

***Ideas for Strengthening Broader
Impacts in Engineering Research
Proposals or Education Plan in
CAREER Proposals***

Dr. Thomas Tretter, CRIMSTED

Dr. Patricia Ralston, CTLE

NSF CAREER Context

“Broader Impacts” section required

- Primary criteria are based on scientific merit of your proposal
- Strong “Broader Impacts” section can be the feature that distinguishes your proposal from other strong proposals
- Will share some ideas in this session for how you might conceptualize a portion of your “broader impacts”



Hanover Research Group – NSF CAREER Workshop on Outreach/Education/Broader Impacts

DO

- Identify partners and provide appropriate letters of support
- Describe activities in detail
- Budget for activities
- Integrate activities with the research
- Design activities using best practices (provide literature)
- Design activities for specific audiences to achieve defined outcomes

DON'T

- Limit activities to curriculum changes or additional grad students
- Develop elaborate new outreach programs for the sake of outreach alone
- Propose an activity without providing sufficient detail for reviewers to assess feasibility, approach, and likelihood of achieving desired outcomes
- Identify a partner without providing a *strong* letter of support

Extending Broader Impacts to K-12 or public

K-12

- Engineering Design standards are now (since 2015) a part of K-12 science standards in Kentucky
<http://www.nextgenscience.org/>
- Teachers are looking for support how to teach engineering design in age-appropriate ways
- BUT your proposed effort with K-12 teachers and students needs to fit within their curriculum

Public

- Potential to collaborate with UofL planetarium to create public program (video, telling story of the work in larger context, combine with Q&A in live presentation by researcher)



Engineering Design Standards for Middle School

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.