



Strategies for Preparing NSF CAREER Grants

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Overview of NSF Career Grants

- 5-year project
- Minimum budget = \$400,000
- Full-time faculty on tenure track
- Currently untenured
- Three attempts allowed
- Standard NSF 15-page format, with special sections described later
- Designed to help junior faculty get tenure
- Reviewed as a CAREER cohort

2012 Changes to CAREER Grants

- Letters of collaboration strongly advised
- Department letter can be 2 pages
- Data management plan, including data on education and evaluation
- Post-doctoral mentoring plan
- Training program in Responsible Conduct of Research for
 - NSF-supported
 - undergraduate students
 - graduate students
 - postdoctoral associates

2012 Deadlines: 2013 not available yet

- July 23, 2012
 - BIO, CISE, EHR, OCI
- July 24, 2012
 - ENG
- July 25, 2012
 - GEO, MPS, SBE, OPP

Review Criteria for CAREER

- The proposed research project, including preliminary supporting data where appropriate, specific objectives, methods and procedures to be used and expected significance of the results;
- The proposed educational activities, including **plans to evaluate their impact**;
- How the research and educational activities are **integrated** with one another
- Results from prior NSF support, if applicable
- Must address in **both** proposal and abstract
 - Intellectual merit in
 - Research
 - Education
 - Broader impact in
 - Research
 - Education

Other Review Factors

- Facilities, Equipment and Other Resources" section of the proposal, used to assess the adequacy of the organizational resources available to perform the effort proposed. In addition, NSF Program Officer will review it for programmatic and technical sufficiency.
- Departmental letter describes information relevant to how the applicant's research and education activities mesh with the needs of the department/institution/organization.
- Mentoring activities, as described in the Postdoctoral Mentoring Plan submitted in the Supplementary Documents Section of the proposal (if applicable), will also be evaluated as part of the merit review process under the Foundation's broader impacts merit review criterion.
- Data Management Plan will be reviewed as an integral part of the proposal, coming under intellectual merit, broader impacts or both, as appropriate for the scientific community of relevance.



CAREER Award Details

- Funds academic career development
- Based on a development plan to build “a lifetime of **integrated** contributions to research and education”
- Is a research **path**, not a research **project**
- **Answers the question: what do you want to be known for?**
- **Reflects your strategic plan:**
 - Your expertise/interests
 - Your career/life goals
 - Your position/resources

CAREER Strategic Plan

- Three levels of career development to discuss:
 - Where are you today?
 - Where do you want to be in the future (5, 10, 20 years from now)?
 - What do you want to be known for?
- The proposal activities address
 - How do you get from here to there?



Preparing the Research Part

- Have a strategic plan
- Build on your strengths
- Differentiate this work from Ph.D. study and other sponsored work
- Conduct thorough literature search and some exploratory research before submitting CAREER
- Establish professional contacts

Writing to Reviewers

- Reviewers want to know five things:
 - What is it about? (research objective)
 - How will you do it? (research methods)
 - Can you do it? (your track record, facilities, resources, capabilities, training, commitment)
 - Is it worth doing? (intellectual merit, broader impact)
 - How will you know if your plan works?
 - (evaluation plan)



Research Topic

- Must not have been done before
- Must be significant
- Must lend itself to viable research plan
- Must be a high probability that you can do it
- Must have available facilities
- Must fit **your strategic plan**



Research Objectives

- Clear and concise statement of what you intend to find out that we don't already know
- Up front, 25 words or less
- “The research objective of this project is...”
 - What you intend to find out
 - How you intend to find out



Impressing the Reviewers

- What is the current state of the art?
- Who are the top ten researchers in the field?
- What are they doing right now?
- What do they consider the key research issues?
- Who would most likely review your proposal?



CAREER Proposal

- Should advance you toward your **life goals** (scientific, educational, personal)
- Should be compatible with your department and institution's goals
 - **Clearly described in department letter**
- Should represent a contribution to your institution and to society at large--**broader impact**



Research Component of Proposal

- 12 pages, **maximum**
- Preliminary supporting data, if available
- Specific objectives over five years
- Methods and procedures to be used
- Expected significance of results
 - Intellectual
 - Applied (broader impact)
 - Educational (involvement of students)

Education Component of Proposal

- 2-3 pages **minimum**
- Must describe **both** your educational activities and **your plans to evaluate**
 - Designing **innovative** courses or curricula
 - Undergraduate
 - Graduate
 - Combined
 - On-line, blended
 - Off-campus, short-term



Education component, continued

- Your educational activities and
- **your plans to evaluate**
 - Supporting teacher preparation and enhancement
 - RET individual
 - RET site—if available on your campus
 - Collaboration with Project Lead the Way and other similar programs in local schools



Examples of Educational Outreach

- Conducting outreach and mentoring activities to enhance scientific literacy
 - Science Bag--UWM
 - Local Science Fairs
 - Robotics
 - Rube Goldberg
 - MPS STEM Partners
 - Science museums: Discovery World, Betty Brinn Children's Museum, Urban Ecology Center
 - Boards of local science organizations
 - Parent-teacher-school organizations
 - Classroom talks:
 - Elementary
 - Middle
 - Secondary



Additional Educational Activities

- Church or community groups
- Senior citizen centers/homes
- Advocacy groups
- Op-ed pieces
- Popular press articles
- Media outlets: interviews, press releases
- Campus publications
- University, college and personal web pages
- Other media: Twitter, Facebook, etc.



Additional Educational Activities

- Conducting outreach and mentoring activities for underrepresented groups:
 - Upward Bound
 - McNair Scholars
 - Talent Search
 - Student Support Services
 - Access to Success or similar local programs
 - Working with female high schools, charter and other specialty schools
- Advising student organizations
- Volunteering as tutor or mentor
- Collaborating with student organizations:
 - SWE, NSBE, SHPE and others



Additional Educational Activities

- Undergraduate research opportunities
 - REU supplements
 - REU sites (enhances diversity efforts)
 - Incorporate main transfer feeder schools
 - Undergraduate Research Programs
- Incorporating research activities into undergraduate courses
 - Directed individual research
 - Independent study courses
 - Hands-on research units/assignments
 - Group projects



Additional Educational Activities

- Linking educational activities to industrial, international, or cross-disciplinary work
 - Industry seminars, workshops
 - Industry consortia
 - Industry-supported research
 - Campus-wide centers and institutes
 - REU for international collaboration
 - NSF International Programs
 - Collaborative research
 - Visiting professors



Additional Educational Activities

- Implementing innovative methods for evaluation and assessment
 - ABET standards/reaccreditation
 - New/other assessment methods Designing new educational materials and practices
 - NSF Transforming Undergraduate Education (TUES) Program in Science, Technology, Engineering, and Mathematics
 - Team/collaborative teaching
 - Distance learning
 - Use of D2L strategies (classroom management)
 - General Education programs



Additional Educational Activities

- Researching pedagogy or students' learning/conceptual development
- Presenting at ASEE (or similar conferences related to education)
- Writing papers about learning and/ or teaching strategies, outcomes
- Working with School of Education colleagues (curriculum and instruction, science and mathematics education)
 - Pre-professional
 - Graduate students
 - Continuing education



Additional Educational Activities

- Adapting and implementing effective educational materials and best practices developed elsewhere
 - Consistent with research and best practices in curriculum
 - Control groups, experimental groups of same course
 - Active learning methodologies
 - Visits to others' classes and campuses



Additional Educational Activities

- Guest lecturers (internal, external)
- Videotaping one's lectures
- Requesting peer observation
- Using best-practice web sites
- Posting own examples of best practices, assignments that worked, innovative teaching techniques, learning outcomes, etc.



Integration of Education and Research

- Show **HOW** education and research plans fit the context of
 - UWM mission, goals, resources
 - College/department strategic plan
- Describe **HOW** research/education plan is
 - Creative
 - Integrative
 - Effective
- Describe **HOW** you are building a firm foundation for a lifetime of integrated research and education

Evaluation of Educational Activities

- Purpose of evaluation:
 - Answers basic questions about educational component:
 - What worked?
 - Why did it work?
 - How do you know it worked?
 - What groups of people were affected and why?
 - What are the lasting effects of this component?
 - **For the participants**
 - **For the institution**
 - **For the PI**

Evaluation, continued

- Evaluation data and tools
 - Describe your plan to collect data
 - Describe what data you will collect and why you chose it
 - Describe what you will do with the data to analyze results of education
 - Build a timeline for data collection and evaluation
 - Include evaluation/education references
- Major sources of evaluation information:
 - Local School of Education
 - NSF User-Friendly Handbook for Mixed-Method Evaluation:
<http://www.nsf.gov/pubs/1997/nsf97153>



Thanks

For Questions and Follow-up:
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