

ENGINEERING RESEARCH CENTERS

ERCs: History and impact

Continuing Efforts:

Award five new Gen-3 ERCs in fiscal year 2008

New Initiatives:

ERCs for EPSCoR States

ERCs: History and Impact

Industry, academe, and the White House joined in 1984 to ask the National Science Foundation to create the ERC program to join academe and industry in partnership to strengthen the competitive position of industry in a global economy. The partnership establishes cross-disciplinary centers focused on advancing fundamental knowledge and systems technology and providing a design and manufacturing experience for students. The aim is to produce graduates who are leaders in realizing innovation in industry.

A committee from the National Academy of Engineering (NAE) developed the goals and structure of the ERC program. NSF accepted the challenge, Congress provided a start-up budget of \$10 million, and the program issued its first solicitation in 1985. Since then, the sustained goal has been to support centers that provide a unique culture where faculty and students integrate research and education across disciplines and focus on a continuum of research from fundamentals to systems technology.

An ERC opens a unique dimension on campus that complements the disciplinary, basic science academic culture. The objective is to produce engineering graduates who are highly innovative and productive in industry. The ERC program gives them realistic engineering experience from design and “build,” through to proof-of-concept testbeds. This culture also serves to attract pre-college students to engineering, impacts the curriculum for undergraduate and graduate engineering students, and motivates engineering undergraduate students to complete their degrees and pursue graduate studies.

For example, the MIT Biotechnology Process Engineering (BPEC) ERC educated a cadre of graduates who were capable of speedily developing the processing technology needed to advance new pharmaceuticals. BPEC graduates were in place to produce the manufacturing technology for protease inhibitors, the anti-HIV Aids drug now saving lives around the world.

Examples of other ERC contributions are described in the Appendix, page 34.

Continuing efforts

Award Five New Gen-3 ERCs in Fiscal Year 2008

The ERC program started its third decade in fiscal year 2006 and, at the request of the fiscal year 2004 Committee of Visitors (COV), the program revised its goals to initiate the third generation (Gen-3) of ERCs. The Gen-3 ERCs will catalyze engineering schools to produce creative and innovative graduates who can successfully compete in a global economy. The goal of the ERC program is to build a culture that integrates discovery and innovation in a global economy by joining academe, industry and practitioners in partnership to:

- Advance fundamental knowledge and transformational engineered systems;
- Provide a model for engineering education to produce graduates who are leaders in innovation in a globally competitive economy; and
- Speed the translation of knowledge to technology and innovation through partnerships.

To achieve those goals, the ERC key features have been restructured as follows through ERC Solicitation NSF 07-521, which will establish five new Gen-3 ERCs in fiscal year 2008.

These new ERCs will:

- Have a stronger focus than current ERCs on combining fundamental research with research and education focused on innovation. The innovation focus will support small firms engaged in transformative research within the ERC's research program to speed innovation and expose students to the innovation process. Partnerships will include industry and practitioners, state and local government, or academic programs designed to stimulate entrepreneurship.
- Prepare students for success in the global economy, and may include a foreign university as a core partner. Support for the foreign university is to be provided by foreign sources.
- Operate strategically designed education programs to develop graduates who are experienced in the creative process and cross-cultural collaboration.
- Form long-term sustained partnerships with precollege educational institutions to attract more students to engineering. Partnerships will connect teachers and students in precollege institutions with students in ERCs to bring engineering concepts into the classroom and engage talented high school students in the ERC's research programs as Young Scholars. Thus the new ERCs will help to increase the enrollment and diversity of domestic students in engineering and science degree programs.

These goals were designed to align directly with the *American Competitiveness Initiative* goals to increase the number and quality of U.S. engineering and science graduates and also with the imperatives set down in the NAE's *Rising Above the Gathering Storm*.