Position Yourself for CAREER Success

NSF Faculty Early-Career Development Program
Position Yourself for CAREER Success

- About the CAREER Program: goals and funding statistics
- Eligibility and Readiness
- Selecting a Research Topic and Planning the Project
- Considerations for Writing
- Structuring your Proposal
- Letters and Other Documents
- Budget & Justification
- Common Issues – “Top Ten” and General Wisdom
NSF Career Award

- A **career development** award, not just a research award.
- 5 years of funding – minimum $500,000 in the Engineering and Biology Directorates or Division of Polar Programs; $400,000 for all others
- You can enter 3 CAREER competitions, so **TIMING** is important.
  - You cannot submit the same research proposal to more than one entity.
  - The proposed research must be distinct from any other federally-funded research.
- **Career ENG Deadline:** **July 19, 2018** and the third Thursday in July, annually thereafter.
Goals of the CAREER Program

- Provide stable support for five years:
  - The CAREER award, including indirect costs, should total a minimum of $500,000 for the 5-year duration, for proposals to the Directorate for Biological Sciences (BIO), the Directorate for Engineering (ENG), and the Office of Polar Programs (OPP).
  - Other Directorates are expected to total a minimum of $400,000 for the 5-year duration.
- Allow the career development of outstanding new teacher-scholars in the context of the mission of their organization.
- Build a foundation for a lifetime of integrated contributions to research and education.
- Incentivize universities to value the integration of research and education.
- Increase participation of individuals who are traditionally underrepresented in science and engineering.
What is in a fundable CAREER proposal?

- A compelling research plan.
- Innovative but do-able education plan.
- A plan for the effective integration of both sets of activities.
CAREER Funding Rates and Expectations Vary

- CAREER proposals are submitted to a disciplinary unit or program.
- They are reviewed according to the relevant Program guidelines.
  - Talk to Program Officer or Division Contact for more information.
- Ask about expectations for scope of research and education plans.
CAREER Application Rates

- CSE
- GEO
- ENG
- BIO
- EHR
- MPS
- SBE

Yearly application rates for different fields from 2010 to 2016.
An Overview of Recent Engineering Directorate CAREER Awards

<table>
<thead>
<tr>
<th>Description</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
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<tbody>
<tr>
<td>Total Engineering Directorate CAREER awards grants</td>
<td>$73 million</td>
<td>$80 million</td>
<td>$78 million</td>
</tr>
<tr>
<td>#early career engineering faculty funded</td>
<td>146</td>
<td>160</td>
<td>156</td>
</tr>
<tr>
<td>#institutions with Engineering Directorate CAREER recipients</td>
<td>81</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Engineering Directorate CAREER awards made to new principal investigators.</td>
<td>51%</td>
<td>51%</td>
<td>52%</td>
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<tr>
<td>Engineering Directorate CAREER awards made to women</td>
<td>29%</td>
<td>30%</td>
<td>32%</td>
</tr>
<tr>
<td>Engineering Directorate CAREER awards made to investigators from underrepresented groups</td>
<td>9%</td>
<td>7%</td>
<td>10%</td>
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</table>
2017 NSF Engineering Directorate-supported CAREER Awards By the Numbers:

5 year awards
16 Engineering Directorate-supported CAREER awards (~10%) were to PIs from underrepresented groups.
34% of all NSF CAREER awards were made through the Engineering Directorate.
50 Engineering Directorate-supported CAREER awardees (~32%) were women.
82 Engineering CAREER awards (~52%) made to new PIs.
88 institutions in 34 states had Engineering CAREER recipients.
156 early career engineering faculty funded.

$500,000 award per recipient.
$78,000,000,000 in NSF Engineering Directorate-supported CAREER awards.
Investigator Eligibility Criteria

- Hold a doctoral degree in a field supported by NSF by proposal deadline
- Be untenured by October 1 following proposal deadline
- Be employed in a tenure-track (or equivalent) position at an eligible institution as an Assistant Professor (by October 1 following deadline)
- Have not previously received a CAREER award
- Have not had more than two CAREER proposals reviewed
- Untenured Associate Professors are NOT eligible
CAREER or Regular proposal?

- CAREER proposals are single-PI projects that include research and education activities that are integrated, innovative, and ambitious.
- CAREER proposals require a STRONG letter of support from the Department Chair.
- The CAREER program’s aims are lofty - CAREER awards are a lot of work.
- Consider...
  - Are you at the right stage in your career to undertake the commitments of a CAREER award?
  - Have you discussed your ideas with mentors/peers/program officers?
  - Have you demonstrated commitment to both research and education?
Is CAREER right for your project?

- Is your project idea appropriate for NSF, with research and education activities that are innovative, ambitious and consistent with a five year duration?
- Is your Department/Organization supportive?
- Are you committed to the goals of CAREER?
- Are you at the right stage in your career?
- Have you discussed your ideas with mentors, program officers, and other appropriate individuals?
Considerations for Selecting a Research Topic

- Your research topic should be:
  - Innovative and exciting – with promise for impact in your field.
  - Continuation of dissertation research? Relatively newer, more innovative offshoot? Research on different but related topic?
- Can you develop a convincing 5-year research plan?
- Do you have enough preliminary results and/or publications to convince reviewers you have the expertise to be successful?
- Once you have narrowed down to one or more NSF programs, contact the Program Officer.
Think deeply about your CAREER project idea

- Who are you?
- What makes you qualified to undertake this project?
- What is your grant project idea?
- What would be lost if your project wasn’t funded?
  - Outcomes
  - Dissemination
  - Impact
- What makes this project right for the NSF?
Plan the **Education Component**

- Successful educational plans go beyond what would be expected as a normal part of being a faculty member.
- Not so ambitious to be a burden on PI who must earn tenure.
- Should include several activities aimed at different groups: enhancing undergrad and grad education, often include outreach to K-12 or the larger community.
- Should address diversity.
- Understand NSF’s motivation - **integration of research + education**.
- Understand your motivation- **your passionate interests**.
- Read the educational literature, assessment, dissemination.
- Find collaborators, leverage existing activities.
Integration of Research and Education

How will your research impact your education goals and how will your education activities feed back into your research?

- Involve others (graduate, undergraduates, K-12, high school teachers, public) in your research using new tools, laboratory methods, field components, web outreach, cyber networks, etc...

- Partner with those in other communities, especially those traditionally underrepresented in science and engineering.

- Bring the excitement of your research topics to help in the education of others.

- Search for new methods to deliver your research results to a broader audience than those in the immediate research community.

- Use the broader community to gather and analyze data for your scientific pursuits (“citizen science”).
Considerations for Writing

- Remember that a CAREER grant invests in the PI:
  - Convince reviewers to invest in you, not just your project.
  - Explain your long-term career goals (briefly).
  - Describe the importance to NSF of your research and education goals.
  - Discuss your potential to become a future leader in your field.
  - How will this grant help you become a leader in your field?

- NSF uses the CAREER program to change academic culture
  - Promotes integration of research and education (not research vs. education).
  - Seeks to recruit the next generation of scientists and engineers to promote a scientifically literate society.
Considerations for Writing

Show reviewers how the project fits with the institution’s mission:

- Provide examples that show there is clear institutional support for the activities you propose.
- Describe ODU’s mission & student population and ways that we are unique. ODU is not an HBCU, but...

Old Dominion University (ODU) can be described as a “minority serving institution” (MSI), which is a postsecondary institution with an enrollment that includes at least 25% of a specific minority group (e.g., Asian, African American, Hispanic, Native American). ODU’s undergraduate enrollment includes 28% of students who self-reported as African American or Black (Fall 2016).

This definition of an “MSI” as based on a 25% threshold of a minority group is consistent with the description used in Characteristics of Minority-Serving Institutions and Minority Undergraduates Enrolled in These Institutions, a 2008 report issued by the Department of Education’s Institute of Education Sciences:

“Black-serving non-HBCUs: institutions that are not HBCUs/TCUs but in which Black students constitute at least 25 percent of the total undergraduate enrollment, while students of all other individual minority groups each constitute less than 25 percent of the total undergraduate enrollment” (http://nces.ed.gov/pubs2008/2008156.pdf)

- Your plans should reflect your own disciplinary and educational interests and goals, as well as the interests and needs of your organization.
- A strong 2-page letter from your Department Chair is critical. Discuss providing a draft.
Structuring your Project Description

I. Introduction and Overview (suggestion: 1-2 pages) Goals and Significance of Career Plan (both research and education)
   A. Overview of approach and why it’s innovative

II. Research Plan (9-10 pages)
   A. Background & Significance (3 pages or less) Prior work and Preliminary Results
   B. Experimental/Methodological Plan
   C. Schedule with milestones

III. Education Plan (3-4 pages)
   A. Education objectives and Expected outcomes
   B. Background (cite educational literature)
   C. Prior work and preliminary results
   D. Education and Outreach Activities
   E. Assessment
   F. How research and education plans are integrated
   G. Schedule and milestones

IV. Results of Prior NSF Support (required if applicable) Broader Impacts (required)

NOTE: “The research and educational activities do not need to be addressed separately if the relationship between the two is such that the presentation of the integrated project is better served by interspersing the two throughout the Project Description.”
Writing the **Education Component**

**Education Plan** (typically 3-4 pages for research intensive institution)

- Educational Goals, Objectives, and Expected Outcomes
- Background (cite educational literature)
- Prior Work and Preliminary Results
  - Describe any activities related to education plan that you have already been engaged in; include outcomes if you have them
- Education and Outreach Activities
  - Describe activities in detail; analogous to your experimental plan in the research section
- Assessment
  - Connect your goals and objectives to your assessment plan
- Dissemination
  - Be specific and try to do more than publishing in educational journals or putting up a website; e.g., create [open education resource website](#)
Letters of Collaboration & Other Documents

- Letters of Collaboration may not be mere letters of support or letters of reference! The letter should consist of a single-sentence statement of collaboration:
  - “If the proposal submitted by Dr. [name of the PI] entitled [proposal title] is selected for funding by the NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description.”
  - Must NOT recommend or endorse PI or project
- Project Description or Facilities, Equipment, and Other Resources must document the nature of all project collaborations, such as:
  - Intellectual contributions to the project
  - Permission to access a site, use instrumentation or facility
  - Offer to furnish samples / materials for research
  - Logistical support / evaluation services
  - Mentoring of U.S. students at a foreign site, if applicable
- Data Management Plan
- Biosketch
- Current and Pending Support
Convey strong support for the PI’s proposed CAREER research and education activities.

Describe the relationship between the PI’s career goals and job responsibilities and that of the department.

Discuss the department/institutional commitment to the professional development of the PI with mentoring and support for the PI’s efforts to integrate research and education.

Verify that the PI is eligible for the CAREER program.
How much to request? Depends on the directorate… minimum of $500k for ENG.

- Engineering awards tend to be closer to minimum as it receives the most applications.
- Talk with colleagues and the Program Officer; research similar funded projects.

No Co-PIs or other senior staff allowed, but consultants and sub-awards are allowed.

Some programs will support buy out of academic year time for teaching-intensive institutions (check with your Program Officer).

Support for education plan may be requested.

No cost sharing allowed.

Not a lot of money after IDC (53%), your summer salary for a month, support for graduate student (post-doc, undergrad?), travel, equipment, materials & supplies, participant support costs - and remember to factor in costs related to the education component and outcome evaluation of the education program(s).
Traits of Successful CAREER Proposals

- CAREER proposals should match the expectations in the disciplinary programs in terms of research and education - This is a highly competitive program!
- Write with peer reviewers in mind - Ask your Program Officer what types of reviewers will be assessing your proposal.
- Appropriate scope of education and research activities. It is a 5-year plan, not your whole life.
- Go outside the education box of regular research proposals in your field.
- Strike a balance between doable research activities and more risky pursuits.
Top Ten **Weaknesses** of NSF Proposals

- Proposed activities are not described in sufficient **detail** with clear **plans**
- **Evaluation** plan is missing or incomplete
- Proposed activities are not **doable** or they will not result in expected outcomes
- **Dissemination** plan is inadequate and will not contribute to STEM education knowledge base
- Proposal does not have good potential for involving **minorities or women**
- Proposed ideas do not build on **prior work** or existing products
- Proposed ideas are not **novel or innovative**
- Proposed ideas are not likely to have a **large impact** (Number of students, broadness of idea, etc.)
- Proposed **collaboration** with other organizations (diverse 4-year schools, community colleges, K-12, etc.) is not detailed or believable
- Topic is not **important and timely**, does not introduce new material; or is not responsive to industry or a community need
Questions...