

Engineering Education Research

Engineering Education and Centers Division
Engineering Directorate
National Science Foundation

Alan Cheville, Program Director

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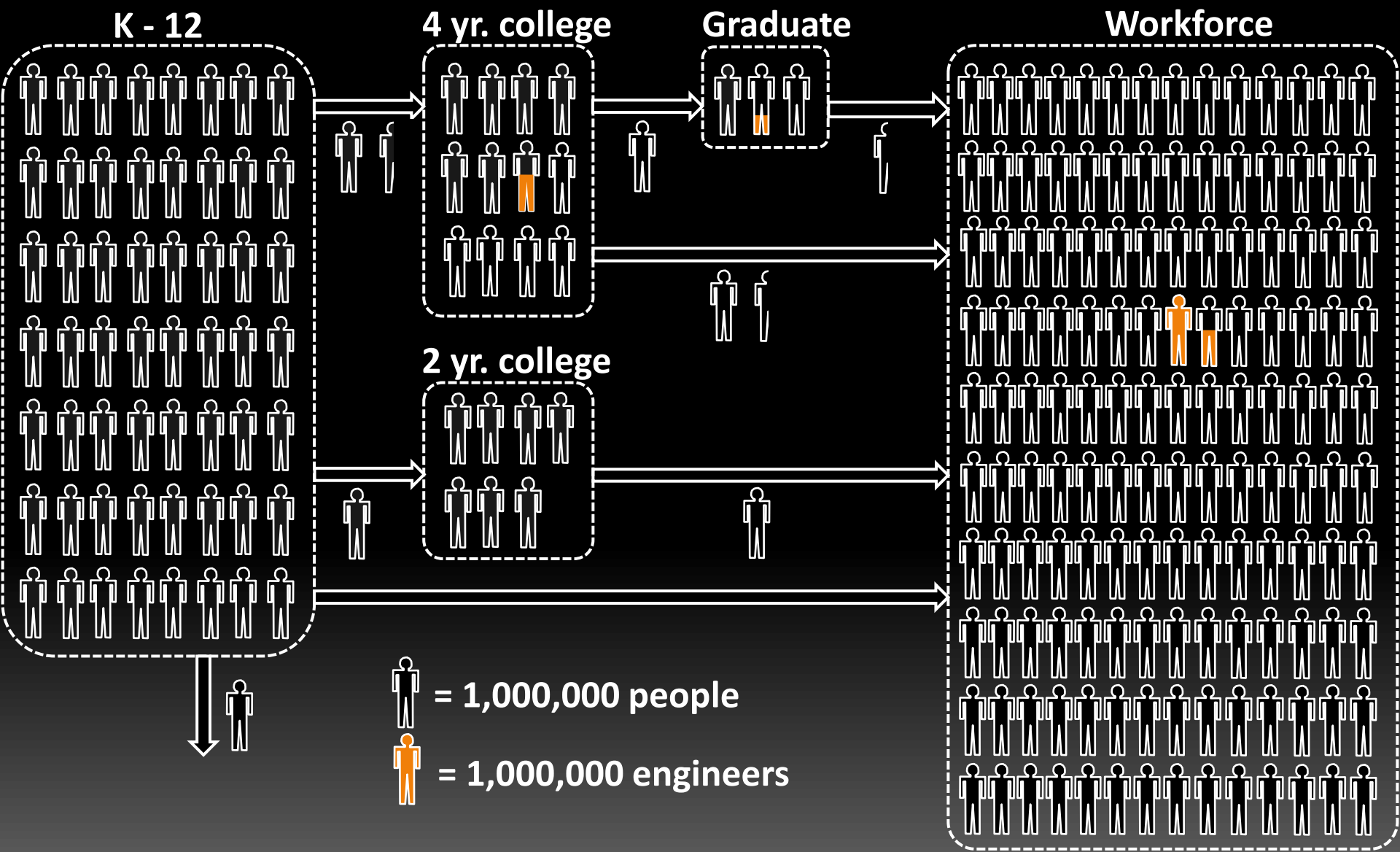
703.292.7107

Program Mission:

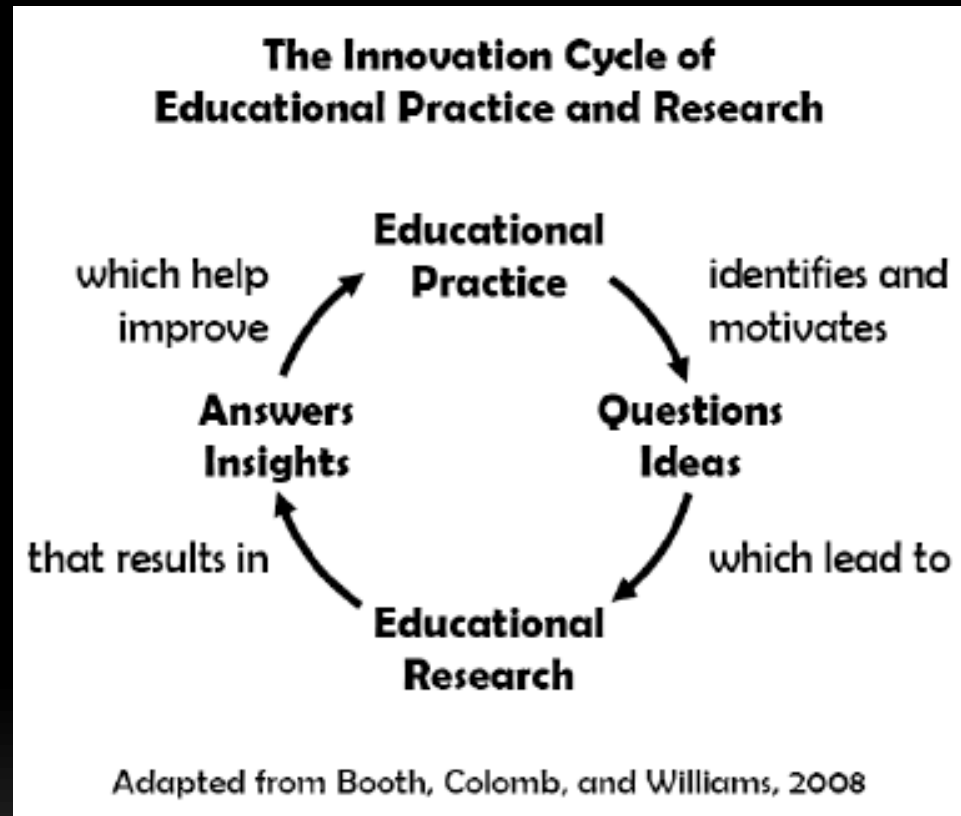
The Division of Engineering Education and Centers (EEC) seeks to enable a world-leading system of engineering education, equally open and available to all members of society, that dynamically and rapidly adapts to meet the changing needs of society and the nation's economy.

Accomplish this mission primarily through support of *research* in engineering education and human resource development

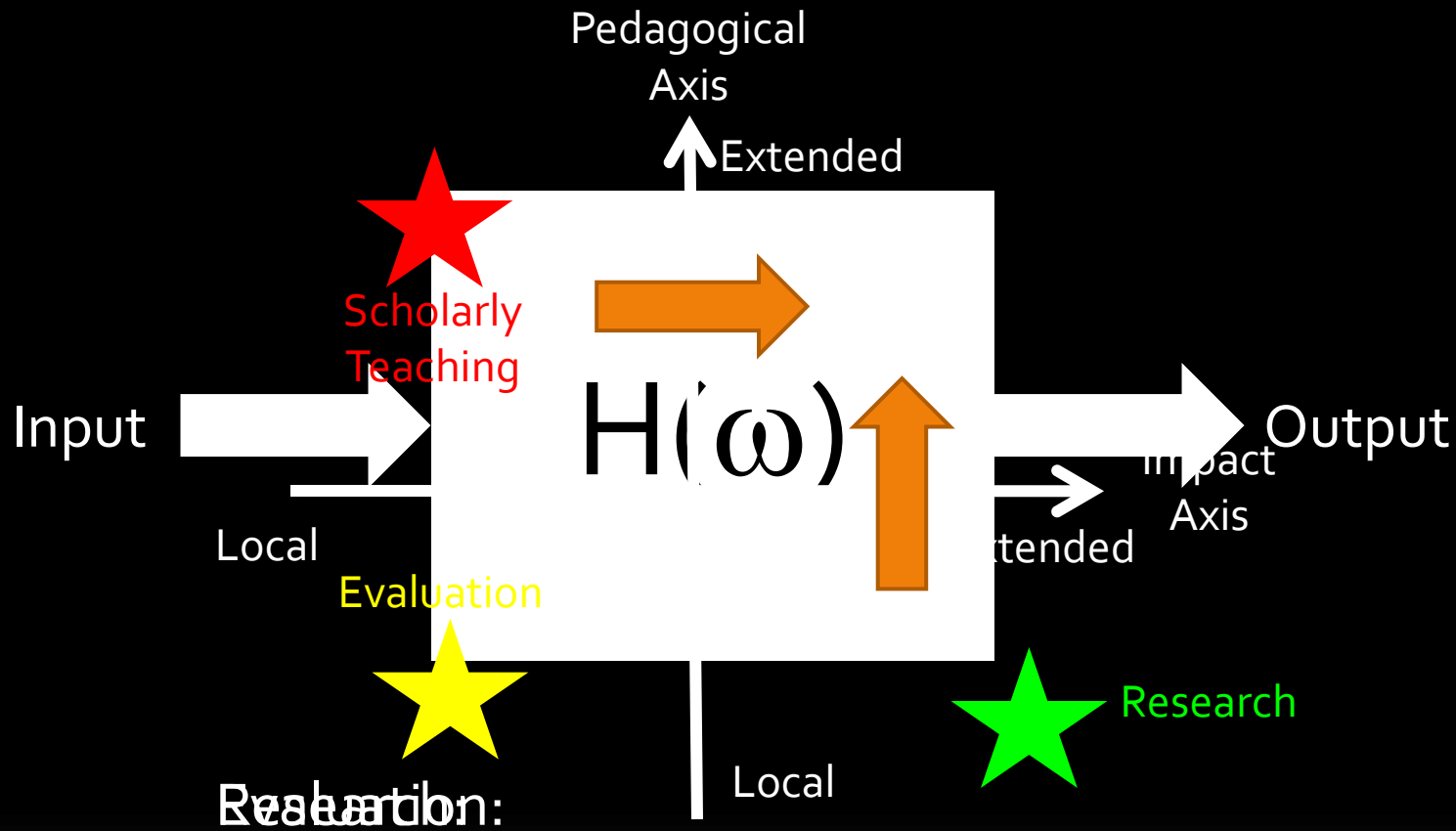
Engineers in School and Workforce



What is Engineering Education Research?



What is Engineering Education Research?



- Identify changes in system driven by input and output
- Alter but preserve methodologies
- Explain to explain why changes are occurring
- Specify to a given context
- Generalizable and/or transferable

Engineering Education Research

Research in Engineering Education (Program Description PD-1340)

 No Limit
See GPG

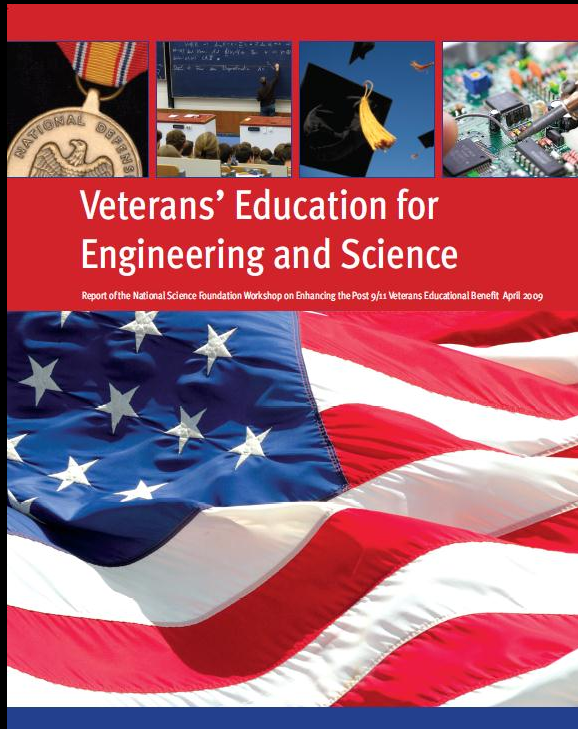
Fundamental research in engineering education learning and systems.

- Increasing our understanding of how engineering students learn and the capacity that supports such discovery.
- Understanding how to increase the diffusion and impact of engineering education research.
- Understanding engineering education in broader, organizing frameworks such as innovation, globalization, complex engineered systems, or sustainability.
- Diversifying pathways to and through engineering degree programs.

Contact: Alan Cheville rchevill@nsf.gov

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503584

Particular Target Group: Veterans



- 2008 Act significantly expands benefits to veterans
 - *36 months of tuition limited to maximum in state tuition for state university.*
 - Monthly Housing Allowance
 - \$1000 for Books and Supplies
- 2.1 M veterans are eligible (est.)
- 46% of veterans use benefits for four year college
- Veterans are *different* than typical students :
 - Likely older than most students
 - May have families to support
 - May initially feel uncomfortable in new academic setting
 - Sensitive about being mistaken for ROTC students
 - **Must make rapid progress in degree completion**
 - Most likely transfer or part-time students
 - Vast majority are mature and disciplined
 - 98% US citizens

Research Initiation Grants in Engineering Education (NSF 11-507)

\$ 150,000
2 years

Allow faculty to expand engineering education
research competencies

- Address boundary-spanning challenges in engineering education.
- Develop expertise in engineering education.
- Develop interdisciplinary partnerships.
- Explore the theoretical basis, research methodologies, and epistemologies of synergistic discipline(s).

Contact: Alan Cheville rchevill@nsf.gov

http://nsf.gov/funding/pgm_summ.jsp?pims_id=503603

Ethics Education in Science & Engineering (11-514)

\$ 300,000*
3 years

Emphasis on research in STEM ethics

- Research and educational projects to improve ethics education in all of the fields of science and engineering that NSF supports.
- Proposals must focus on improving ethics education for graduate students in those fields, although the proposed programs may benefit advanced undergraduates in addition to graduate students.

Contact: Sue Kemnitzer skemnitz@nsf.gov

http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf11514

Transforming Undergraduate Education in STEM (TUES 10-544)

\$ Type
Dependent

On the development side of the research & development continuum.

- Program run in EHR/DUE.
- Supports efforts to create, adapt, and disseminate new learning materials and teaching strategies
- Work should reflect advances both in STEM disciplines and in what is known about teaching and learning; i.e. based on research.
- Focus on producing STEM graduates- long-term potential for national impact is a factor in reviews.
- Three types: Type 1- local scope, Type 2- regional scope, Type 3- national scope

Contact: Don Millard dmillard@nsf.gov

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5741

Nanotechnology in Undergraduate Education (10-536)

\$ 200,000
2 years

NUE projects enable individuals and programs to integrate nanoscale engineering into their curricula.

- Interdisciplinary collaborations are an important element of the program.
- Projects should make a case for impact on students and explain how impact will be evaluated.
- International collaborations are encouraged.
- One proposal per PI and per institution- engineering only.

Contact: mpoats@nsf.gov

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13656

Human Resource Development

Research Experience for Undergraduates (09-598)

\$ No limit*
<5 years

Supports engaging undergraduate students in research through both sites and supplements.

- Research experience must be well defined with cohort learning experiences in sites.
- Special opportunities with DoD, DoE, international experiences, ethics, and RET program.
- Cross-cutting NSF program.
- Costs other than participant support are limited.
- Both sites (*) and supplements are available.

Contact: ebolding@nsf.gov

http://nsf.gov/funding/pgm_summ.jsp?pims_id=5517

Research Experience for Teachers (11-509)

\$ 500,000*
3 years

Supports development of K-12 & community college STEM teachers in research

- Provides summer support for teachers to engage in research.
- Successful proposals support development of participating teachers
- Costs other than participant support are limited.
- Available in ENG and CISE.
- Both sites (*) and supplements are available.

Contact: mpoats@nsf.gov

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5736

Cross-Cutting Programs

Broadening Participation Research Initiation Grants in Engineering (10-609)

\$ 175,000
2 years

Focus on initiating research projects that will broaden participation of under-represented groups

- Research Initiation Grant- no prior NSF funding allowed, minimal funding (< \$50K) from other sources.
- Opportunity to increase the diversity of researchers through research support early in their careers
- Encourages support of under-represented groups, engineers at minority-serving institutions, and persons with disabilities
- Supports synergy of research and opportunities to broaden participation of under-represented groups.

Contact: Omnia El-Hakim [oelehakim@nsf.gov](mailto:oelhakim@nsf.gov)

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503160

Integrative Graduate Education and Research Traineeship - IGERT (10-523)

\$ 3,000,000
5 years

Fundamentally transform graduate education in new interdisciplinary research areas.

- IGERT is a flagship NSF program addressing needs of the future in People and Ideas
- Funds graduate students and education, not research
- Intended to catalyze a cultural change in graduate education
- Facilitates graduate student development in addition to new knowledge generation.
- Facilitates diversity in student participation and preparation.

Contact: Melur Ramasubramanian ramasub@nsf.gov

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12759

Faculty Early Career Development- CAREER award (11-690)

\$ 400,000
5 years

Support and promote early career faculty in developing integrated research and education programs

- Development of new faculty with integrated research and education programs
- Foundation-wide activity
- NSF's most prestigious awards for teacher-scholars who most effectively integrate research and education

Contact: Cognizant Division Program Officer (see web site)

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503214

Questions?