

## Some Perspectives on the NSF CAREER Program – E.J. Podlaha-Murphy

### CAREER



“National Science Foundation'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.” – NSF website

RFP: <http://www.nsf.gov/pubs/2008/nsf08557/nsf08557.htm>

FAQ: <http://www.nsf.gov/pubs/2008/nsf08051/nsf08051.jsp>

### PECASE

NSF makes the nomination from the CAREER winner pool – nothing special do here, except keep in mind the criteria:

- (1) scientific/eng innovation
- (2) community impact

# Research Component

- Sound argument for your research
  - Avoid speculation
  - Include “preliminary” work; including published examples
  - Show that you are building upon a central theme
- Unique to the CAREER award is how the proposed will fit into the PI’s overall career goals
  - e.g. career goals: expand knowledge in an unrepresented area, become a leading expert in the field, start a new program, etc...in the text be confident that you will be tenured - don’t doubt your abilities.
- Planning of the project
  - Who will do the work (exp/theory/outreach)?
    - »One or two graduate students?
    - »Will you have UGs in the lab?
    - »Try to leverage existing programs for more “bodies”
  - Parallel vs Sequential planning: Does one part of the project need to be completed before the next OR are multiple aspects to be done simultaneously.
- Some collaboration is OK if it provides unique capabilities/facilities (national labs, international researchers)

**Note, this is a single PI program!**

# Educational Component

- Try to include *novel* educational tools, programs and ideas
  - It is well recognized that many institutions have “canned” programs already set-up for outreach, use them, but try to go beyond that.
- Try to impact large groups of people, efficiently
  - e.g. Hosting a high school teacher is good, but running a program with a small group to bring in several high school teachers is better
  - e.g. Visiting a middle school is good, but getting grad students involved to have a team that is dispersed to several middle schools per semester is better.
- Be inclusive to underrepresented groups
  - Don’t just “say” it, but have a solid action plan
- Add a means of evaluating the educational aspect
  - e.g. Might want to ask someone in the Education Department for help (or outside evaluator)
  - e.g. Have student surveys – did they like the new class or module?

# Integrating Education & Research

## (Many ways to do this)

Brainstorming...

### Ho – hum (what everybody says)

- Add new modules to existing classes
- Introduce new classes
- Have grad students carry out research
- Host UGs in the lab (use REUs)
- Have students present results at conferences
- Create a new website

### More creative

- Be the faculty lead on student projects with outside competition, (ex. ChemE-car competition at AIChE, etc.)
- Participate in outreach that uses results from research or is in the area of your research  
(ex. \* Host a girl scout troop and plan a variety of demos: make “lemon batteries”, create “magnetic pennies”, etc., \* Have a group of UGs design a “board game” on the topic of your research)

**Have a few from both categories**

# Integrating Education & Research (Many ways to do this)

## A little more creative (and more impactful)

### Examples

- Hook-up with a local science museum to showcase your work  
Ex. In the nano-area, “Nanodays” is good format for this
- Organize international exchanges for grad students to work on research; create ties for on-going research, could mention the Fulbright program as ways to leverage.
- Don’t just introduce a new class, start a new concentration or minor

# Letters



Should include support letters!

- by people in the field that can verify that you have the expertise to complete the project
- by people who have equipment you need and plan to use, they need to say it is OK
- Collaborators, what is especially good are international ones or with scientists at national labs; be careful that their role is supportive as the CAREER is a single PI program
- by people who may be affected by or help implement your education plan (eg. COE administrators that coordinate outreach)
- **Required:** letter by your chair – make sure he/she writes more than a page. **VERY CRITICAL!**

# Matching

- Not required, but is viewed very positively
- Institutional \$\$
  - Get a commitment from your chair, dean or above to give you extra dough to support some aspect of the proposal
- Institutional – in kind
  - Examples: Reduced teaching load, waive user fees for facilities, bigger lab space, new equipment item, additional TA or RA, etc.
- Outside
  - Examples:
    - Company involvement, can be in-kind (eg. having a company host a tour of their facility to students)
    - National/International communities that provide small funds for outreach or the infrastructure to do them.

# Common No-no's

- Follow the NSF format
  - Reviewers will be looking for something to comment on...don't let it be format (especially reference format)
- Use up all the space allotted
  - Use all 15 pages; what to do if your short?
    - » Add a timeline,
    - » Give more detail about the experiment or theory
    - » Try to avoid expanding in the literature review section (for young investigators this is typical already well done)
    - » Don't EVER double space! Don't ever use smaller font than is permitted! Don't ever blow-up a figure so that it takes up more than ½ the space on a page.
  - Fill up the references in the bio section; what do to if you have less than 10 refs?
    - » Add proceedings as a reference or abstract to talks
    - » Plan ahead – maybe write a review article
- Don't be sloppy
  - Make sure figure numbers correspond correctly in the text/have figure labels
  - Spell peoples' names correctly

# Caution



- Don't propose something too far out of your expertise
  - Reviewers will question your qualifications
  - A mistake in scientific fact is the kiss of death
- Don't criticize harshly others' work in the Introduction or Literature Review, (be kind)
  - Authors from your reference list may be reviewers!
- Be cautious about advice from others, the total funding award and balance between research & education has changed through the years – double check the details on-line for your year of submission
- Be sure to be registered to use the NSF-fastlane system through your institution well in advance.

# What are evaluators asked?

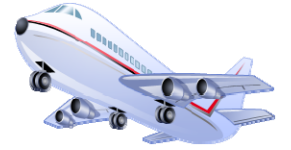
## PLEASE ENTER YOUR EVALUATION INTO THE INTELLECTUAL MERIT BOX IN FASTLANE

- **INTELLECTUAL MERIT-** What is the intellectual merit of the proposed activity? How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

## PLEASE ENTER YOUR EVALUATION INTO THE BROADER IMPACTS BOX IN FASTLANE

- **BROADER IMPACTS-** What are the broader impacts of the proposed activity? How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific

**Tip: have a section labeled “Intellectual Merit” and “Broader Impacts” in your Summary**



Above all, your idea has to fly

- Don't forget to mention, numerous times, how great your idea is (with justification).
- Good ideas will have a large impact, don't forget to mention cross-disciplinary impact, and societal impact

# PECASE – highest honor by the US government, selected among all agencies

(must be US citizen, national or permanent resident. )

The award is to recognize those who “**show exceptional potential for leadership at the frontier of scientific knowledge during the 21<sup>st</sup> century**”

## **Competition is tough, but possible!**

Case study: a colleague at Northeastern University received one:  
Purnima Ratilal, in 2008:

- \* PhD in acoustics from MIT (2002)
- \* Published a *Science* paper (from her PhD work)
- \* A number of highly regarded awards prior to CAREER: ONR Postdoctoral Award in Ocean Acoustics 2002, Bruce Lindsay Award by the Acoustical Society of America in 2006
- \* Had a paper count ~ 10
- \* Of course, great idea: “Explores acoustic, seismic and ultrasound remote sensing in the ocean for military, ecology and commercial applications.”

# Once you get your award

- Do the work that you said you were going to do – and if something happens that prohibits you from doing it be sure to tell your program manager - (you can always file for an extension)
- Be vigilant about reporting (submit reports in a timely manner) & have a good relationship with your program manager
- You may be asked to serve on future CAREER panels – do it. It helps to establish a good rapport with NSF
- Be open to help others
  - *e.g.*, accept opportunities, like this panel. The more people at your institution with a CAREER award the more prestige it brings, you are indirectly affected too!
  - *e.g.*, offer to proofread your colleagues proposals