

Leveraging the NSF Broader- Impacts Criterion for Change in STEM Education

Chuck Kotal, Associate Dean of Arts and Sciences;
Russell Malmberg, Associate Dean of Arts and Sciences; and
Leidong Mao, Faculty of Engineering
The University of Georgia



National Science Foundation merit review criteria in judging research proposals

1. What is the intellectual merit of the proposed activity?
2. What are the broader impacts of the proposed activity?

Researchers must provide a plan that indicates how the project will:

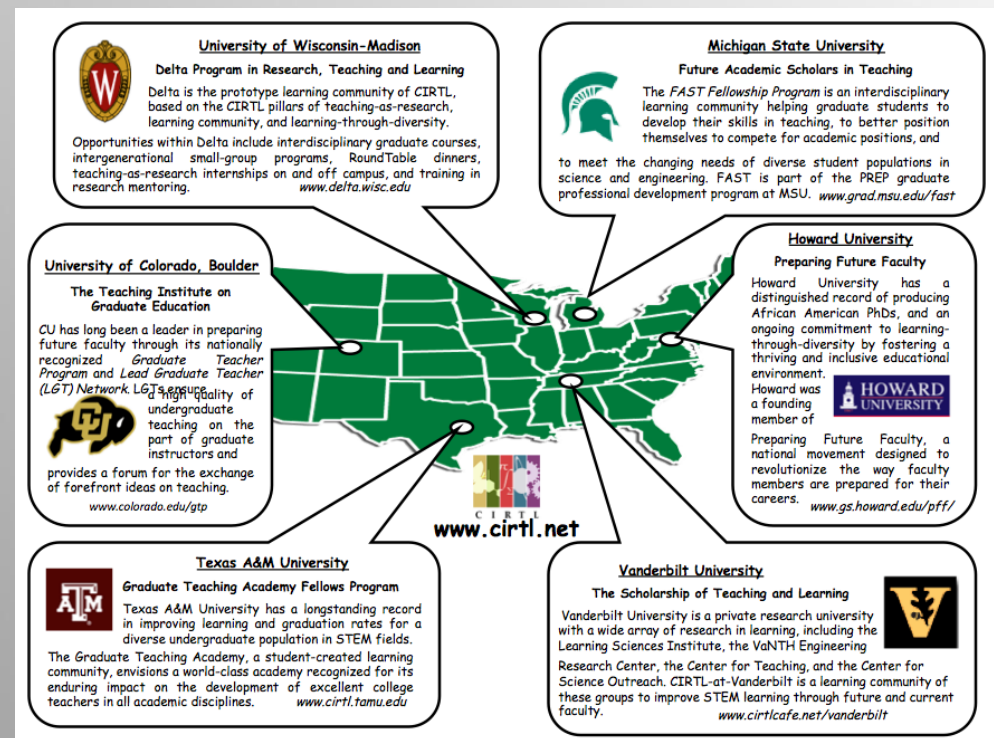
- (1) Promote teaching, training, and learning,
- (2) Broaden the participation of underrepresented groups,
- (3) Enhance the infrastructure for research and education, and
- (4) Disseminate results to enhance scientific understanding.



Center for the Integration of Research, Teaching, and Learning (CIRTL)

Diverse set of research universities committed to:

- Being national change agents in STEM graduate education around teaching and learning.
- The core ideas (pillars):
 - teaching-as-research
 - learning community
 - learning-through-diversity
- Collaboration with network universities - sharing programs, resources, successes, and initiatives.



The CIRTL Network
<http://www.cirtl.net/>



Who Benefits?

- **Future Faculty—**
 - stronger resume
 - prepared to teach effectively
 - positive effects on research
- **Current Faculty—**
 - broader impact statement
 - graduate students/postdocs hired
 - BOR policy
- **Undergraduate Students—**
 - better instruction!



8.3.15 Enhancing Teaching and Learning in K-12 Schools and USG Institutions

The BOR recognizes the value of USG faculty engagement in the effort to continuously improve teaching and learning in K-12 schools and USG institutions.

- **Work in K-12 Schools**

USG institutions **will support and reward faculty who participate in significant and approved efforts to improve teaching and learning in K-12 schools, including teacher preparation**, through decisions in promotion and tenure, pre-tenure and post-tenure review, annual review and merit pay, workload, recognition, allocation of resources, and other rewards.

- **Work in USG Institutions**

USG institutions will **support and reward faculty who participate in significant efforts to improve teaching and learning in USG institutions** through decisions in promotion and tenure, pre-tenure and post-tenure review, annual review and merit pay, workload, recognition, allocation of resources, and other rewards.



office of
STEM
education

science technology engineering mathematics

The University
of Georgia 

UGA OVPI Sponsored Programs

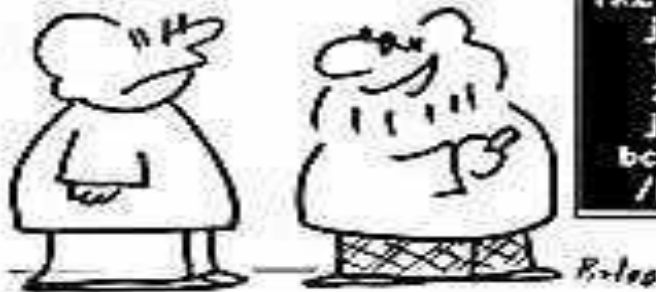
Resources for Broader Impacts Sections

<http://www.ovpr.uga.edu/osp/proposal/broader-impacts>

Disclaimer

© Original Artist

Reproduction rights obtainable from
www.CartoonStock.com



inable from) / [n^{-4.906i}] x bc⁻ 56.1rx pke 9243jNM
{3.4219d} x {ndt} kt11.ort-9bt}bc⁻ 56.1rx pke 9243jNM
m2356tΩrtkl14 n x {3.4219d}bc⁻ 56.1rx pke 9243jNM
rkŁ 231 {3.4219d}n(3.5xcd)/[n^{-4.906i}] x bc⁻n(3.5xcd)
jr5099 9d} x {ndt} 1.ort-9bt}bc⁻ 56.1rx pke 9243jNM
/[n^{-4.906i}] x bc⁻n(3.5xcd)/[n^{-4.906i}] x bc⁻ x {3.421
9d}bc⁻x bc⁻n(3.5xcd)/[n^{-4.906i}] x {3.4219d}bc⁻ 56.1
56.1rx pke 9243jNM6i} x {3.4219d}bc⁻ 56.1rx pke 92
rkŁ 231 {3.4219d}n(3.5xcd)/[n^{-4.906i}] x bc⁻n(3.5xcd)
jr5099 / [n^{-4.906i}] x bc⁻n(3.5xcd)/[n^{-4.906i}] x
{3.4219d}bc⁻ 56.1rx pke 9243jNMjr5099 / [n<sup>-4
231 {3.219d}n(3.5xcd)/[n^{-4.906i}] x bc⁻n(3.5xcd)
jr5099 / [n^{-4.906i}] x bc⁻n(3.5xcd)/[n^{-4.906i}] x
bc⁻ 56.1rx pke 9243jNMrkŁ 231 {3.4219d}n(3.5xcd)
/[n^{-4.906i}] x bc⁻n(3) kt30 = X</sup>

SearchID: firmman958

“It’s a foolproof formula for
writing grant applications.”

- The following is **my own experience (Engineering division)**
 - Does not guarantee successful application

Broader Impacts – Regular Proposal – As an Applicant

- Most important – **Transformative** research idea!
- Also important – **Complete** broader impacts!
- Broader Impacts focus on the benefit to society at large as a result of your research.
- Means to benefit society include:
 - Economic/environment/energy
 - Education and training
 - Providing opportunities for underrepresented groups
 - Improving research and education infrastructure

The key issue is how your research results will be applied — why would the general public care?

Broader Impacts – Regular Proposal – As an Applicant

- Undergraduate
 - Curriculum
 - Projects (REUs)
- Graduate
 - Curriculum
 - Conferences
 - Involvement with industry, national labs
- Networks, partnerships
- K-12 outreach (RETs)
- Museum projects

<http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>

Broader Impacts – Regular Proposal – As a Reviewer

- Process: *ad hoc* only, panel only, combination
 - Reviews obtained from non-conflicted experts – at least three required
 - *Ad hoc* only: PD makes funding recommendation to DD
 - Panel: Panel makes recommendation to PD, PD makes funding recommendation to DD
 - We as panel only makes recommendations based on IM & BI, funding decisions are up to PD and DD
 - Reviewers typically look at BI for its completeness (important components such as K-12, outreach, minority groups) – Satisfactory BI
 - Reviewers will recognize difficult outreach efforts – Strong BI
 - Proposals in HR, R, and DNR categories
 - DD concurs on recommendation – end of process for declinations
-

Broader Impacts – Career Proposal – As an Applicant

- Funds the academic **career development** of new faculty (it is **NOT** a research only award)
 - Is based on a development plan, “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”
 - **Teacher – Scholar role** of new faculty
 - Broader impacts needs to be **integrated** with research plan
 - Disseminate research results into classrooms
 - Talk to STEM education experts – recognize where you can contribute
 - You really need to **go out of your way** for outreach effort
 - Have a separate budget for outreach effort
 - K-12 involvement – my experience – a summer institute
 - Involve minority groups - PSLSAMP
 - Have education experts evaluate your outreach activities
 - Long term partnerships
-

My Own Experience

- **Meet Program Officer before writing a proposal!**
 - **Not to schmooze**
 - **Ask questions like**
 - Does my research objective fit well with your program?
 - What is your funding priority?
 - What is the panel like? Lots of theory experts, experimental experts, education experts?
 - Ask to sit on one of the panels – NSF will pay you
-