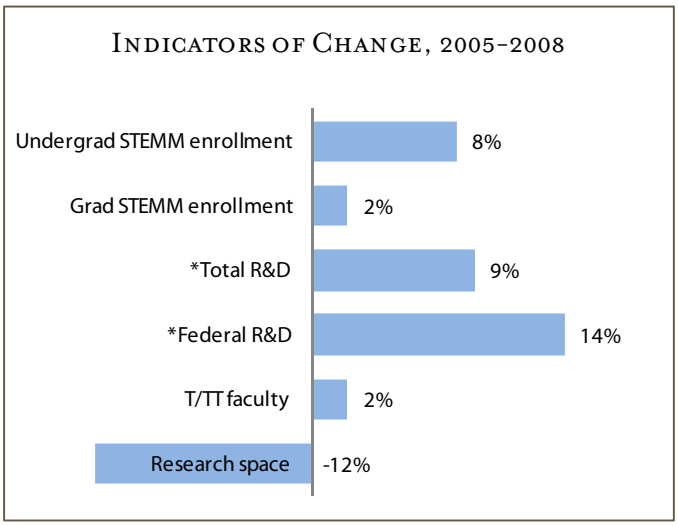
The University of Texas at Austin

The UT System has responded to the challenge set forth by the Rising Above the Gathering Storm (RAGS) report and has committed more than $440 million to strengthen competitiveness at UT Austin. The initial impact of these investments is presented here, organized according to the four critical elements described by RAGS: education, research and technology development, competitive capacity, and incentives.



STEMM = science, technology, engineering, math, and medical/health
* % Change, 2005-2007. Source: NSF.

UT Austin at a Glance

Student enrollment in STEMM, 2008	
Undergraduate (STEMM % of total)	13,961 (37%)
Graduate (STEMM % of total)	3,670 (34%)
New faculty recruited (2005-2008)	
STARs faculty recruited	49
ETF research superiority award recipients	7
Physical space (square footage)	
Teaching	1,992,000
Research	1,359,000
Increase in total sq. ft. through initiative	12%
New STEMM-related endowments (2005-2008)	$49 million
Research expenditures, 2008	$527 million
Federal research expenditures, 2008	$352 million
Intellectual property revenue, 2005-2008	$36 million
U.S. patents issued, 2005-2008	120
Licenses/options executed, 2005-2008	147
Start-up companies, 2005-2008	26

Education

UT Austin has used its resources in a wide variety of areas to meet the goals of the UT System Competitiveness Initiative. The institution has increased its academic physical space by 115,000 square feet, opening the door to changes in their educational curriculum. UT Austin established one new STEMM degree program—a Ph.D. in neuroscience—and is reforming their undergraduate curriculum across all colleges and schools at the university. A Center for Strategic Advising was established to assist students in developing purposeful educational strategies that will result in beneficial training and skills to best meet the students' life plans and goals.

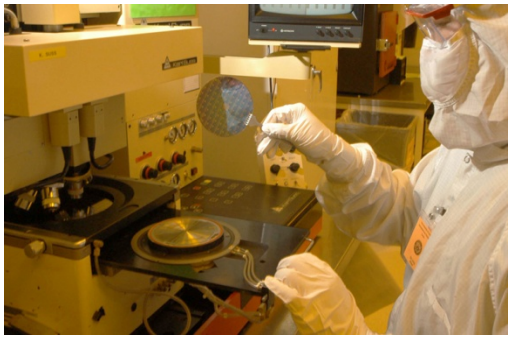
Approximately 1/3 of all undergraduate and graduate students enrolled at UT Austin major in science, technology, engineering, math, and medical/health fields.

UT Austin is focused on increasing educational opportunities in science, technology, engineering, math, and medical/health (STEMM) fields to overcome the workforce shortfall predicted in the RAGS report. Approximately one-third of all undergraduate and graduate students enrolled at UT Austin major in STEMM fields. Undergraduate enrollment in STEMM has increased by 8 percent at UT Austin since 2005, adding almost 1,000 new students, while overall undergraduate enrollment has increased by 3 percent. This growth trend in STEMM enrollment is greater than the 5 percent growth in undergraduate STEMM enrollment at all UT System academic institutions. Undergraduate student enrollment in nursing programs increased by 7 percent and enrollment in health professions increased 2 percent. These trends are less than the 9 percent nursing enrollment increase and the 6 percent increase in health professions enrollment at all UT System academic institutions.

Graduate enrollment in STEMM fields has increased 2 percent since 2005, adding an additional 73 students. This growth is larger than the overall graduate enrollment decline of 2 percent at UT Austin. The rate of increase at UT Austin is considerably less than the 9 percent increase of STEMM graduate students enrolled at all UT System academic institutions while graduate

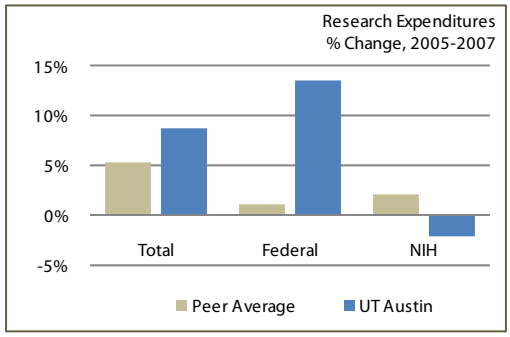
enrollment for all majors increased by 4 percent. Graduate student enrollment in nursing and health professions programs remained relatively stable, decreasing by six students (2%), and two students (3%), respectively. In contrast, enrollment increased at UT System academic institutions by 12 percent at both nursing and health professions programs.

Research & Technology Development



UT Austin is a state and national leader in solving problems through discovery and exploration and has the highest research activity of any academic university in the state of Texas. The university is consistently ranked in the top 25 public universities in the nation and is currently ranked 21st in research expenditures of all public institutions. UT Austin's research comprises 73 percent of the total research expenditures of all UT System academic institutions.

UT Austin has an impressive array of organizational divisions to generate quality research. More than 100 research units, with many centered at the intersection of traditional areas of science, enable UT Austin to lead discovery in emerging areas. Under the Competitiveness Initiative, UT Austin has made significant discoveries in biofuels, astronomy, nanotechnology, atomic physics, genetics, and social science.



Source: NSF, NIH.

Expertise in these leading areas of research is often benchmarked by the money spent to conduct the scientific investigations. Research expenditures at UT Austin exceeded one-half billion dollars in 2008, increasing 9 percent between 2005 and 2007, while national peers averaged a 5 percent increase. Research expenditures from federal sources increased 14 percent during the same time period while peers averaged a 1 percent increase. However, research expenditures from grants awarded by the National Institutes of Health (NIH) increased less than its peers: UT Austin decreased by 2 percent and peers reported a 2 percent increase. NIH funding has substantially increased at UT Austin more recently, which is expected to reverse the declines shown here for the near future.

The research projects related to the impressive climb in research expenditures often lead to breakthrough discoveries. One example is the use of algae as a cost-effective renewable fuel source. Organic Fuels Algae Technologies was formed to commercialize the oil production system developed at UT Austin's Center for Electromechanics. At the core of these technologies is a unique proprietary oil extraction technology that removes the oil from the algae by destroying the cell wall electromechanically. With an extraction unit targeted for completion by the end of 2009, commercial deployment is expected to be achieved within two to three years.

Another example is work produced by the Gulf Coast Carbon Center, the leading academic research group in the country testing carbon sequestration, the geological storage of carbon dioxide and possibly one of the best solutions to the problem of power plant emissions of carbon dioxide. Receiving more than $53 million in funding since 2007, the center conducted the country's first pilot test and now its largest overall test of carbon storage underground, in efforts being closely observed by Secretary of Energy Stephen Chu and others calling for expanded carbon sequestration research. Because the geology of Texas is outstanding for carbon sequestration, research from the center could help create a dynamic new industry in Texas for carbon storage in addition to having global impact.

U.S. Department of Energy named UT Austin as the location for two new Energy Frontier Research Centers with $30.5 million in total funding over five years. Both centers will collaborate with Sandia National Laboratories.

These two examples of potentially marketable products developed by UT Austin faculty demonstrate the institution's leadership role in energy research and development. The U.S. Department of Energy Office of Science recently

named UT Austin as the location for two new Energy Frontier Research Centers "to accelerate the scientific breakthroughs needed to build a new 21st-century energy economy." The centers are 2 of 46 centers named in 2009 and UT Austin is one of three universities to receive two centers (the others were MIT and Northwestern University). The first center, Understanding Charge Separation and Transfer at Interfaces in Energy Materials and Devices, will receive $15 million over five years allocated from the 2009 American Recovery and Reinvestment Act. The research will focus on nanostructured molecular materials for electrical energy storage and organic photovoltaic applications. The second center, Frontiers of Subsurface Energy Security, will receive $15.5 million over five years to study the movement or transport of carbon dioxide and other greenhouse gases in geological systems. Both centers will collaborate with Sandia National Laboratories.

Competitive Capacity

Competitive capacity, or the resources necessary to advance academic and research goals, is a fundamental building block for institutional activities. Resources include: world-class faculty, innovative buildings with advanced research laboratories and academic spaces, recognition programs to support faculty efforts, and interest from external donors.

Faculty Recruitment

Attracting top-caliber senior researchers who are internationally recognized for advanced breakthroughs in their fields leads to major innovations in discovery, development, and application of research. UT Austin has increased the number of tenured/tenure track faculty by 2 percent, or 29 people, since 2005.

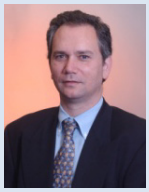
Thirty-five faculty members were recruited and seven were retained through the UT System STARs (Science and Technology Acquisition and Recruitment) Program in the departments of chemistry and biochemistry, chemical engineering, civil engineering, computer sciences, electrical and computer engineering, geological sciences, human ecology, linguistics, materials science and engineering, mechanical engineering, molecular cell and developmental biology, molecular genetics and microbiology, neurobiology, petroleum and geosystems engineering, pharmacy, physics, psychology, and sociology. STARs awards totaled $19.8 million to support these 42 faculty members.

In addition to the STARs Program, the Texas Emerging Technology Fund (TETF) supported two separate initiatives to attract world-class researchers to UT Austin. The first award for the Texas Nanoelectronics Research Superiority Initiative funded seven researchers at UT Austin, UT Arlington, and UT Dallas with a public-private partnership of $10 million from the TETF, $10 million from UT System, and $10 million from industry partners. Four researchers have been approved by the advisory board to join the faculty at UT Austin: Dr. Julian Cheng, Dr. Rodney Ruoff, Dr. Edward Yu, and Dr. Xiaoyang Zhu.

STARs Faculty Members of the National Academies

Dr. Richard Aldrich is Karl Folkers Chair in Interdisciplinary Biomedical Research II and professor of neurobiology. The $500,000 STARs award helped recruit Dr. Aldrich to UT Austin from Stanford University to continue his work in understanding electrical signaling in cells. Dr. Aldrich is a member of the National Academy of Sciences.

Dr. Robert Dickinson is professor of geological sciences and a member of the National Academy of Sciences, National Academy of Engineering, and a foreign member of the Chinese Academy of Sciences. Dr. Dickinson's was recruited from Georgia Tech to continue his research in climate modeling and change.



Dr. George Georgiou is Cockrell Family Regents Chair in Engineering No. 9 and professor of chemical and biomedical engineering. He is a member of the National Academy of Engineering and co-developed the leading protein therapeutic for treating inhaled anthrax. The $500,000 STARs award enabled Dr. Georgiou to continue his internationally recognized scholarship at UT Austin.

Dr. Jonathan Sessler is Rowland Pettit Centennial Professor in Chemistry. He is a member of the National Academy of Sciences and is a world renowned "molecular engineer," developing compounds for novel therapeutic or diagnostic agents. The $500,000 STARs award enabled Dr. Sessler to continue his internationally recognized scholarship at UT Austin.

Dr. William Press is the Warren J. and Viola M. Raymer Chair in Computer Sciences and Integrative Biology and a member of the National Academy of Sciences. The $1 million STARs award helped bring Dr. Press to UT Austin following his service as Deputy Laboratory Director at Los Alamos National Laboratory. Dr. Press was recently named to serve on the President's Council of Advisors on Science and Technology (PCAST).

The second TETF award funded the recruitment of three researchers to UT Austin for the Neuroscience Imaging Center. The center provides three different scientific approaches to visualizing the nervous system and nerve cell

function. Two faculty members—Dr. Kristen Harris and Dr. Max Snodderly—have joined UT Austin, and one more is currently being evaluated by TETF for approval.

Infrastructure

New construction and renovation of existing facilities to create state-of-the-art buildings provide educational and research possibilities that drive the competitiveness initiative. UT Austin faces challenges associated with its research facilities due to aging facilities and changing teaching and research requirements. To address this issue, UT Austin is currently developing a systematic plan for facilities enhancement and preservation and has made significant progress in space management capability. Physical research space has declined by 12 percent since 2005, losing 177,000 square feet even though the UT System Competitiveness Initiative has added or renovated more than 452,000 square feet of research space. Another 650,000 square feet will be added under the Competitiveness Initiative as current construction and renovation projects are completed. Specifically, the Competitiveness Initiative funded seven new and/or renovated facilities: expansion of the Applied Research Laboratory, the Biomedical Engineering Building, Dell Computer Science Hall, Dell Pediatric Research Institute, the Norman Hackerman Building, a vivarium, and renovations to the Robert A. Welch Hall.

Competitiveness Initiative Provides $420 million for Capital Projects at UT Austin

The Applied Research Laboratory (ARL) Expansion, named the McKinney Wing, Phase II, was necessary to maintain competitiveness for external research funding and qualified staff necessary to meet the lab's goals. The $3.5 million construction project is complete and was fully funded by research grants. ARL was established at UT Austin in 1946 as an organized research unit dedicated to improving the U.S. military's capability in applications such as acoustics, electromagnetic, and information technology. ARL's operating budget was $68 million in FY 2008.

The Biomedical Engineering Building provides six floors of space to consolidate the department of biomedical engineering previously housed in three separate facilities. Laboratory space will be provided for the department of medicinal chemistry and teaching laboratory space will be available for the department of biology. The first two stages of this $77 million project were completed and occupied in August, 2008. At the request of UT Austin, a third stage consisting of an additional 39,000 GSF of research and teaching lab space was added to the project in February, 2008, and will be completed in December 2010.

The Dell Computer Science Hall will add 132,000 total square feet of space in five floors plus a basement. The construction will include demolition of an outdated chilling station, which has been replaced by UT Austin as part of a separate project. The new $67 million project includes demolition of Taylor Hall and connecting the new building to the Applied Computational Engineering and Sciences Building.

The Dell Pediatric Research Institute will establish a pediatric health research institute in Austin. Combining UT Austin's core expertise in life sciences with the new Dell Children's Medical Center will establish Austin as a center of excellence for children's health and biomedical research. The $97 million project is complete, adding 150,000 gross square feet to the campus inventory, of which almost 100,000 will be designated for research purposes. The Dell Pediatric Research Institute is the first phase of development at The University of Texas Health Research Campus, a 15-acre property leased from the City of Austin within the 711-acre Robert Mueller Municipal Airport Reuse and Redevelopment Plan in East Austin.

The Norman Hackerman Building/ Vivarium/ Robert A. Welch Hall project will add approximately 287,000 gross square feet with modern, technology-enabled classrooms and undergraduate teaching laboratories critical to UT Austin's ability to continue to provide excellence in science education. The building will provide office and laboratory research space to recruit and retain faculty in critical academic initiative areas such as chemistry, neuroscience, computational biology, environmental sciences, pharmacy, and molecular and cellular biology. Included in the $175 million project is a vivarium of approximately 20,000 gross square feet that will be used to support research conducted in the Norman Hackerman Building. The project also includes Phase I renovations to approximately 50,000 gross square feet of Welch Hall for use as a modern chemistry teaching and research laboratory building.

Philanthropy to Support STEMM Initiatives

A compelling indicator of competitiveness is the institution's appeal to philanthropists who join its commitment to excellence. UT Austin raised $48.5 million in STEMM-specific endowments since FY 2005, including graduate fellowships, distinguished chairs to support faculty research, and student scholarships. More than $4.8 million is distributed for STEMM research and scholarships on an annual basis from these new endowments. STEMM-related allocations equal almost 60 percent of the total philanthropic distribution per year.

Charitable contributions will also support infrastructure related to the UT System Competitiveness Initiative. A total of $63 million in donations was raised to enhance physical research and teaching space, including $47 million for the Dell Computer Science Hall and $8 million each for the Dell Pediatric Research Institute and the Biomedical Engineering Building. These gifts match substantial investments allocated by the UT System Board of Regents, the State of Texas, external granting agencies, and UT Austin.

Since 2005, UT Austin has raised $48.5 million for endowments supporting science, technology, engineering, math, and medical/health fields. From these new endowments, almost $5 million is distributed annually for STEMM-related research and scholarships.

Faculty Awards

The faculty at UT Austin are often recognized for their exceptional leadership and significant contributions to their respective fields of study. The institution's competitive stature is enhanced by the recognition that these awards bring and the experiences that are then shared with students, colleagues, and the community. For example, five UT Austin faculty members have received MERIT (Method to Extend Research in Time) Awards from the National Institutes of Health, a true symbol of scientific achievement in the research community. MERIT awards are rare, offered to less than 5 percent of NIH-funded investigators, limited to those who have demonstrated superior competence and outstanding productivity in previous research efforts. MERIT awards provide investigators with long-term, stable research funding to foster their continued creativity without the burden of preparing frequent research grant proposals.

NIH MERIT Award Recipients

Dr. Kristen Harris, Professor of Neurobiology and expert in neuroscience imaging to understand the structural components involved in learning and memory.

Dr. Daniel Johnston, Director of the Center for Learning and Memory, Institute for Neuroscience, and Karl Folkers Chair in Interdisciplinary Biomedical Research. Dr. Johnston's expertise is in the use of imaging to understand brain function associated with memory.

Dr. Hung-Wen (Ben) Liu, Professor of Chemistry and Biochemistry, Professor of Pharmacy, and George H. Hitchings Regents Chair in Drug Design. Dr. Liu's research team studies the mechanisms of enzymes involved in biological processes and the engineering of biological pathways important to drug development.

Dr. Shelley Payne, Professor of Molecular Genetics and Microbiology and University Distinguished Teaching Professor. Dr. Payne is an expert in genetics and regulation of disease causing pathogens.

Dr. Wesley Thompson, Professor of Neurobiology and member of the Institute for Neuroscience and the Institute for Cell and Molecular Biology, is internationally recognized for his use of imaging to study the regeneration of nervous system connections, especially in the brain, following nerve injury.

Faculty at UT Austin are recognized by other prominent agencies for their outstanding research. Since 2005, the National Science Foundation has also awarded more than 50 junior faculty at UT Austin with a prestigious CAREER award, providing grant funding to those who effectively integrate innovative education and research. Five faculty have been invited into the National Academy of Sciences, eight into the National Academy of Engineering, seven into the American Academy of Arts and Sciences, and three into the American Academy of Nursing. The American Association for the Advancement of Science has named nine Fellows from UT Austin during this time, deeming their work toward the advancement of science or its applications as "scientifically or socially distinguished." These are just a few examples of the awards bestowed upon UT Austin faculty; many more examples of exceptional work can be found in institutional reports.

U.S. President George W. Bush presents C. Grant Willson with a National Medal of Technology and Innovation during an East Room ceremony at the White House on September 29, 2008, in Washington, D.C. (Photo by Alex Wong/Getty Images North America)

The National Medal of Technology and Innovation, the highest U.S. honor for science and technology, was awarded to Dr. C. Grant Willson, Rashid Engineering Regents Chair of Chemical Engineering, by President George W. Bush in 2008. Dr. Willson's work has transformed the competitiveness of the microelectronics industry by inventing materials and techniques to efficiently manufacture smaller microelectronic components.

Incentives

Various Systemwide initiatives and institutional programs provide additional incentives to excel in science, technology, engineering, math, and medical/health. The UT System's Chancellor's Entrepreneurship and Innovation Awards recognized Drs. C. Grant Willson and S. V. Sreenivason for their work in nanomanufacturing and step and flash lithography. Dr. Willson joined UT Austin in 1993 and is the co-author of more than 300 journal publications, several books, and is co-inventor on more than 25 issued patents.

The UT System Texas Ignition Fund has funded projects to commercialize five inventions at UT Austin:

- An algae biofuel extraction process
- Engineered skin substitutes that could be used in the treatment of diabetic foot ulcers, chronic leg ulcers, and burns
- Next-generation solar cells through a novel method for seeding the growth of semiconductor nanoparticles into a conducting polymer matrix
- Power systems for medical devices (collaboration between UT Austin, UT Health Science Center-San Antonio, and UT San Antonio)
- Ultrafast laser scalpel with imaging that could allow diagnosis and removal of small skin cancer lesions during a single outpatient procedure