Who are you?
Name, Department, share if you have submitted a CAREER award yet
Today’s discussion

- CAREER program overview
- NSF Criteria
- Why broader impacts?
- Core BI ingredients in your proposal
- How we can help
- Tips
- Beyond the proposal
- References
CAREER: The Faculty Early Career Development Program

- NSF’s most prestigious awards in support of junior faculty
- Emphasizes outstanding research, excellent education and the integration of education and research
- Encourages submission especially from women, members of underrepresented minority groups, and persons with disabilities
- Departure from PhD work, No co-PIs are permitted
- Can apply for up to $400K ($500K for BIO & OPP)
- Full Proposal Deadlines:
  - July 20, 2016: BIO, CISE, HER
  - July 21, 2016: ENG
  - July 22, 2016: GEO, MPS, SBE
NSF Award Criteria

- **Intellectual merit**
  - Importance in advancing knowledge/understanding in a field
  - Creativity and novelty of approach
  - Qualification of investigator
  - Completeness of research plan
  - Access to resources

- **Broader impacts** (take seriously and be innovative – equal weight with Intellectual Merit – *not an afterthought*)
  - Promotion of teaching and training
  - Inclusion of under-represented minorities
  - Enhancement of infrastructure and partnerships
  - Dissemination of results
  - Benefits to society, use of use of research results to inform science policy
Keen national interest in broadening participation

- **Individuals**
  - Women
  - Minorities
  - Persons with disabilities
  - Veterans
  - Urban males

- **Institutions**
  - Informal and Formal K12 organizations
  - Community-based organizations
  - Community colleges
  - Women-serving organizations
  - Industry

- **Geographic areas**
  - Lower socioeconomic areas
  - Urban areas in general
  - MA DEP Environmental Justice communities
Why broader impacts?

Take seriously and be innovative – equal weight with Intellectual Merit – not an afterthought

1. Advance science while promoting teaching, training and learning
2. Broaden participation of underrepresented groups
3. Enhance infrastructure for research and education
4. Provide broad dissemination to enhance scientific and technological understanding
5. Highlight the benefit to society
Why does NSF require broader impacts?

- **Full participation** of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM)
- Improved **STEM education and educator development** at any level
- Increased **public scientific literacy and public engagement** with science and technology
- Improved **well-being of individuals** in society
- Development of a **diverse, globally competitive STEM workforce**
- Increased **partnerships** between academia, industry, and others
- Improved **national security**
- Increased **economic competitiveness** of the United States
- Enhanced **infrastructure** for research and education

*(Based on language from the America COMPETES Act (2007, 2010)*
Broader Impact Nuts and Bolts

COSEE NOW developed the Broader Impacts Wizard

http://www.cosee.net/about/highlights/broaderimpacts/biwizard/
Broader Impact Resources

http://broaderimpacts.net/

Five guiding questions
(see handout)
Question 1
What is the potential for the proposed activity to benefit society and contribute to achievement of specific desired societal outcomes?

NABI Guiding Principles http://broaderimpacts.net/
Question 2
To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

NABI Guiding Principles http://broaderimpacts.net/
Question 3
Is the plan for carrying out the proposed activities well-reasoned, well organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?

Question 4
How well qualified is the individual, team, or institution to conduct the proposed activities?

NABI Guiding Principles http://broaderimpacts.net/
Question 5
Are there adequate resources available to the PI (either at the home institution or through collaborations) to carry out the proposed activities? Is the budget allocated for Broader Impact activities sufficient to successfully implement them?

NABI Guiding Principles http://broaderimpacts.net/
Evaluation Plans

Need evaluation plans - both formative (immediate) and summative (cumulative)

- A project evaluation plan outlines how you will systematically collect data from your audience to address questions such as:
  - Was this BI project successful? To what extent did the project meet stated goals and objectives?
  - Was this BI project valuable to your audience? Were your BI activities appropriate for them?
  - Did your audience change as a result of this BI project, and in what ways i.e. knowledge, skills, or behavior)?

(Great resources from CAISE: www.informalscience.org/evaluation)
Evaluation Report

Questions that might be asked:

1. Whom did you reach? How many? Demographics?
2. Did participants find the program valuable?
3. To what extend did program participation increase student interest?
4. What did participants learn?
5. Have participants changed their behavior?
Obstacles: You are not alone!

- What prevents you from engaging?
  - I don’t have the time
  - I don’t have the money/there’s no room in my budget for this
  - I don’t know what to do
  - I don’t know how to do it/how to do it well
  - Tenure and promotion don’t take this much into consideration so why bother
  - I don’t enjoy it
  - This should be someone else’s job
  - I don’t understand what NSF is looking for
  - I’m nervous that my research might not have the desired impact on society
  - NSF funding doesn’t leave proportionate room in their budget limits to include
Education – Not just your grad students/postdocs

- Undergraduate
  - Curriculum, new course or new minor
  - Research Projects (we have Center for Undergrad Research)

- Graduate
  - Curriculum
  - Conferences
  - Involvement with industry, national labs

- Public access website, develop an app

- K-14 outreach
  - Potential to partner with the Center for STEM Education, Marine Science Center, and/or other organizations

Reviewers are interested in the sustainability of your innovation
Don’t promise to do all this, pick 2-3 things and do them well
Do’s and Don’t

Do

• Approach with the same detail as intellectual content
• Articulate an identified need
• Plan to include some costs in your budget for implementation and – possibly – assessment
• Do your homework; review what is already being implemented by your institution and with the constituents you intend to serve
• Describe the impact of the activities with some clear metrics and outputs
• Review possible challenges you may have with implementation of your proposed education plan (space/staffing/additional costs, liability issues)

Don’t

• Just have a list of activities with no mention of who will run them and at what cost
• Provide a laundry list of achievements at your institution that don’t relate to your proposed activities
• Do not leave your broader impacts plan as an afterthought
How can we help?

• **Brainstorming** re: possible educational outreach plans
• **Provide references/information** re: recent reports and recommendations in STEM Education
• **Facilitate partnerships** with educators, school districts, community organizations, media practitioners who can collaborate and implement work with you
• **Write and/or secure letters of commitment**
• **Provide opportunities for collaboration with existing programs**
• **Assist with implementation** of your education components
• **Provide STEM enrichment opportunities for K-12 students**, especially those of currently underrepresented backgrounds in STEM fields
• **Provide opportunities for university students and faculty** to lead and participate in Broader Impact efforts
• **Provide opportunities for the general public, K12 students, teachers and families** to learn about the current and developing research, highlighting the work of NU faculty
• **Build and sustain a STEM learning community**
Community College Faculty and K-12 Teachers

- RET (Research Experiences for Teachers)
- Content specific summer workshops

K14 students

- STEM Summer Program (Middle School)
- STEM Field Trips Series (Elementary/Middle School)
- After-school programming (Elementary/Middle School)
- Young Scholars (High School)
- Building Bridges
- Research Experiences for Undergraduates
Impact of Center for STEM Programs

All program offerings are available free of charge to accepted participants.

- We engage close to 1,000 students annually in our STEM Field Trips and educational outreach events.
- We have up to 60 undergraduate students each semester assisting with outreach efforts.
- We have supported 485 middle school students over the past 13 years in our summer STEM Program.
- We have supported 441 high school students since the creation of the NUYSP program,
  - 83% of alumni are enrolled and/or completed a bachelor's degree in a STEM field.

Faculty perspective “I didn’t expect the students to be able to do anything like what they actually have done. They were driven, capable, and fun members of the lab. It was just such an amazing experience. I am also super impressed that two students were able to submit a published paper as authors, I did not dream that that would ever be possible.”
• **Youth and educators**
  • Onsite, offsite, classroom programs, internships, high school symposium
  • In school, after-school, summer

• **Community**
  • Public films, lectures, BioBlitz, Open House

• **Stakeholders**
  • Boston Harbor Habitat Coalition
  • Technical assistance on projects, to secure grants that involve NU resources
Broader Impact Resources

http://broaderimpacts.net/
COSEE Broader Impacts Support

- **Broader Impacts Wizard**
  - Can help you to ID target audience and plan appropriate activities, budget, objectives, and evaluation plan
  - [https://www.youtube.com/watch?v=EzDocJzeCpo](https://www.youtube.com/watch?v=EzDocJzeCpo)

- **Broader Impacts Evaluation**
  - Can help you to articulate the “story” you want to tell (your outcomes)
  - [https://www.youtube.com/watch?v=LakZfRHpm9w](https://www.youtube.com/watch?v=LakZfRHpm9w)

- **SeaHarmony**
  - Yes, this is for real! Find others interested in collaborating with you
  - [http://www.cosee.net/about/highlights/broaderimpacts/seaharmony](http://www.cosee.net/about/highlights/broaderimpacts/seaharmony)
References

- Educate to Innovate: [http://www.whitehouse.gov/issues/education/k-12/educate-innovate](http://www.whitehouse.gov/issues/education/k-12/educate-innovate)
- Center for STEM Report Blog: [http://www.stem.neu.edu/blog/reports-publications/](http://www.stem.neu.edu/blog/reports-publications/)
- University of Florida proposal development resources: [http://research.ufl.edu/research-program-development/proposal-development-resources.html](http://research.ufl.edu/research-program-development/proposal-development-resources.html)
- Center for the Advancement of Informal Science Education: [http://www.informalscience.org/](http://www.informalscience.org/)
- Tips from 16 Successful Faculty: [http://www2.clarku.edu/offices/research/pdfs/NSFProposalWritingTips.pdf](http://www2.clarku.edu/offices/research/pdfs/NSFProposalWritingTips.pdf)
Additional Resources

- Tips from 16 Successful Faculty [http://www2.clarku.edu/offices/research/pdfs/NSFProposalWritingTips.pdf](http://www2.clarku.edu/offices/research/pdfs/NSFProposalWritingTips.pdf)
- Video – Dr. Wanda Ward, NSF [https://www.youtube.com/watch?v=8nt6Mqfdg0k](https://www.youtube.com/watch?v=8nt6Mqfdg0k)

NSF Documents


Broader Impact Plan

Audience
I have chosen to work with (for example) **K-12 Students** because...It is important to work with this group to...

- Foster a scientifically literate population
- Enhance the future workforce
- Increase the ability to solve future challenges (i.e. energy, health, environment, and national security)
- Increase America’s global competitiveness

Activity – (for example, enhance the current curriculum of STEM Field Trip series)

Partners (Center for STEM/Marine Science Center)

Project Description

- The following is a description of my Broader Impact project, including my goals, objectives and tasks.
- **Be sure that your goals and objectives are SMART:** Specific, Measurable, Audience-directed, Realistic and Time bound.

Evaluation

- To measure the success of this project, I will also perform the following assessments

Budget

- (summary from BI Wizard)
Beyond the Award

- Don’t include what you can take out in a supplement
- Beyond the award there are supplements
  - REU (Research Experience for Undergraduates): $6,000 per year per student, nominally one student per award (two, provided one is from an underrepresented group), does NOT include equipment
  - RET (Research Experience for Teachers): $10,000 to involve a K-12 teacher in your research
  - Initiating international collaborations (Office of International Science and Engineering)
  - Informal education (EHR)