit
  - Review the titles/abstracts of funded proposals
  - Obtain copies of funded proposals (public)
  - Contact program director to discuss your research idea, but come prepared:
  - Prepare a one-page abstract or project summary to discuss with the program officer
  - Volunteer to serve as a reviewer on a panel
- If you do not have a fit, it is a waste of time to submit!

Getting fully acquainted with NSF08-557

- Read NSF's Proposal and Award Policies and Procedures Guide (NSF-09 1) effective Jan 5, 2009:

  http://www.nsf.gov/pubs/policydocs/pappguide/nsf09_1/nsf091.pdf

  Part I Proposal Preparation and Submission Guidelines (GPG) starts from page 14
- Specific guidelines for the NSF CAREER awards are in grant solicitation NSF 08-557
  - Read NSF08-557 very carefully. Then read it again!

Use NSF08-557 to develop proposal

- Use it to develop the structure, order, and detail of the proposal narrative.
- Use it as an organizational template during proposal development to help ensure every requirement is addressed fully.

Keep on track from the outset

- Copy and paste the key sections, research objectives, and review criteria into the first draft of the proposal narrative
- The RFP then serves as an organizational template for the proposal and a reference point to ensure subsequent draft iterations of the narrative are continuously calibrated to the guidelines.
- Use the CHECKLIST (hand-out) to ensure compliance with NSF08-557

Your CAREER proposal should

- advance you toward your life goals
- be a stepping stone to the next thing
- be compatible with your institution's goals
- represent a contribution to society at large
- build on your strengths
- differentiate this research from your Ph.D. thesis work and other sponsored work

The CAREER Research Topic

- The CAREER proposal is *not* a research proposal
- The CAREER proposal is a proposal detailing how you will spend $400,000 to enhance your career development
- Your career involves a research *path*, not a research project
- Determine your research path—your lifelong research goals—and then identify milestones toward your goals
- Detail the first one or two as the research projects for your CAREER proposal

Components of a CAREER Proposal

- ✓ **Cover Sheet**
- ✓ **Project Summary**
- ✓ **Project Description**
- ✓ **References**
- ✓ **Biographical Sketch**
- ✓ **Budget and Justification**
- ✓ **Current and Pending Support**
- ✓ **Facilities/Equipment/Other Resources**
- ✓ **Supplementary Documentation**
  - ✓ **Departmental Support Letter**
  - ✓ **Collaboration Letters**

The project summary

- Most important section (initial impressions, used for reviewer selection)
- Contains goals, objectives and scope of study, significance, brief description of methods, hypotheses and expected results
- Clear, concise, accurate, exciting
- Particularly important with panel reviews

The project summary

- Captures the interest of reviewers
- Defines the core idea clearly
- Describes concisely the connectedness of the core idea to specific research activities and outcomes
- Serves as a conceptual and relational roadmap to the proposal narrative
- Is not an abstract of the proposal
- **For NSF the project summary has specific required elements.**

Writing the Project Summary of a CAREER Proposal

The First Sentences

- My long-term research goal is…
- In pursuit of this goal, the research objective of this CAREER proposal is…
- The research approach is…
- My long-term educational goal is…
- In pursuit of this goal, the educational objective of this CAREER proposal is…
- The educational approach is…
- Then use headings
  - Intellectual Merit
  - Broader Impact
- Anything else *will* lower your rating

Goals, Objectives, Hypotheses

- Scientifically far-reaching aspects vs. specific outcomes
- Hypotheses: Specific set of testable conjectures

Goal: "to further our understanding of the implication of global climate change on wetlands"

Objective: "to measure the diffusivity of methanol in water as a function of temperature and composition"

Hypothesis: "Zinc can effectively compete with other metals for enzyme-active sites, transporter proteins, and other biologically important ligands."

Project Description

- Research Plan
- Educational Plan
- Either two halves of the 15 pages or completely integrated together
- At the beginning you will need something that could have a heading such as: Overall Objectives, Overview and Significance, Significance and Project Objectives, or Statement of the Problem

Significance statement

- Funnel the reader: broadest goals to specific aims
- Ask what scientists inside vs. outside field would perceive as greatest contribution
- Consider both empirical and theoretical contributions
- Explain the value of the work: Identify basic and applied uses of results
- Ask how you expect others to use your results
- Compare contributions that are likely to be important 1 year vs. 10 years after completion

Introduction and background

- Focus on important points and establish relevance
- Discuss motivation for the project
- Not too long
- Use schematics, models, headings, and formatting to channel the reader to show the direction that proposal is going
- Relevant literature review
- Preliminary results

Successful proposals

- Stress the novel aspects of your approach
- Differentiate your work from that done by others
- Emphasize the hypothesis that your research will test
- Respond to all aspects of the program description
- Support your ideas with references / preliminary results
- Describe applications that could result from the research
- Show where the research might lead
- Include figures and graphs to facilitate understanding – teach, not snow

Don’t annoy reviewers

- Typographical errors
- Erroneous references
- Exceed page length guidelines
- Too small font
- Overly dramatic

References

- Be unbiased – cite disputed work
- Cite peer-reviewed work, key review articles
- Cite your own work but not excessively
- Cite recent work
- Cite only work you have read – don’t cut & paste
- Reviewers will check for their articles
- Include a sufficient number of references to establish credibility and feasibility
- Ensure accuracy of citations

Tips

- Ask a colleague to review your proposal
- Respected researchers in your field will read your proposal – make a good impression
- Respect intellectual property, give appropriate credit
- Don’t promise too much

Tips from CAREER proposal reviewers

Things I look for in a CAREER Proposal – Vikesland

1. *Does the educational plan incorporate assessment activities?*
2. *Is the research hypothesis-based and innovative?* Not incremental!
3. Will the PI be able to do the work that they propose? Do they have the skills, resources, and time to do the work?

Things I look for in a CAREER Proposal
de los Reyes

1. *Is the research problem/issue compelling?*
2. *Is the research hypothesis-based?*
3. *Is the overall approach innovative, inspired, novel?*
4. *Does the PI show a thorough understanding of the area/problem? Is the PI qualified to do the research?*
5. *Will the research, even if negative results are found, open up new areas of knowledge, or lead to more exciting questions?*
6. *Is the education component related to or integrated with the research area and the PI's future career? Does it make sense, or is it simply an add-on?*
7. *Is the proposal tightly written?*

Thoughts about CAREER Proposals: Advice I give to colleagues

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Provide a vision; a big picture

- Reviewers need to see a broad vision of your career and your contributions
- Not a single project award
- Show a few (two or three) detailed ideas for research that fit into your vision.
- Show how the research plan and the educational plan fit into the same big picture.

Establish a track record before applying

- In research, funding, and in educational plan.
- Use your opportunities to apply well.
- Reviewers have the responsibility to make sure that the government's money is spent well, so they inevitably minimize risk (judged in part by the track record).

Start early; go through several drafts.

- A poorly conceived, or poorly written, proposal is not worth submitting.
- Have colleagues comment. (But it is your proposal, not theirs.)
- Proposals do not get sent back for revision.
- Generally, writing fewer excellent proposals that get funded is better than writing many poor proposals that don't.
- Recognize that even excellent proposals get turned down, so don't be too discouraged if you are not successful.

Optimize the Chair's Letter

- Communicate early and often
- Make sure the chair is fully supportive
- Chair should appreciate both the research and educational plan
- Use senior colleagues if the chair is not in your area
- Chair's letter should reflect your vision

Weaknesses of Unsuccessful Proposals

- Research is either too ambitious or too narrowly focused
- Proposed methods do not address the stated research goals
- Educational component is either limited to routine courses or is unrealistically overambitious
- Integration of research and education is weak or uninspired”

Bibliography

- New Faculty workshop presentation by Geoff Prentice and Tim Anderson of NSF (http://www.nsf.gov/eng/cbet/presentations/)
- Texas A&M NSF CAREER Seminar March 27, 2007 (http://opd.tamu.edu/seminar-materials)

On-Line Proposal Writing Guides

National Science Foundation

www.nsf.gov/pubs/

Environmental Protection Agency

http://www.epa.gov/ogd/recipient/tips.htm

http://www.epa.gov/ogd/grants/how_to_apply.htm

The Foundation Center

http://foundationcenter.org/getstarted/learnabout/proposalwriting.html

NIH

http://grants.nih.gov/grants/grant_tips.htm

http://deainfo.nci.nih.gov/EXTRA/EXTDOCS/gntapp.htm

http://www.niaid.nih.gov/ncn/grants/default.htm

"A Winning Strategy for Grant Applications"

On-Line Proposal Writing Guides

Style Guide

http://www.colorado.edu/Publications/styleguide/symbols.html

Final Thoughts

- Contact program directors
  - Meet at professional society conferences
  - Volunteer to review proposals, e.g., http://www.nsf.gov/eng/cbet/reviewer/
- Examine successful proposals
  - Ask colleagues for their proposals
  - Get proposal reviews from colleagues
- Suggest reviewers for your proposal
  - Use FastLane form provided