Texas Engineering & Technical Consortium

Engineering an Innovative Future
Global Competitiveness of US Math and Science is on a decline

Scores above U.S.

- Norway 581
- Sweden 573
- (Russian Federation) 545
- (Denmark) 534
- (Slovenia) 523
- (Germany) 522
- (Australia) 518
- (Cyprus) 494
- Switzerland 488
- (Latvia) 488
- Greece 486
- (Canada) 485
- France 466
- Czech Republic 451
- (Austria) 435
- (United States) 423

Scores similar to U.S.

International average = 501

NOTE: Countries not meeting international guidelines are shown in parentheses.

SOURCE: Third International Mathematics and Science Study.

Advanced mathematics

- France 557
- (Russian Federation) 542
- Switzerland 533
- (Australia) 525
- (Denmark) 522
- (Cyprus) 518
- (Lithuania) 516
- Greece 513
- Sweden 512
- Canada 509
- (Slovenia) 475
- (Italy) 474
- Czech Republic 469
- (Germany) 465
- (United States) 442
- (Austria) 436

International average = 501
Global Competition: U.S. Being Outpaced in Number of Engineering Grads

# of Engineering Graduates

- China: 1.0%
- Europe (EU): 2.7%
- Japan: 5.8%
- U.S.: 1.8%
- India: 0.2%
- Taiwan: 4.3%

(%) = Percent of 24 year olds with engineering degrees

Source: National Science Board, “Science and Engineering Indicators – 2002”, Table 2-18
Global Competition: U.S. is Slipping

As other nations aggressively seek to surpass the U. S., our nation risks losing our legacy of innovation and global leadership.

- China graduates nearly four times the number of engineers as the U.S.
- European Union members award 2.5 times the engineering degrees as the U.S.  
  (Source: National Science Foundation, 2000 data)
- The number of engineering and science doctoral degrees from 1989-2001 grew:
  - 81% in the United Kingdom
  - 39% in Germany
  - Only 19% in the United States

- About half the advanced degrees in engineering and science in the U.S. are awarded to foreign nationals.  
  (Source: “Losing the Competitive Advantage,” American Electronics Association, 2005)
High Demand for Engineers and Scientists

To meet current job forecasts, we need to add **122,000** engineers and scientists every year for a decade

Source: Bureau of Labor Statistics, 2004

“Ensuring college readiness and workforce readiness must be one of the primary aims of education. With the undeniable march towards a global, technology-based economy, that means our secondary schools must place a greater premium on science and math education.” –Gov. Rick Perry
Out of every 100 9th graders in Texas:

- 62 graduate from High School in four years
- 32 enter college
- 19 are still in college during their second year
- 11 will graduate with an associate’s degree in three years or a bachelor’s degree in six years
- ONLY TWO WILL GRADUATE WITH AN ENGINEERING DEGREE
TETC History and Background

In 2001, a bi-partisan group of Texas legislators passed the Technology Workforce Development Act, establishing TETC and the Technology Workforce Development (TWD) grants program in response to requests by industry to increase engineering and computer science graduates in Texas.
TETC Purpose/Measurement

- **Purpose**
  - Increase both the quantity and quality of baccalaureate-level engineers and computer scientists
  - Foster cooperative relationships and activities involving industry and Texas-based institutions of higher education that offer engineering and computer science degrees

- **Measurement**
  - Texas Higher Education Coordinating Board tracks gains in enrollment and graduates
  - Includes tracking of underrepresented minorities and women
TETC Mission

- Meet the market demands for engineering and computer science graduates from participating schools in Texas.
- Improve the diversity of graduating engineers and computer scientists from participating schools.
- Increase collaboration between industry and higher education in Texas.
Who is Involved

Corporate Contributors:

AMD
AT&T
Applied Materials
Freescale Semiconductor
Freese and Nichols
Hewlett Packard
Intel
Lockheed Martin
National Instruments
National Semiconductor
Raytheon
Sabre International
SEMA TECH
Texas Instruments

34 Participating Universities:

Baylor University
Lamar University
Midwestern State University
North Texas State University
Prairie View University
Rice University
Sam Houston State University
Southern Methodist University
St. Mary’s University
Stephen F. Austin State University
Tarleton State University
Texas A&M University
Texas A&M University-Commerce
Texas A&M University-Corpus Christi
Texas A&M University-Kingsville
Texas A&M University-Texarkana
Texas Southern University
Texas State University-San Marcos
Texas Tech University
Texas Woman’s University
The University of Texas-Pan American
The University of Texas at Arlington
The University of Texas at Austin
The University of Texas at Brownsville
The University of Texas at Dallas
The University of Texas at El Paso
The University of Texas at San Antonio
The University of Texas at Tyler
The University of Texas of the Permian Basin
University of Houston
University of Houston-Clear Lake
University of Houston-Downtown
University of Houston-Victoria
West Texas A&M University

Texas Engineering and Technical Consortium
Proactive Solutions: Strength Through Collaboration

- TETC unites intellectual, financial and strategic resources to graduate more high-quality U.S. engineers and computer scientists who look like Texas, through:
  - Replication of Best Practices
  - Retention
  - Recruitment
  - Outreach
  - Diversity
  - Curriculum
Tangible Results: Helping Students

- From 2001-2006, TETC Technology Workforce Development (TWD) Grants benefited:
  - 18,200 high school students/teachers
  - 16,600 entering students
  - 19,000 progressing students
  - 9,000 advanced students
  - 3,100 graduated students

- TETC-TWD schools have increased the number of electrical engineering graduates by 49 percent since 2001.

- Computer science graduates have declined across the U.S. The number of graduates at TETC institutions have only declined by 6% compared to the national decline of 24%.
**Texas Engineering & Technical Consortium**

**Financials**  
(Updated January 1, 2008)

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry Cash</td>
<td>$4.18 million</td>
</tr>
<tr>
<td>Industry In-kind</td>
<td>$1.07 million</td>
</tr>
<tr>
<td>Federal Appropriations (DOE)</td>
<td>$3.78 million</td>
</tr>
<tr>
<td>Department of Labor</td>
<td>$10.25 million*</td>
</tr>
<tr>
<td>State Matching</td>
<td>$7.78 million</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$27.06 million</strong>**</td>
</tr>
</tbody>
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*Governor made possible to go through DOL grant program  
**Future commitments include $4 Million FY 2008
## Proactive Solutions: Where the Money Goes

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant Awards (Grants provided to Texas engineering and computer science programs)</td>
<td>$23.98 million</td>
</tr>
<tr>
<td>Cash Balance</td>
<td>$0.89 million</td>
</tr>
<tr>
<td>Industry In-Kind Contributions (Industry donations of lab equipment and software)</td>
<td>$1.07 million</td>
</tr>
<tr>
<td>Program Development</td>
<td>$0.70 million</td>
</tr>
<tr>
<td>Best Practices</td>
<td>$0.01 million</td>
</tr>
<tr>
<td>State Administrative Costs</td>
<td>$0.41 million</td>
</tr>
<tr>
<td><strong>Total TETC Grants</strong></td>
<td><strong>$27.06 million</strong></td>
</tr>
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Helping Students: Real Stories

“During my first semester at Texas A&M, I was unsure of what degree I wanted to pursue. I had just put ‘Computer Engineering’ down on my application to start school with a degree plan instead of simply general studies. That semester I took Introduction to Engineering 1, which was a class that had recently been modified through a TETC grant. Students were in pairs and given a robot kit. During the beginning of the semester we built the robot and did labs with it to better understand concepts from the lectures. Eventually we had a project in which we had to design the electronics for the robot to enable it to navigate through a maze.

“Growing up I have always been told to find a job with something you enjoy. I enjoyed working with that robot, and the electronics that went with it. If it weren’t for those hands-on labs dealing with the robot I could have easily been bogged down by learning the theory of electronics without applying it. Because of that freshman year project, I now look forward to graduating and have decided to stick with the tough course load.”

Denise Garrett
Junior
Texas A&M University
Computer Engineering

TETC
Texas Engineering and Technical Consortium
“As a freshman, I was struggling in school trying to juggle between my homework and an outside job at the same time. Luckily, I heard about the TETC program that our Electrical Engineering department had that would allow a student to work on campus in the engineering building part time under the condition that I would only be allowed to work 10 hours a week and could not obtain an outside job.

“At the beginning of sophomore year, I took a job as an assistant to a professor of the Electrical Engineering department. This allowed me to focus more on my studies and gave me the flexibility to make my working schedule fit around my school schedule. Also it gave me the opportunity to get to know some of the faculty of the department, and that helped me obtain a sense of belonging.

“Because of the program, I was able to improve my grades ... I obtained a job offer from Raytheon in the Dallas area and will begin work in August [2005]. ... I truly believe that a good amount of my success was because I had the time and the finances to stay focused and excel my studies due to the TETC program.”
University Responses to Why They are Involved

- Why Involved?
  - Money for schools/programs
  - Seeing an Impact
  - Benefits programs and students

“Obviously, engineering is the source of invention and production that drives the modern economy. Every product we enjoy is the result of the creative work of engineers. What is less known is that engineering is the most common first degree among Fortune 500 CEOs. Engineering graduates also go on to medical and law schools, and return for MBAs.”

“The fact is that we need to educate many more engineers than work in traditional engineering jobs, since so many of them use their engineering training as a foundation for other professions. Engineers are problem solvers, and people who are not afraid of problems are needed throughout our society.”

Dean Streetman
College of Engineering, The University of Texas at Austin
TETC Executive Committee Member
Industry Member Responses to Why They are Involved

- Why Involved?
  - Best practice models to increase engineering/computer science graduates
  - Good public policy
  - Public/Private partnership
  - Leverages resources

“To maintain our state’s technology leadership and economic growth, we must ensure a strong flow of highly qualified scientists and engineers from our universities and colleges in Texas. TETC is making significant progress identifying and addressing critical issues that will ultimately lead to more students graduating from our universities with science and engineering degrees.”

Ray Almgren, National Instruments
Chairman-TETC