Developing an Excellent Education Plan for your Faculty Early Career Development (CAREER) Program Proposal

A Workshop Presented by the Delta Program in Research, Teaching, and Learning and WISCIENCE

Tuesday, June 14, 2016

8:30 am – 10:30 am

Mechanical Engineering, rm 1153

Agenda

Introductions and Overview	5-10 min
Individual reflection on worksheet	5 min
Pairwise discussion about your ideas	5 min
Overview of CAREER award *Trina McMahon*, Civil and Environmental Engineering/Bacteriology Faculty co-Director, Delta Program	20 min
Ideas and Advice from Successful CAREER Awardees *Ahna R. Skop*, Associate Professor of Genetics & Life Sciences Communication *Bulent Sarlioglu*, Assistant Professor, Electrical and Computer Engineering	30 min
Introduction to Campus Resources *Ben Taylor*, UW-MRSEC Informal Education Group *Kevin Niemi*, WISCIENCE *Megan Schmid*, Madison Teaching and Learning Excellence Program *Karen Dunn*, Steenbock Memorial Library *Brianna Marshall*, Research Data Services *Don Gillian-Daniel*, Delta Program in Research, Teaching and Learning	30 min
Discussion and networking	20 min
Workshop evaluation	5 min

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Working Document:
Your CAREER Education Plan

June 14, 2016

1. What part of your research do you hope to infuse into your education plan?

2. What audience are you targeting? Why are you targeting them? Have you considered issues of diversity and under-representation in this selection?

3. How will you locate/recruit your proposed audience to your project?

4. What other efforts on campus can you connect with to improve the success and impact of your efforts?

5. Give 2-3 specific ideas for how you are going to implement your plan. What evidence can you provide that you can actually carry your plan out successfully?

6. What are 2-3 objectives you are thinking of including in your education plan?

7. What are 2-3 outcomes you hope will come out of your plan?

8. How will you evaluate your success? How will you know if/when you have achieved each of your expected outcomes?

Important Text from the CAREER Proposal Call 2016

Full text at: http://www.nsf.gov/pubs/2015/nsf15555/nsf15555.pdf

A. CAREER Program

This premier program emphasizes the importance the Foundation places on the early development of academic careers dedicated to stimulating the discovery process in which the excitement of research is enhanced by inspired teaching and enthusiastic learning. Effective integration of research and education generates a synergy in which the process of discovery stimulates learning, and assures that the findings and methods of research and education are quickly and effectively communicated in a broader context and to a larger audience.

The CAREER program embodies NSF's commitment to encourage faculty and academic institutions to value and support the integration of research and education. Successful Principal Investigators will propose creative, integrative and effective research and education plans, developed within the context of the mission, goals, and resources of their organizations, while building a firm foundation for a lifetime of contributions to research, education and their integration.

Integration of Research and Education - All CAREER proposals must have an integrated research and education plan at their core. NSF recognizes that there is no single approach to an integrated research and education plan, but encourages all applicants to think creatively about how their research will impact their education goals and, conversely, how their education activities will feed back into their research. These plans should reflect the proposer's own disciplinary and educational interests and goals, as well as the needs and context of his or her organization. Because there may be different expectations within different disciplinary fields and/or different organizations, a wide range of research and education activities may be appropriate for the CAREER program. Proposers are encouraged to communicate with the CAREER contact or cognizant Program Officer in the Division closest to their area of research to discuss the expectations and approaches that are most appropriate for that area (see http://www.nsf.gov/crssprgm/career/contacts.jsp for a list of CAREER contacts by division).

Project Description:

The Project Description section should contain a well-argued and specific proposal for activities that will, over a 5-year period, build a firm foundation for a lifetime of contributions to research and education in the context of the Principal Investigator's organization. The Project Description may not exceed 15 pages.

The Project Description should include:

- a description of the proposed research project, including preliminary supporting data where appropriate, specific objectives, methods and procedures to be used, and expected significance of the results;
- a description of the proposed educational activities, including plans to evaluate their impact on students and other participants;
- a description of how the research and educational activities are integrated with one another; and results of prior NSF support, if applicable.

Successful applicants will propose creative, effective, integrated research and education plans, and indicate how they will assess these components. While excellence in both education and research is expected, activity of an intensity that leads to an unreasonable workload is not. 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.

Proposed research activities may be in any area of science, mathematics, engineering and education normally supported by NSF. To help determine the appropriateness of the project for NSF and identify the disciplinary program to which it should be submitted, proposers are urged to refer to the NSF Guide to Programs. Program information can also be found on Directorate web pages, which can be accessed from the NSF home page (http://www.nsf.gov/). Proposers are also encouraged to contact the appropriate NSF Program Officer before submitting the proposal.

Cross-Disciplinary Perspectives – NSF recognizes that disciplinary boundaries evolve with time and that inter-, multi-, transdisciplinary approaches are often needed to push the frontiers of research and education. We invite proposals from early-career investigators who wish to pursue research and education activities that cross disciplinary boundaries. Increasingly, CAREER proposals are co-reviewed by more than one program within a Division, a Directorate, or across Directorates/Offices. We encourage investigators to seek research and education collaborations with partners in other areas of academia as well as from other sectors (for example, partnerships with industry, national laboratories, schools and school districts, or museums). Investigators have the option of including the associated costs in the budget line items of the proposal, or in subawards to another institution for all necessary research and educational activities (for example, hiring an external evaluator, or securing time at a shared research facility). Because the CAREER program is designed to foster individual career development, partners or collaborators may not be listed as co-principal investigators on the cover page or as senior personnel in the budget of subawards. Proposals submitted with co-principal investigators will be returned without review. 6 International/Global Dimensions – NSF encourages CAREER Principal Investigators to include international/global dimensions in their projects. As appropriate, the CAREER proposal should delineate how its activities fit within the context of expertise, facilities, data, and other resources that are being applied globally in relevant areas of research and education, and how the CAREER award would position the Principal Investigator and his/her organization to take a leadership role. If applicable, the proposal should clearly state how the research and education activities will be enhanced by international engagements, and should describe the benefits to participants in the U.S. and abroad. If an international component is included, proposers are encouraged to contact the relevant country Program Officer in the International Science and Engineering (ISE) Section listed in http://www.nsf.gov/od/iia/ise/countrylist.jsp.

Field Work in the Polar Regions – For guidance on submitting information about field work proposed in the Arctic or Antarctica, proposers should contact the Program Officer in Polar Programs (http://www.nsf.gov/div/index.jsp?div=PLR) who is associated with the program most closely aligned with the research being proposed.

Education Activities – Proposed education activities may be in a broad range of areas and may be directed to any level: K-12 students, undergraduates, graduate students, and/or the general public, but should be related to the proposed research. Some examples are: designing innovative courses or curricula; supporting teacher preparation and enhancement; conducting outreach and mentoring activities to enhance scientific literacy or involve students from groups that have been traditionally underrepresented

in science; researching students' learning and conceptual development in the discipline; incorporating research activities into undergraduate courses; providing mentored international research experiences for U.S. students; linking education activities to industrial, international, or cross-disciplinary work; and implementing innovative methods for evaluation and assessment. Education activities may also include designing new or adapting and implementing effective educational materials and practices. Such activities should be consistent with research and best practices in curriculum, pedagogy, and evaluation. Proposers may build on NSF- supported activities or other educational projects ongoing on campus. The following resources may be helpful in developing the educational activities.

National Research Council. (2000). *How People Learn: Brain, Mind, Experience, and School*. Committee on Developments in the Science of Learning. Bransford, J.D., Brown, A.L., Cocking, R.R., Editors. with additional material from the Committee on Learning Research and Educational Practice. Donovan, M.S., Bransford, J.D., and Pellegrino, J.W., Editors.

National Research Council. (2001). *Adding it up: Helping children learn mathematics*. Mathematics Learning Study Committee. Kilpatrick, J., Swafford, J., and Findell, B., Editors.

National Research Council. (2001). *Knowing what students know: The science and design of educational assessment*. Committee on the Foundations of Assessment. Pellegrino, J., Chudowsky, N., and Glaser, R., Editors

National Research Council. (2002). *Scientific research in education*. Committee on Scientific Principles for Education Research. Shavelson, R.J., and Towne, L., Editors.

National Research Council. (2007). *Taking Science to School: Learning and Teaching Science In Grades K-8*. Duschl, R. A, Schweingruber, H. A, and Shouse, A. W., Editors.

National Research Council. (2009). *Learning in Informal Environments: People, Places, and Pursuits.* Bell, P., Lewenstein, B., Shouse, A. W., and Feder, M. A., *Editors*.

National Research Council. (2010). *Surrounded by Science: Learning Science in Informal Environments.* Fenichel, M. and Schweingruber, H.A., *Editors.*

Broadening Participation in Graduate Education (2009) - http://www.cgsnet.org/broadening-participation-graduate- education - 0

National Lab Network - http://www.nationallabnetwork.org/
Broadening Participation in Computer Sciences portal - http://www.bpcportal.org/

A CAREER proposal must indicate the goals and objectives of the proposed education activities, how it will be integrated with the research component, and the criteria for assessing how these goals will be met. Principal investigators are strongly encouraged to describe how the impact of the educational activities will be assessed or evaluated. A helpful document for information on evaluating educational activities is the NSF publication *The 2002 User-Friendly Handbook for Project Evaluation* (NSF 02-057).

Grant Proposal Guide (GPG) - 2016

Full text at: http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg_print.pdf

Chapter III: NSF Proposal Processing and Review

Proposals received by NSF are assigned to the appropriate NSF program and are assessed to ensure that they meet NSF compliance requirements. All compliant proposals are then carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as ad hoc reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included as GPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/merit_review/

Proposal review is one step in the NSF program planning and implementation process. Embedded in this process are core strategies that are fundamental to the fulfillment of NSF's mission. More information about NSF's mission and strategies can be found in Investing *in Science, Engineering, and Education for the Nation's Future*: NSF Strategic Plan for 2014-2018. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These broader impacts may be accomplished through the research itself, through activities that are

directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.

- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the Grant Proposal Guide III-2 NSF 16-1 funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.
These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.(i) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to:
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?

2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
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?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: 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; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Some NSF-Supported Initiatives at UW-Madison
To Leverage in Your Proposal

CIRTL - Center of the Integration of Research, Teaching and Learning Network

CIRTL, a national network of 21 institutions, promotes the development of a national faculty in science, technology, engineering, and mathematics (STEM) committed to implementing and advancing effective teaching practices for diverse student audiences as part of their professional careers. To accomplish these goals CIRTL is founded on three pillars: Teaching-as-Research, Learning Communities and Learning-through-Diversity. The local implementation of CIRTL at UW-Madison is The Delta Program in Research, Teaching, and Learning.

For more information visit: http://www.cirtl.net/ and http://delta.wisc.edu/

WiscAmp – Wisconsin Alliance for Minority Participation

WiscAMP aims to address retention and persistence of underrepresented minorities in STEM disciplines by expanding and improving on successful models already in place and fostering and sustaining an alliance among partner institutions.

For more information visit: http://wiscamp.engr.wisc.edu/

WISELI – Women in Science, Engineering and Leadership Institute

The long-term goal of WISELI is to have the gender of the faculty, chairs, and deans reflect the gender of the student body. To accomplish these goals, WISELI will be a visible, campus-wide entity, endorsed by top-level administrators, which will use UW-Madison as a "living laboratory" to study the problem and implement solutions.

For more information visit: http://wiseli.engr.wisc.edu/

IEG UW MRSEC – Materials Research Science and Engineering Center Interdisciplinary Education Group

This program uses examples of nanotechnology and advanced materials to explore fundamental science and engineering concepts at the college level and to share the "wow" and potential of these fields with public audiences. They work to enhance public understanding of science and engineering through a central theme of "Exploring the Nanoworld, Innovating through Materials" using web dissemination to a range of educators, presentations in public venues, and contributions to popular publications and media.

For more information visit: http://mrsec.wisc.edu/Edetc/

NSEC- Nanoscale Science and Engineering Center

This group addresses grand challenges associated with directed assembly of nanoscale materials into functional systems and architectures through the use of self-assembly, chemical patterning, and external fields. Public dialogue, analysis of governmental regulation, and environmental health and safety research are integral components of the Center. The NSEC operates an ambitious and unique education and outreach program aimed at cultivating the next generation of nanoscale science and engineering experts with diverse and interdisciplinary backgrounds.

For more information visit: http://www.nsec.wisc.edu

CHANGE-IGERT -Certificate on Humans and the Global Environment

The Certificate on Humans and the Global Environment (CHANGE) established a workgroup that aids a small amount of new PhD students each year. The CHANGE program involves faculty members in

departments ranging across atmospheric and oceanic sciences, ecology, environmental studies, veterinary medicine, and sociology. An objective of the CHANGE program is to train graduate students to work on environmental problems as a group. Students are encouraged to expand their collaborative efforts beyond the classroom through client-based project work and academic publications.

For more information visit: http://www.nelson.wisc.edu/graduate/change/index.php

Talking About Leaving, Revisited

This five-year study builds on research by Elaine Seymour and Nancy Hewitt that found poor teaching was the most significant influence on STEM majors' decisions to switch fields. Seymour and Hewitt's 1997 book Talking about Leaving: Why Undergraduates Leave the Sciences subsequently spurred nationwide efforts to improve teaching in STEM courses and to retain more students of color and women into STEM fields. This new study, known as Talking about Leaving Revisited, will investigate whether rates of switching from STEM majors—and students' experiences in the process—have changed since efforts to improve college science teaching began 15 years ago.

For more information visit: http://talr.wceruw.org/

PREP – Psychological Research Experience Program

The Psychology Research Experience Program (PREP) provides intensive mentoring and experience in scientific research and professional development to undergraduates from historically underrepresented populations who have expressed and demonstrated an interest in a career in scientific psychology.

For more information visit:
https://psych.wisc.edu/PREP%20Application%20and%20Selection.htm

Water Sustainability and Climate In the Yahara Watershed

The project is part of an endeavor to understand the interactions between water, climate, land use, infrastructure, and ecosystems through place-based research and innovative methods.

For more information visit: https://wsc.limnology.wisc.edu/about/project

CHTC – The Center for High Throughput Computing

The Center for High Throughput Computing (CHTC) offers a variety of large-scale computing resources and services for UW-affiliated researchers and their collaborators, including classically-defined high-throughput computing (HTC) and high-performance computing (HPC) resources.

For more information visit: http://chtc.cs.wisc.edu

IceCube Neutrino Observatory

IceCube is a particle detector at the South Pole that records the interactions of a nearly massless subatomic particle called the neutrino. IceCube searches for neutrinos from the most violent astrophysical sources: events like exploding stars, gamma-ray bursts, and cataclysmic phenomena involving black holes and neutron stars. The IceCube telescope is a powerful tool to search for dark matter and could reveal the physical processes associated with the enigmatic origin of the highest energy particles in nature. The University of Wisconsin–Madison is the lead institution responsible for the maintenance and operations of the detector.

For more information visit: https://icecube.wisc.edu/

Research Experience for Undergraduates

Current programs partially funded by NSF at UW-Madison
Text at: http://www.grad.wisc.edu/education/diversity/srop/index.html

Integrated Biological Sciences Summer Research Program
Amber Smith, Faculty Associate for Research Mentor
Email: amber.smith@wisc.edu

Website: https://wiscience.wisc.edu/IBS-SRP

Biochemistry & Biophysics
Kelley Harris-Johnson (kelleyharris@wisc.edu)

Bioenergy
John Greenler (jgreenler@glbrc.wisc.edu)

Cellular and Molecular Biology
Jessica Skarlupka (cmb@bocklabs.wisc.edu)

Computational Biology and Biostatistics
Whitney A. Sweeney (sweeney@biostat.wisc.edu)

Ecology, Plants and Environmental Systems
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Molecular & Environmental Toxicology
Eileen Stevens (emstevens@wisc.edu)

Neurobiology
Mallory Musolf (musolf@wisc.edu)

Virology
Johan den Boon (jdenboon@morgridgeinstitute.org)

Integrated Chemistry, Chemical Engineering, and Materials Science Research Experience for Undergraduates Programs
Andrew Greenberg, Director
Email: aegreenb@engr.wisc.edu

Research Experience for Undergraduates in Nanotechnology (Nano REU)
Website:
https://dl.dropboxusercontent.com/u/84759847/Reasearch_Expereince_for_Undergraduates_in_Nanotechnology/REU_in_Nanotechnology.html

DELTA Integrating Research, Teaching, and Learning

CIRTL Network Center for the Integration of Research, Teaching, and Learning

WISCIENCE Learn · Teach · Share

REU in Chemistry and Biological Engineering
Website:
https://dl.dropboxusercontent.com/u/84759847/REU_in_Chemistry_and_Chemical_and_Biological_Engineering/REU_in_Chemistry.html

Research Experience for Undergraduates in the Chemistry of Materials for Renewable Energy (CMRE REU)
Website:
https://dl.dropboxusercontent.com/u/84759847/REU_in_The_Chemistry_of_Materials_for_Renewable_Energy/REU_in_Chemisrtry_of_Materials_for_Renewable_Energy.html

Psychology Research Experience Program (PREP)
Email: prep@psych.wisc.edu
Website: https://psych.wisc.edu/PREP%20Application%20and%20Selection.htm

Research Experience for Undergraduates – Astrophysics
Eric Hooper, Director
Email: reu@astro.wisc.edu
Website: http://www.astro.wisc.edu/undergrads/uw-madison-reu-program/

Research Experience for Undergraduates – Microbiology
Jon Roll, Program Director
Email: jtroll@wisc.edu
Website: http://www.bact.wisc.edu/pro_reu.php

Summer Education Research Program (SERP)
Ruttanatip (Dang) Chonwerawong, Program Director, Coordinator
Email: rchonwer@education.wisc.edu
Website: http://www.education.wisc.edu/serp/

Summer Undergraduate Research Experience –SURE/REU (Engineering)
Kelly Burton, Program Coordinator
Email: gers@engr.wisc.edu

Website: http://gers.engr.wisc.edu/sure.php

UW-Madison CAREER Award Recipients – previous 8 years
List current as of May 2016

Name	Award Date	Department
Tullia Dymarz	6/1/2016	Department of Medical Sciences
Jun Yin	6/1/2016	Department of Medical Sciences
Robert Roth	6/1/2016	Geography
Prashant Sharma	3/1/2016	Zoology
Melih Eriten	2/1/2016	Mechanical Engineering
Bulent Sarlioglu	2/1/2016	Electrical and Computer Engineering
Christy Tremonti	1/1/2016	Astronomy
Xuehua Zhong	12/15/2015	Microbiology
Timothy Bertram	8/1/2015	Agricultural Sciences
Christina Remucal	7/1/2015	Civil and Environmental Engineering
Etienne Garand	4/1/2015	Chemistry
Oliver Schmitz	3/1/2015	Engineering Physics
Daniel Ludois	2/15/2015	Electrical and Computer Engineering
Sushmita Roy	8/1/2014	Biostatistics
Richard Kent	7/1/2014	Mathematics
Erika Marin-Spiotta	6/15/2014	Geography
Krishanu Saha	6/1/2014	Biomedical Engineering
Clifford Thurber	6/1/2014	Geology
Michael Arnold	5/15/2014	Engineering
Marisa Otegni	4/19/2014	Molecular Biology
Ahna Skop	4/6/2014	Molecular Biology
Xinyu Zhang	4/1/2014	Engineering
Donna Fernandez	3/11/2014	Molecular Biology
Kurt Amann	11/25/2013	Molecular Biology
Michael Graham	8/23/2013	Physics
David Anderson	8/6/2013	Mathematics
Basil Tikoff	7/31/2013	Earthscience and Geology
Snezana Stanimirovic	7/16/2013	Astronomy
Shanon Peters	7/3/2013	Earthscience and Geology
David Wassarman	5/30/2013	Genetics
Laurence Loewe	5/15/2013	Biology
Patrick Krysan	3/21/2013	Biotechnology
Micheal Sheets	3/21/2013	Genetics
George Huber	1/31/2013	Chemical and Biological Engineering
Corinna Gries	7/16/2012	Genetics
Peter Shanan	7/1/2012	Geology
Benjamin Recht	6/1/2012	Computer Science
Laurence Loewe	6/1/2012	Genetics
Brian Pfleger	6/1/2012	Chemical and Biological Engineering

Xudong Wang	5/1/2012	Materials Science and Engineering
Reina Maruyama	5/1/2012	Physics
David Rothamer	2/1/2012	Mechanical Engineering
Bilge Mutlu	9/15/2011	Computer Science
Snezana Stanimirovic	9/15/2011	Astronomy
Benedek Valko	9/1/2011	Mathematics
Douglas Weibel	8/16/2011	Biochemistry
Andrej Zlatos	8/1/2011	Mathematics
Shan Lu	6/2/2011	Computer Science
Jennifer Reed	6/1/2011	Chemical and Biological Engineering
Zhiguang Qian	6/1/2011	Statistics
Jennifer Reed	6/1/2011	Chemical and Biological Engineering
Christopher Re	5/1/2011	Computer Science
Nader Behdad	4/1/2011	Electrical and Computer Engineering
Azadeh Davoodi	1/1/2011	Electrical and Computer Engineering
Pamela Kreeger	3/15/2010	Biomedical Engineering
Maxim Vavilov	3/15/2010	Physics
Amy Ellis	3/15/2010	Curriculum and Instruction
Jingshan Li	3/15/2010	Industrial and System Engineering
James Luedtke	2/1/2010	Industrial Engineering and Computer Sciences
Shaoqin Gong	1/1/2010	Biomedical Engineering
Teresa Holloway	9/1/2009	Environmental Studies
Oguzhan Alagoz	9/1/2009	Industrial and System Engineering
Brenda Ogle	9/1/2009	Biomedical Engineering
Karthikeyan Sankaralingam	9/1/2009	Computer Science
Ankur Desai	9/1/2009	Atmospheric and Oceanic Sciences
Kevin Turner	8/1/2009	Mechanical Engineering
Dan Negrut	3/1/2009	Mechanical Engineering
Li Zhang	3/1/2009	Computer Science
Kurt Squire	8/15/2008	Curriculum and Instruction
Izabela Szlufarska	6/1/2008	Materials Science and Engineering
Michael Swift	6/1/2008	Computer Science
Hongrui Jaing	5/1/2008	Electrical and Computer Engineering
Aseem Ansari	5/1/2008	Biochemistry
Cameron Curie	4/1/2008	Bacteriology
Joshua Coon	2/15/2008	Chemistry
Mahesh Mahanthappa	2/1/2008	Chemistry
Suman Banerjee	2/1/2008	Computer Science
Srinivasa Akella	2/1/2008	Computer Science
Krishnan Suresh	1/1/2008	Mechanical Engineering
Chris Weise	8/1/2007	Biochemistry
Katherine McMahon	5/1/2007	Civil & Environmental &Biomedical Engineering
Shuchi Chawla	3/15/2007	Computer Sciences
Teri Balser	2/1/2007	Soil Science
Tehshik Yoon	2/1/2007	Chemistry

AnHai Doan	8/31/2006	Computer Science
Cristian Estan	7/1/2006	Computer Sciences
Ahna Skop	5/15/2006	Genetics
Shiyu Zhou	5/1/2006	Industrial Engineering
Irena Knezevic	4/1/2006	Electrical and Computer Engineering
Christos Maravelias	4/1/2006	Chemical and Biological Engineering
Song Jin	3/1/2006	Chemistry
Joel Pederson	3/1/2006	Soil Science Academic Program
Kristyn Masters	2/1/2006	Biomedical Engineering

Merit Review Criterion: Broader Impacts (Chemistry Examples)

Text at: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13626&org=CHE&from=home

SYNOPSIS

Merit Review Criterion: Broader Impacts

All proposals submitted to the National Science Foundation are evaluated through use of two National Science Board approved merit review criteria. The two merit review criteria are 1) What is the intellectual merit of the proposed activity? and 2) What are the broader impacts of the proposed activity? Proposals that do not separately address both merit review criteria within the Project Summary and Project Description will be returned without review.

Guidance regarding the merit review criterion of broader impacts and examples illustrating activities likely to demonstrate broader impacts are available in Chapter III of the Grant Proposal Guide section of the Proposal and Award Policies and Procedures (PAPP) Guide, http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp.

In addition to the guidelines and examples provided by the PAPP Guide, below is a list of examples demonstrating how the chemistry community has addressed the merit review criterion of broader impacts:

- Offering national or international summer research or outreach programs for middle and high school students, high school teachers, or undergraduate students including many from underrepresented groups.
- Organizing national and international workshops or symposia for faculty or students.
- Training and mentoring students to be future professionals.
- Strengthening the chemical workforce through curriculum development.
- Implementing strategies to increase the number of women and minority chemists in tenured academic positions in research universities.
- Updating curriculum by writing texts or developing new classroom instructional materials and laboratory experiments.
- Introducing students to authentic research experiences in the first- and second-year chemistry laboratory curriculum.
- Working with science centers to disseminate their research and educational activities to a broad audience via exhibits, outreach programs, activities or events.
- Mentoring junior faculty.
- Serving as a journal editor or peer reviewer for grants and publications.
- Preparing new compounds, materials, techniques or devices of industrial, medical, environmental, or computational significance.
- Identifying more effective ways to use existing energy resources. Discovering new or renewable energy sources.
- Developing new sensors, technology or instrumentation for national security.
- Forming start-up companies for manufacturing or distributing new products or technologies.

- Writing scholarly review articles for peer reviewed journals or less technical articles for the public.
- Participating in interdisciplinary research or educational activities.
- Contributing to cyber-enabled chemistry activities such as participating with or establishing a team of researchers who can assemble distributed expertise and resources in a virtual lab to target chemical research and education priorities.
- Collaborating with industrial or government colleagues.
- Establishing international research collaborations.
- Assisting journalists with their articles and press releases on technical topics.
- Developing new art forms for communicating science to wider audiences.
- Designing new routes to commodity or fine chemicals.
- Designing safer laboratory procedures or environmentally benign processes.

Broader impact activities are a critical element for the long-term health, vitality, and infrastructure of the chemistry discipline. They contribute to new discoveries and understandings, an enhanced infrastructure for research and education, broad dissemination of research results, recruitment of a diverse workforce, professional development of co-workers and effective communication with non-specialist audiences regarding the societal benefits of the research being conducted. Collectively, the broader impact of the research and educational activities being completed by the chemistry community represents a success story that should be widely shared.

We hope that the above guidelines and examples will assist you with addressing and incorporating the merit review criterion of broader impacts within your proposal.

Example Postdoctoral Researcher Mentoring Plan

Adapted from: https://www.nsf.gov/eng/iip/sbir/Sample_Postdoc_Mentoring_Plan.doc

This Postdoctoral Researcher Mentoring Plan has been prepared by <organization name>. The Plan establishes guidelines for work to be performed by a Postdoctoral Researcher in support of the NSF <SBIR or STTR> <Phase I or Phase II> Project Awarded to <company name>, entitled "<title of project>". The Postdoctoral Researcher assigned to the project will work in <name/university> laboratory and will conduct research on <name tasks>.

1. Orientation will include in-depth conversations between <company researcher name> and the Postdoctoral Researcher. Mutual expectations will be discussed and agreed upon in advance. Orientation topics will include (a) the amount of independence the Postdoctoral Researcher requires, (b) interaction with coworkers, (c) productivity including the importance of scientific publications, (d) work habits and laboratory safety, and (e) documentation of research methodologies and experimental details so that the work can be continued by other researchers in the future.

2. Career Counseling will be directed at providing the Postdoctoral Researcher with the skills, knowledge, and experience needed to excel in his/her chosen career path. In addition to guidance provided by <post doc researcher name>, the Postdoctoral Researcher will be encouraged to discuss career options with researchers and managers at <university name> and with former students and colleagues of < post doc researcher name>.

3. Experience with Preparation of Grant Proposals will be gained by direct involvement of the Postdoctoral Researcher in proposals prepared by <company name>. The Postdoctoral Researcher will have an opportunity to learn best practices in proposal preparation including identification of key research questions, definition of objectives, description of approach and rationale, and construction of a work plan, timeline, and budget.

4. Publications and Presentations are expected to result form the work supported by the grant. These will be prepared under the direction of < post doc researcher name> and in collaboration with researchers at <company name> as appropriate. The Postdoctoral Researcher will receive guidance and training in the preparation of manuscripts for scientific journals and presentations at conferences.

5. Teaching and Mentoring Skills will be developed through professional development activities around teaching through the Delta Program in Research, Teaching and Learning at UW-Madison or the national Center for the Integration of Research, Teaching and Learning (CIRTL) Network. < post doc researcher name> will attend workshops, seminars and/or courses offered by the Delta program or CIRTL to learn to teach effectively. For example, Delta's College Classroom course will provide < post doc researcher name> with fundamental pedagogical skills. Delta's Research Mentor Training seminar will prepare < post doc researcher name> to effectively mentor graduate and undergraduate students. Additional skills will be developed in the context of regular meetings within <university name> research group during which graduate students and postdoctoral researchers describe their work to colleagues within the group and assist each other with solutions to challenging research problems, often resulting in cross fertilization of ideas.

6. Instruction in Professional Practices will be provided on a regular basis in the context of the research work and will include fundamentals of the scientific method, laboratory safety, and other standards of professional practice. In addition, the Postdoctoral Researcher will be encouraged to affiliate with one or more professional societies in his/her chosen field.

7. Technology Transfer activities will include regular contact with researchers at <company name>. The Postdoctoral Researcher will be given an opportunity to become familiar with the university-industry relationship including applicable confidentiality requirements and preparation of invention disclosure applications.

8. Success of the Mentoring Plan will be assessed by monitoring the personal progress of the Postdoctoral Researcher through a tracking of the Postdoctoral Researcher's progress toward his/her career goals after finishing the postdoctoral program.

Developing an Excellent Education Plan for your Faculty Early Career Development (CAREER) Program Proposal
6/14/16
Evaluation

1. How did you hear about this workshop? If you heard via email, who was the email from?

2. Using the rating scale below, please indicate your satisfaction with each of the topics covered in this workshop:

Very Dissatisfied	Dissatisfied	Neither Dissatisfied or Satisfied	Satisfied	Very Satisfied
(1)	(2)	(3)	(4)	(5)

TOPIC	**RATING**
Overview of CAREER Criteria	
Experiences of successful applicants	
Introductions to campus resources and potential partners	
Networking time	

2. What aspects of this workshop did you find most useful?

3. What would be something to improve in this workshop?

4. Any other comments?

Thanks for coming!

DELTA Integrating Research, Teaching, and Learning

CIRTL Network Center for the Integration of Research, Teaching, and Learning

WISCIENCE Learn · Teach · Share