Engineering Education and Centers Division

Gary A. Gabriele
Division Director
Outline

Current Programs

Where we’re headed
EEC Staff

Director
Gary Gabriele

Deputy Directors
Sue Kemnitzer, Lynn Preston

Senior Advisor
Bruce Kramer

Program Officers
Win Aung, Esther Bolding, Patrick Carriere, John Hurt, Sharon Middledorf, Vila Mujumdar, Linda Parker, Mary Poats, Don Price, Sohi Rastegar, Alex Schwarzkopf, Bob Norwood (NASA IPA)

Program Staff: Deborah Daniels, Greg Misiorek, Darlene Suggs, Shalika Walton, Susan Watson,
Role of EEC within ENG

Engineering Education and Workforce Development

Interdisciplinary Programs

Government, University and Industry Partnerships

Management of Large Projects
EEC Activities

Engineering Research Centers

Industry/University Cooperative Research Centers

Engineering Education and Human Resources

Partnerships for Innovation

Cooperative Programs
Engineering Education and Human Resources

• Engineering Education Program (35 awards) ($2.6 M)
  • Unsolicited program to increase quantity & quality of U.S. citizens who earn BS degrees in engineering

• Department-level Reform of Undergraduate Engineering Education (60 planning, 12 implementation) ($8.0 M)
  • Supports department & larger units to reformulate, streamline, and update engineering and engineering technology degree programs

• Research Experiences for Undergraduates (75 sites) ($6.6 M)

• Research Experiences for Teachers (12 sites) ($2.3 M)
Injected into newly paralyzed or weak muscles, the BION™, which is approximately the size of two rice grains, receives command signals from a flat rubber coil that a patient places over an affected area. The transmission coil causes the bionic nerve to produce electrical stimulation pulses that activate adjacent neurons. Precisely placed, the device enables target muscles to be strengthened and retrained through a patient's individualized exercise regimen. 

Credit: University of Southern California; National Science Foundation
Industry/University Cooperative Research Centers

- Advanced Electronics (5 centers)
- Advanced Manufacturing (2)
- Advanced Materials (7)
- Biotechnology (4)
- Civil Infrastructure Systems (3)
- Information and Communications (5+4)
- Energy and Environment (3+1)
- Fabrication & Processing Technology (9)
- Health and Safety (3)
- Quality, Reliability, & Maintenance (2)
- Systems Design and Simulation (1)

The University of Iowa (lead institution) and the University of Texas at Austin
Partnerships for Innovation

• Promotes innovation by bringing together colleges and universities, State and local governments, private sector firms, and nonprofit organizations. These organizations form partnerships that support innovation in their communities by developing the people, tools, and infrastructure needed to connect new scientific discoveries to practical uses.

18 Active Awards

“Enhancing the NE Ohio Biotech Sector”, Case Western Reserve
“Scanning Bodegas”, Polytechnic University
“Innovations in Aquaculture Feeds”, Southern Illinois University at Carbondale
Other programs we manage for ENG

- Nanoscale Science and Engineering Centers
- Integrated Graduate Education and Research Training
- Graduate Research Fellowship
- Centers for Learning and Technology
- Nanotechnology Undergraduate Education
- Nanoscale Interdisciplinary Research Teams
Research Challenges

• Skewing of the nation’s research priorities away from engineering and physical sciences toward life sciences.

• Erosion of the engineering research infrastructure.

• Perceived shift in funding from basic to applied by industry and federal mission agencies.

• Perception that industry is downsizing large corporate R&D labs in physical sciences and engineering.

• Engineering intensive mission agencies are focusing on more short-term research
Workforce Challenges

• Declining interest in science and engineering programs, particularly among women and minorities.

• Shifting demographics is reducing traditional pool of engineering students

• Math and science preparation at K-12 is lagging

• Aging engineering population

• Foreign nationals now are an uncertain source of talent
Where we’re going

• ERC Program
  • Reassess ERC program assumptions against current environment
  • Define future directions for ERC program

• I/UCRC Program
  • Similar assessment to ERC program
  • Increases to funding for center operations and fundamental research.
Where we’re going

• Workforce Development
  • Increase funding for RET and REU sites
  • Development of better mentoring programs for women and minority UGs, Grads, and faculty
Where we’re going

• Engineering Education
  • Emphasis on engineering education research versus curriculum reform.
  • Emphasis increasing the diversity in engineering education at all levels.
Thank you.