

Research Initiation Grants in Engineering Education

- Enables engineering faculty who are renowned for teaching, mentoring, or leading educational reform efforts to initiate collaborations with colleagues in the learning and cognitive sciences to address difficult, boundary-spanning problems in engineering education
- ~\$3M for 20 awards
- Proposals due the last Thursday in March

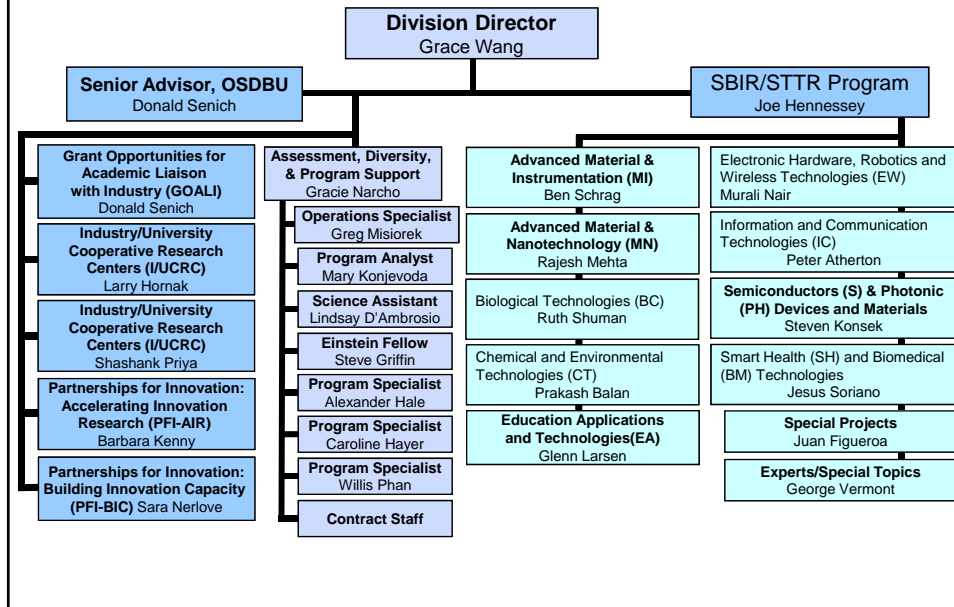
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Engineering Education Research

- Seeks to enable a system of engineering education, equally open to all members of society, that dynamically and rapidly adapts to meet changing needs. Research areas include:
 - 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 frameworks such as sustainability
 - Diversifying pathways to and through engineering degree programs

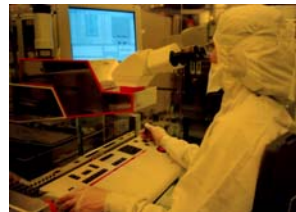
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Industrial Innovation and Partnerships(IIP)



Grant Opportunities for Academic Liaison with Industry (GOALI)

Synergize university-industry partnerships and fund transformative research that lies beyond that which industry would normally fund



Industrial scientists and engineers to universities

Faculty, postdoctoral fellows, and students to industry

University-industry teams to conduct joint research projects

Accelerating Innovation Research (AIR)

NSF funding lineage required

- **AIR choice 1: TECHNOLOGY TRANSLATION (TT)**
 - Proofs-of-concept and/or pre-commercial prototypes
 - Promote entrepreneurial thinking among faculty and students
 - Up to \$200k for 18 months

- **AIR choice 2: RESEARCH ALLIANCE (RA)**
 - Develop innovation ecosystem
 - Stimulate entrepreneurial & innovation activities
 - Up to \$800k for 3 years
 - Third party investment required

Building Innovation Capacity (BIC)

- **Platform technologies to enable customer-centered and market-driven "smart" service systems**
 - Potential to achieve transformational change

- **Academe-industry partnerships required**
 - Industry contribution of customer feedback and market knowledge to ensure relevance

- **Social behavioral and/or cognitive science component required** to understand the potential interaction of the technology with customers/users

- Up to \$800k for 3 years

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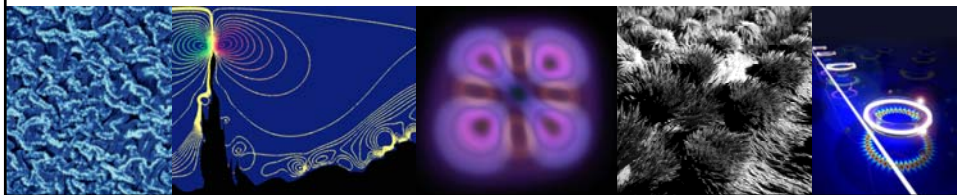
Industry/University Cooperative Research Centers (I/UCRC)

➤ **Mission:**

- To contribute to the nation's research infrastructure base by **developing long-term partnerships among industry, academe and government**
- To leverage NSF funds with industry to **support graduate students performing industrially relevant research**



ENG Investments and Crosscutting Programs



Advanced Manufacturing

National initiatives

- Advanced Manufacturing Partnership
 - National Robotics Initiative
 - Materials Genome Initiative
- National Manufacturing Institutes
 - Pilot institute for the National Network for Manufacturing Innovation (NNMI)

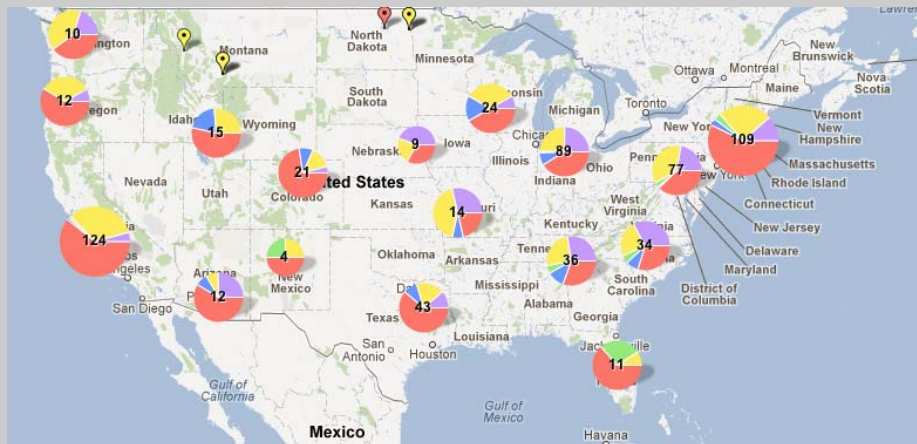
CMU



Rolls Royce

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The I-Corps Network

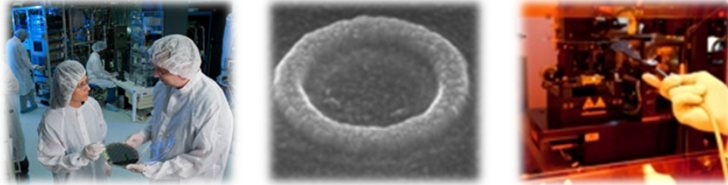


Program ● SBIR Phase II ● STTR Phase II ● STTR Phase I ● SBIR Phase I ● I-Corps MIT

Active SBIR/STTR Awards as of July 16, 2012 and All I-Corps Awards

Nanosystems Engineering Research Centers

- Three NSF awards of \$55.5 million (2012-2017)
- **Advanced Self-Powered Systems of Integrated Sensors and Technology**
 - North Carolina State University: self-powered wearable systems that simultaneously monitor a person's environment and health; links exposure to pollutants and chronic diseases.
- **Nanomanufacturing Systems for Mobile Computing and Mobile Energy Technologies**
 - UT-Austin: high-throughput, reliable, and versatile nanomanufacturing process systems and will demonstrate them through the manufacture of mobile nanodevices.
- **Transformational Applications of Nanoscale Multiferroic Systems**
 - UCLA: exploit nanoscale phenomena to reduce the size and increase the efficiency of components and systems whose functions rely on the manipulation of either magnetic or electromagnetic fields.



Credits, L to R: Marc Hall, NCSU; Joshua Leon Hockel, Mechanical and Aerospace Engineering, UCLA; Cockrell School of Engineering, University of Texas at Austin

Nanotechnology Infrastructure

- **Network for Computational Nanotechnology (NCN)**
 - Cyber Platform
 - NanoBIO Node
 - Nano-Engineered Electronic Device Simulation (NEEDS) Node
- **National Nanotechnology Infrastructure Network (NNIN)**
 - FY 2013 was year ten of this planned ten-year investment, re-competing this year

Earthquake Engineering Research and Research Infrastructure FY 2015-FY 2019



Award 0936505 (Hutchinson)

- National Science Board (NSB-08-16) requires large, multi-user facilities re compete
- NEES completes planned ten years of research and operations on September 30, 2014; current NEES operations awardee is Purdue University
- FY 2013: After two years of planning with community, NSF re competed NEES through NSF 13-537; anticipated outcome was one award; no award made
- FY 2014: NSF 14-054 Dear Colleague Letter informing community of revised plans
 - NSF 14-557, Decision Frameworks for Multi-hazard Resilient and Sustainable Buildings (RSB), broadening research into multi-hazards
 - New solicitation to be released summer 2014 (Natural Hazards Engineering Research Infrastructure (NHERI) FY 2015-FY 2019) to re compete NEES with added wind engineering component; outcome will be up to ten individual awards for coordination office, cyberinfrastructure, simulation center, and 7 experimental facilities
- FY 2015: Level support with better balance between NHERI and research support
 - NHERI awards to be made in FY 2015
 - Earthquake engineering components form the successor NEES as a subset of NHERI
 - NSF will support Purdue University to operate the NEES cyberinfrastructure during NHERI competition period until new cyberinfrastructure awardee made
 - Several CMMI research programs will reorganize to better realign with NHERI and multi-hazards research direction

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New Sustainability Research Networks (SRNs)

- NSF SEES SRN: Natural Gas Development and its Effects on Air and Water Resources
 - Led by the University of Colorado, Boulder
- NSF SEES SRN: Sustainable Climate Risk Management Strategies
 - Led by Pennsylvania State University

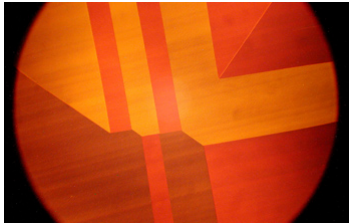


Credit: Alfred Eustes, Colorado School of Mines

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Optics and Photonics

- 2012 – NRC issued **Optics and Photonics: Essential Technologies for Our Nation**
- 2010 – ECCS award to National Academies
- 1998 – NRC issued **Harnessing Light: Optical Science and Engineering for the 21st Century**



Credit: *Integrated Photonics Inc.*

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CAREER

- Forward-looking program review is led by Pat Farrell, ENG Advisory Committee member
- NSF CAREER Coordinating Committee chair is Theresa Maldonado, ENG/EEC Division Director
- ENG award size increased to \$500,000
- Note: the CAREER award is not a research award, it is a career development award

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Ethics

- Persons submitting proposals to the Federal government are held to high standards of conduct
- Misbehavior can be dealt with quite severely
 - PI barred from submission to NSF up to 2 years
 - Permanently barred from proposal review
 - At least two cases of jail time (Grimes case, 42 months in Federal prison)
 - Maximum \$250,000 fine, 5 years in prison

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Major Forms of Misbehavior

- Plagiarism—uncited reproduction of the work of others
- Falsification—intentional misrepresentation of data or results (progress reports)
- Fabrication—making up data
- Double charges—billing the government twice for the same work

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Train and Verify

- Faculty and students should be trained annually—consequences should be made explicit
- Institutions need to perform oversight
- Institutions themselves need to operate in a culture of compliance

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Questions

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