CornellEngineering
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Education and Outreach Components of a CAREER Proposal

Think Impact, Integrated, Visionary, ***Feasible***

CAREER Program goals:

- "early development of academic careers in which the excitement of research is **enhanced by inspired teaching and dissemination of new knowledge**"
- "… process of discovery stimulates learning and assures that research findings are quickly and effectively communicated in a **broader context and to a large audience**"
- "… stable support …to enable awardees to develop careers not only as outstanding researchers but **also as effective, committed educators"**

Details

- "Single-PI projects that **include research and education activities that are integrated, innovative, and ambitious … feasible"**
- "The CAREER **program's aims are lofty** – CAREER awards are a lot of work"
- "… **demonstrated commitment to both research and education"**
- **"Compelling argument** that project will achieve effective **integration of or synergy** between research and education activities"
- "Plans should reflect your own disciplinary and educational interests and goals, as well as the needs and context of your organization"
- "A budget that is consistent with the scope of the research and education activities"
- "Expectations for scope of research and education activities vary with disciplinary community norms"
- NSF CAREER Contacts provided at: https://www.nsf.gov/crssprgm/career/contacts.jsp.

Above guidance excerpted from NSF presentation slides on CAREER
(bold emphasis added)
https://www.nsf.gov/mps/dms/career_and_pecase_information/career_webinar_slides_2018.pdf

CAREER PROPOSAL COMPONENTS:

Research:	Education:	Integration:	Letters of Collaboration:
	Idea(s) Audience Venue Learning Outcomes Assessment Dissemination	What is the link? What is the value added? Is the workload realistic? Timeline	Not letters of recommendation Required wording: "If the proposal submitted by Dr. [---] entitled [---] is selected for funding by the NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description."

Courses you will teach with emphasis on new material that will be developed and shared, research informed pedagogies that will be used

Outreach beyond your own students, leverage your efforts by including your students

Outcomes, Assessment, Dissemination, Continued learning, Growth of impact across 5 years

POINTS TO REMEMBER:

- ◻ Your education component plan should be clearly stated and well written
- ◻ Clearly state the educational objectives or student learning objectives of your education component
- ◻ Include the target audience and how you will reach them
- ◻ Include how the education component will be evaluated (assessed) (doesn't have to be elaborate but does have to be included)
- ◻ If you have a plan to disseminate your work, include it
- ◻ Clearly state the proposed impact of your education component (beyond specific objectives for attendees, impact on choices, impact on populations…)
- ◻ Add a figure that sums up your outreach and is memorable if possible
- ◻ Include references for your education component
- ◻ Include any engineering education or science education papers you have written in your publications list
- ◻ Include something about your courses, pedagogy, what new material you are developing (and sharing), necessary but not sufficient component, keep this short, 1-2 paragraphs
- ◻ Include a description of how your education component is integrated with your research
- ◻ Typically use 3-4 pages of your proposal for the education/outreach/broader impacts
- ◻ Ask your chair or director to include in the letter of support something on your integrating research and education and how you are being mentored in that

- Consult with our McCormick Institute or diversity programs or an established outreach program as needed to leverage your time. Embedding your education component in an existing program may help with impact and dissemination
- Your chair can use your consulting with our McCormick Institute as part of your being mentored in teaching
- Have someone read the plan; it should be understandable outside your specialty

MTEI ASSISTANCE with CAREER PROPOSALS:

CAREER Proposal workshop collaboration
Read and comment on education component of proposal*
Assistance with writing outcomes and assessment plans*
Course feedback surveys**

*For engineering faculty. Others as time permits.
**For engineering faculty. Others, contact Center for Teaching Innovation (CTI, formerly CTE).

ONLINE RESOURCES:

Annotated sample proposal sections: Writing a Winning CAREER Proposal, Seminar Handouts 2015, Lucy Deckard
http://research.utsa.edu/wp-content/uploads/2015/02/CAREER-Workshop-Handouts-April-2015.pdf

Compendium of Advice on writing CAREER proposals, 16 articles and good concrete advice
http://www2.clarku.edu/offices/research/pdfs/NSFProposalWritingTips.pdf

Writing an NSF CAREER Award proposal
http://homes.cs.washington.edu/~mernst/advice/career-grant.html

The 2002 User-Friendly Handbook for Project Evaluation
http://www.nsf.gov/pubs/2002/nsf02057/nsf02057.pdf

Professional Societies STEM Education Resources – a few examples

Potential Venues for Learning from and for Disseminating Your Work

American Society for Engineering Education - ASEE
American Association of Physics Teachers – AAPT, college and HS level
Often other technical conferences will include an education track.

POTENTIAL REFERENCES:

Books:

The ABCs of How We Learn, 26 Scientifically Proven Approaches, How They Work, and When to Use Them, Daniel L. Schwartz, Jessica M. Tsang, and Kristen P. Blair, W.W. Norton Co., New York, 2016

How Learning Works, 7 Research-Based Principles for Smart Teaching, Susan A. Ambrose, Michael W. Bridges, Michele DiPietro, Marsha C. Lovett, Marie K. Norman, Jossey-Bass, Wiley Imprint, 2010

Educating Engineers: Preparing 21st Century Leaders in the Context of New Modes of Learning, National Academies Press, 2013 ISBN 978-0-309-26770-0

How People Learn, Brain, Mind, Experience, and School, National Research Council, National Academices Press, ©2000

Educating the Engineer of 2020, Adapting Engineering Education to the New Century, National Research Council, National Academices Press, ©2002

The Effective, Efficient Professor, Teaching Scholarship and Service, Phillip C.Wankat, Allyn and Bacon © 2002

The Engineer of 2020, Visions of Engineering in the New Century, National Academy of Engineering, National Academies Press, ©2004

Articles:

Bjorklund, S.A. and N.L. Fortenberry, Measuring Student and Faculty Engagement in Engineering Education, National Academy of Engineering, 2005, CASEE Report 5902001-20050705, https://www.nae.edu/File.aspx?id=11463&v=451a62ea

Prince, Michael, "Does Active Learning Work?" A Review of the Research", Journal of Engineering Education, 93(3), 223-231,) 2004). Also available online at: http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Papers/Prince_AL.pdf

Felder, Richard, Many engineering education articles at: http://www4.ncsu.edu/unity/lockers/users/f/felder/public/RMF.html

Wieman, Carl, "WHY NOT TRY A Scientific Approach to Science Education?", Change, September/October 2007. Teaching Resources website: http://cwsei.ubc.ca/

NOTE: Additional titles and links to articles on our website: engineering.cornell.edu/MTEI