PROPOSAL WRITING WORKSHOP:
NSF CAREER PROPOSAL

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NSF CAREER Proposals

Quote from NSF 15-555:
“....NSF’s most prestigious awards in support of junior faculty who exemplify the role of teacher scholars through
• outstanding research,
• excellent education and the
• integration of education and research within the context of the mission of their organizations.

... build a firm

• foundation for a life time of leadership in integrating education and research. ....”
NSF CAREER Proposal Workshop Outline

Review of Rules and Web Sites
Synopsis of a Career Proposal
Before you Write -
  What are your Objectives
  Abstracts of Past Career Winners
  Contact with Program Manager
  NU Contacts
Components of a Career Proposal
Format Reminders and Writing Tips
Submission
Web Sites for the NSF CAREER Program

CAREER Program Page, Including Frequently asked Questions:

CAREER Solicitation:

CAREER Contacts:
http://www.nsf.gov/crssprgm/career/contacts.jsp

Abstracts Search of Past CAREER Awards:  Look up at bottom of CAREER Program URL
Must-see Web Sites

NSF Grant Proposal Guide (GPG):


NSF Proposal Writing Guide (February 2004):


FastLane Homepage:

https://www.fastlane.nsf.gov/fastlane.jsp
National Science Foundation Directorates Involved in CAREER

- Biology (BIO)
- Computer Information Sciences & Engineering (CISE)
- Education (EHR)
- Engineering (ENG)
- Geosciences (GEO)
- International (OCI)
- Math, Physical Sciences (MPS)
- Polar Research (OPP)
- Social, Behavioral, Economic Sciences (SBE)

NSF CAREER Proposal Deadlines

For 2016:

July 20, 2016: BIO, CISE, HER

July 21, 2016: ENG

July 22, 2016: GEO, MPS, SBE
CAREER Program Requirements

- By July deadline
  - hold a PhD in an NSF supported field
  - may be untenured
  - no previous CAREER recipient

- By 1 October following the July target date
  - be in a tenure track position as an “Assistant Professor” in an NSF supported field

- Limit: Only one CAREER proposal per year, no more than three CAREER proposals total
CAREER Program Funding

- $400k over five years for all CAREER proposals except
- $500k for BIO and ENG proposals over five years

(high prestige, but little funding per year)
What is a Research Proposal?

A Proposal is:
- a **PLAN** towards innovative **Research/Education RESULTS**
- the basis for a **BUSINESS DEAL** (contract / grant) that offers your good research/education results in return for financial support
  - What is a “good idea” leading to an innovative result?
  - Who may be interested in this result?
  - What does it take to convince a funding agency to listen?
- a “sales brochure” inviting NSF to pay for your research/education plans

You want to sell a good idea to the NSF for the best price

THUS, in addition to a scientist, a lab manager you have to be a psychologist

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What is your Strategic Plan?

- Where do you want to be in 5 to 10 years?
  - What are your long range research and education objectives?
- How do you intend to accomplish these objectives?
  - What methods will you use?
  - How long will it take, any milestones?
  - Are there any obstacles on your way?
  - What will it cost?
  - Are personnel, equipment, supplies and space requirements available?
- What difference will you have made in the end?
What is your Research Objective?

- Most important part of the proposal body
- Create new knowledge that will
  - Solve a recognized shortfall
  - Prove a hypothesis
  - Open up a new technology

- Objective statement has to emphasize the impact, the “difference” to be made
Synopsis of a CAREER Proposal

- Career proposals are different from other research proposals. They reflect your own long range career goals in research and education, and how they fit into the goals of your organization.

- Projects should be developed in consultation with the Department Head or equivalent organizational official and should include:
  - A description of the proposed research project, including preliminary supporting data where appropriate, specific objectives, methods and procedures to be used, and expected significance of the results;
  - A description of the proposed educational activities, including plans to evaluate their impact;
  - A description of how the research and educational activities are integrated with one another; and
  - Results of prior NSF support, if applicable.
Research Component

- Proposed research activities may be in any area of science, mathematics, engineering and education normally supported by NSF.

- To determine appropriateness of the project and identify the relevant disciplinary program, refer to NSF Guide to Programs [https://www.nsf.gov/funding/browse_all_funding.jsp](https://www.nsf.gov/funding/browse_all_funding.jsp), and Directorate web pages, ([www.nsf.gov](http://www.nsf.gov)).

- Discuss your project with Program Officer(s) – see contact list [http://www.nsf.gov/crssprgm/career/contacts.jsp](http://www.nsf.gov/crssprgm/career/contacts.jsp).

- Look at Abstracts of funded projects in your area to determine whether your project is appropriate for a particular program/discipline
  - See list of Abstracts at the bottom of the Career Program URL
Education Component

- Proposed education activities may be in a broad range of areas directed to any level: K-12 students, undergraduates, graduate students, general public, museums etc.

- Proposal must include the integration of education plans into research program, as well as criteria for assessing that these goals are met
  - how will impact of educational activities be evaluated?

- No page requirement for Education component, shouldn’t be overly-ambitious nor unrealistic.

- Post doc mentoring plan needed - if applicable
Education Component: Examples

- Design innovative courses or curricula
- Support teacher preparation and enhancement
- Conduct outreach and mentoring activities for traditionally underrepresented students
- Integrate research activities into undergraduate courses (use of REUs)
- Link education activities to industrial, international, or cross-disciplinary work, CO-OP
- Design new educational materials and practices or adapt materials developed elsewhere
Before you Write (1): Look at Abstracts of Funded Proposals

- Go to the bottom of the CAREER URL and read successful CAREER proposal abstracts
- Read other funded NSF proposals – ask colleagues or contact PIs on CAREER abstracts
- Talk to colleagues who have received a CAREER award or who sat on NSF CAREER Panels
Before you Write (2): Contact Program Manager

- Your program manager is listed on the CAREER website (email, phone)
- Send email with brief description of research and education objectives and follow up with telephone call
- Explore his/her programmatic and professional goals (his/her research portfolio) before calling
- Relate your research interests to the published goals of his/her portfolio
- “Get on his/her RADAR Screen”
- Do not expect a value judgment
Before you Write (3): Meet and Discuss Proposal with your Department Chair

CAREER proposals must include a letter from the Department Chair demonstrating:

- How the proposed research fits into the long range objectives of the Department
- Commitment to the professional development and mentoring of the PI
- Verification that the PI is eligible to submit a CAREER proposal
Before you Write (4):
Line Up Colleagues to Read Your Draft

- **Accuracy check**: Get feedback from colleagues/experts in your field who will read carefully and critique – not just say it looks good.

- **Clarity check**: Get feedback from other intelligent readers not associated with the project who can point out missing material, organization problems, other points you may miss.

- **Edit Check**: Get feedback from a good technical editor.

- If possible, ask someone who has served on an NSF review panel to read your draft.

- Allow time for feedback and suggestions to be incorporated into the proposal.
Establish an Action Plan

- Use the NSF CAREER Checklist as you prepare the proposal
- Discuss proposal plans & budget details with your Chair & Dean
- Prepare the budget and review it with appropriate College research administrator and ORAF (Research Administration and Finance) representative as soon as possible, but no later than 2 weeks prior to submission
- Have colleagues do a final reading in time for you to incorporate suggestions and edits.

Final CAREER proposals submission to RAF at least 5 days prior to submission due date.

One to two weeks fine tuning before submission to RAF are absolutely necessary.
CAREER Proposal Content (1)

- Proposal Cover Sheet
  - Title: Start with “CAREER: __[your title] ____”
  - no Co-PIs on CAREER proposal!

- Project Summary - three paragraphs, one page (prepare last)
  - Brief research and education objectives, approach and anticipated results
  - Intellectual merit - aiming at scientific impact
  - Broader impact - aiming at societal impact

- Project Description - 15 pages only
  - Goals, objectives, context
  - Proposed approaches (research, education), and significance of expected results
  - Evaluation of educational progress and impact
  - Integration of research and education
  - Results of prior NSF support - when applicable
CAREER Proposal Content (2)

- **References**
- **Bio-sketch** of the PI including list of publications - 2 pages
- **Budget** and Budget Justification
- **Supplementary documentation**
  - Departmental letter of support
    - PI activities supported by, and integrated into education and research goals of the Dept.
    - relationship between CAREER proposal goals and job responsibilities and goals of the PI
    - verification of CAREER eligibility
  - Data Management Plan
- **Letters of support** from collaborators - be specific
  - No letters of endorsements / recommendations
Project Summary (aka Abstract) “the elevator message”

In three paragraphs, limited to one page:

- State up-front your research and education objectives and integration of both - your Vision
  - Why is this research needed?
  - What difference will your research and education goals make?
- Describe the major proposal tasks very briefly
- Provide information on why you are uniquely qualified to perform this research.
- Mention available facilities and infrastructure

- Intellectual Merit - scientific difference
- Broader Impact - societal difference
Project Summary (1)
Intellectual Merit (one paragraph)

- How important is the proposed activity to advancing knowledge and understanding?
- How well qualified is the proposer to conduct the project?
- To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts?
Project Summary (2)
Broader Impacts (one paragraph)

- How well does project broaden participation of underrepresented groups (gender, ethnicity, disability, geographic)?
- Will results be disseminated broadly to enhance science and technology understanding? (summary of data management plan)
- What will be the benefits of project to society?
- Can outcomes be a model for other institutions?
Project Description (1)  
Context/Introduction

- What is the problem? Why do you want to solve it?
- What is the relation of your proposed project to the present state of knowledge?
  - Demonstrate that you are familiar with all past and current important work in the field
  - Know at least 5 most important publications in your field
- Show how your research
  - will fit into or will contribute to the established field of knowledge
  - is unique and innovative
  - will extend knowledge in the field / fill “gaps”
Project Description (2)
Significance

Will this work make a significant contribution? Why is it worth doing?

This “sells” your proposal:

• Solves recognized problems
• Creates new, useful knowledge
• Creates a model – can be replicated and used elsewhere
• Improves existing scientific techniques
• Will lay foundation to new technology
Project Description (3)
Prior Work/Experience

- NSF requires a description of results of NSF funding in previous 5 years, if any

- IMPORTANT for new PIs: Describe what you have done already and how it is relevant to the proposed project, including publications, but focus on the new direction you are moving in. Important: show that you are moving beyond your dissertation and thesis advisor
Project Description (4)
Research & Education: Approach, Execution

- Very concisely summarize the research and education goals/objectives
- Describe overall approach – why did you choose it?
- List major tasks - should correspond to specific goals/objectives.
- Show how you’ll achieve each task.
- Under each task, describe methods:
  - don’t need to fully describe standard methods
  - do need to describe new and innovative procedures
- Discuss how you will measure progress.
- Discuss possible setbacks. What are alternative approaches if problems arise?
Project Description (5)
Other Sections

- Management Plan for your effort
- Staff, personnel, students: roles and responsibilities
- Timetable/ Milestones
- Evaluation Plans
- Resources/infrastructure available
- Post-doc mentoring plan - if applicable

Remember, the Project Description is limited to 15 pages
Biographical Sketch – 2 pages

Professional Preparation (education, degrees)

Professional Appointments: A list, in reverse chronological order, of all the individual's academic/professional appointments beginning with current one.

Publications: A list of: (i) up to 5 publications most closely related to the proposed project; and (ii) up to 5 other significant publications, whether or not related to the proposed project.

Synergistic Activities: A list of up to five examples that demonstrate the broader impact of the individual's professional and scholarly activities that focuses on the integration and transfer of knowledge as well as its creation.

Notable Collaborators: Collaborators, Thesis & Post-doc advisors
Standard Budget items

- Salaries, Wages plus Fringe Benefits for PI, RAs, Students: **current employee fringe is rate is 24.7%**
- Equipment
- Travel
- Other Direct Costs
  - Expendables, Material and Supplies
  - Publication Costs
  - Consultants and Sub Awards
- Overhead / Indirect Cost: **current IC rate is 54.5%**
- Budget Justification
Budget continued

CAREER Support is for 5 years with a total of $500K for BIO and ENG; $400K all other Directorates

- Note: Fringe Benefits and Overhead (F&A costs) reduce funding available to you

- Use this formula to figure out Direct Cost & Overhead:
  \[ \text{Direct Cost} = \frac{\text{Budget Maximum}}{1 + \text{(indirect cost rate)}} \]

- Budget Justification: A budget justification of up to three pages is authorized to provide the necessary justification and documentation of the amounts requested in each funding category.
Letter from Department Chair

- Indication that proposed CAREER activities are integrated into department and organization
- Description of relationship between CAREER project and PI’s career goals and those of dept. and University
- How department chair will ensure appropriate mentoring of PI throughout award period
- Verification that PI is eligible for CAREER
- Signed letter on NU letter head with name, title, and date. One page.
Pay Attention to Format Requirements
font, margins, etc. (p. II-2 of GPG)

- Strictly observe page limits given in the RFP

- Type Sizes and Fonts:
  - Arial, Courier New, or Palatino Linotype at a font size of 10 points or larger
  - Times New Roman at a font size of 11 points or larger; or
  - Computer Modern family of fonts at a font size of 11 points or larger

- Margins, in all directions, must be at least one inch.

- Font size of less than 10 points may be used for mathematical formulas or equations, figure, table or diagram captions. **Text must still be readable.**

- No more than 6 lines of text within a vertical space of 1 inch.
The CAREER Proposal Preparation and Submission Checklist is a good way to make sure you follow all guidelines and include all required proposal components.

Proposal Writing Tips (1)

- Write proposal with reviewer in mind: you have to “sell” your ideas: use first person in Project Description

- Important: Get your message across in the first 1-2 Pages “Elevator Speech”

- Write Project Summary last, use third person

- Write in the active voice whenever possible, project a confident tone

- Use strong action words
  - use “I will ..”, “it is my plan to ..”
  - never “I may ..” or “I would ..”
Proposal Writing Tips (2)

- Organize the proposal for easy reading
- Use appropriate headings and subheadings
- Use charts, bullets, visuals to break up dense text
- Use a ¼ page diagram to replace a page of text
- Use spelling and grammar check – plus personal reading
- Seek feedback from multiple readers
Final Check

- Proof read carefully - use spell checker and colleagues
- Follow directions given in Program Solicitation (RFP)
- Avoid abbreviations, e.g., use “laboratory” and “mathematics” instead of lab and math
- First time using acronym, write out what it stands for and put acronym in parentheses.
Submitting the Proposal

NOTE: Our Research Administration and Finance (RAF) submits all Proposals to NSF

- NU Submission Process
  - Notify RAF early of your intent to submit, find appropriate RAF Representative
  - Obtain NSF FastLane Access password
  - Get RAF help in preparing budget if necessary
  - Enter proposal into COEUS (similar to NSF FastLane format) and submit to RAF for review and final electronic submission

NO LESS THAN 5 DAYS PRIOR TO NSF DUE DATE
Standard Submission Windows for COEUS

Enter Proposal Sections as .pdf File into FastLane

- Cover Sheet
- Project Summary
- Table of Contents
- Project Description
- References Cited
- Biographical Sketches
- Current and Pending Support
- Facilities, Equipment & other Resources
- Supplementary Documents
- Budget and Justification
- List of Suggested Reviewers (optional)
If Proposal is Funded

- Notify Dean, Chair, partners
- Meet with RAF to set up account, get pro-card
- Begin research

Much later:
- Complete research orderly
- Write annual and final reports, submit it to RAF
- Assist RAF in closing out account in time!!
If not Funded:
Read Reviews Carefully & Resubmit

• Do not despair, or lose confidence in yourself
• Take some time and read the reviews
• Talk to the Program officer
• Plan for another, improved proposal
• If the reviewers didn’t understand something, then you need to explain it more carefully
• If the reviewers think you don’t know something, then you need to discuss it in resubmission.
• Share critiques with others, discuss how you intend to respond in new proposal
• NU Research Development is ready to assist