The greatest transfer of intellectual property happens on graduation day when UT engineers go to work. The Cockrell School of Engineering is currently ranked 8th among graduate programs and 10th among undergraduate programs by U.S. News and World Report. Yet one of the world’s leading engineering programs is training tomorrow’s leaders in exhausted and overcrowded buildings. In the Department of Electrical and Computer Engineering, faculty and students are pioneering technology in a 50-year old building that is not equipped to maintain basic computing needs. We have a responsibility to provide the lab and learning spaces to unleash their highest potential, fueling groundbreaking discoveries and lasting economic impact. By building the EERC, our students and faculty will have a facility worthy of their talents.
ECE RESEARCH NEIGHBORHOODS

Center for ECE Research .............................................. $20 million

SOUTH TOWER, LEVELS 3-7

The most prominent naming opportunity in the ECE Department will be all of the research laboratories and offices in the South Tower. The space will be home to seven research neighborhoods outlined below.

Microelectronics & Nanotechnology Research Neighborhood . . . $1 million

SOUTH TOWER, HALF OF LEVEL 3

From the energy we consume to the food we eat and the products we use, nanotechnology and microelectronics research are affecting the entire human experience. Currently our researchers are exploring integrated photonic crystal devices for optical information processing, nanostructure device modeling for transistor structures, nanotechnological advancements in photovoltaics, nanoparticle use in organic devices and materials such as graphene, developing micro- and nano-scale solid-state platforms to analyze biological systems for biotechnology and medicine. This research neighborhood will be home to our top six faculty from our Microelectronics Research Center and their numerous, talented graduate students. Breakthroughs in their studies have potential to affect chip design and manufacturing, consumer and professional electronic devices, cancer and disease treatments, along with military and defense operations. In recognition of the Cockrell School’s strength in this area, the National Science Foundation just awarded a $18.5 million five-year grant to create the Nanomanufacturing Systems for Mobile Computing and Mobile Energy Technologies (NASCENT). A team of professors will develop innovative nanomanufacturing, nanosculpting and nanometrology systems that could lead to versatile mobile computing devices such as wearable sensors, foldable laptops and rollable batteries.

Solid State and Plasma Electronics Research Neighborhood . . . $1 million

SOUTH TOWER, HALF OF LEVEL 3

Complementary and similar to the research being conducted in the Microelectronics and Nanotechnology Neighborhood, UT ECE professors in our Solid State and Plasma Electronics Neighborhood are creating breakthroughs in solar cell technology, biotechnology, scan-pro microscopy, high energy laser advancements and more. Their work will affect how we heal ourselves in hospitals, how we interact with our world via consumer electronic devices, and how we are protected from national threats across the globe. Professors like Dr. Nan Sun are working on creating low-cost medical imaging systems that could potentially transform the industry while Dr. Gary Hallock and his graduate students are exploring the limits of plasma science. Other investigations include quantum transport studies of double barrier heterostructures, components for very-high-speed communications and computation, and high energy laser applications in materials synthesis and processing. Much is yet to be discovered in these fields and our UT ECE faculty are leading the way.
The Integrated Circuits and Systems Group (ICSG) is one of the most active circuit design groups in the country with a young and creative faculty who are world leaders in their fields. The impact of this research is as diverse as the products that use modern chips. Research includes digital, analog, mixed-signal, and RF CMOS ICs for a variety of applications. Key professors like Ranjit Gharpurey’s research to improve the design of transceivers and frequency synthesizers used in narrowband and broadband wireless systems have far-reaching implications, affecting the lifespan, the security, and minimizing frequency disturbances. Verification processes and testing techniques by Professors like Jacob Abraham have already been implemented into industry and he continues to be a leader noted by Thomas Reuters as one of the most cited researchers in the world.

Both professors cite the ability to attract top graduate students as a reason they love being at UT ECE. The research, the talent, and the facilities all play into rankings. Top talent only go to top ranked programs. Without adequate facilities, UT ECE is at a grave disadvantage to maintain its rankings, putting the livelihood and reputation of the Austin “Silicon Hills” at risk as well.
The Computer Architecture and Microprocessors Research Neighborhood ............................................ $1 million

**SOUTH TOWER, HALF OF LEVEL 5**

As current research becomes reliant on the analysis of large data sets, Computer Architecture and Microprocessors provide the toolkit for modern day scientists. No breakthrough in any of society’s grandest challenges would be possible without advances in computer architecture and microprocessor research. Still yet, the activity of our day-to-day lives have now become dependent on improvements to the design and interfaces both in hardware and software. Currently, twelve professors and researchers are exploring work in this area from investigations into parallel computer architecture and processing, internet router architecture, to the latest implications in computer engineering. They are joined by approximately 100 graduate students every year. Professors will be working in this research neighborhood to develop the next leap forward. In 1985, a UT professor and his graduate students introduced HPS, a wide-issue, out-of-order processor that implemented precise exceptions. In 1991, this professor and a graduate student introduced the two-level dynamic branch predictor. Elements of both are now used in some form by every high performance microprocessor. It is hard to predict the future but our engineers in this research neighborhood will be working on it.

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Electromagnetics, Antennas, and Acoustics Research Neighborhood ................................. $1 million

**SOUTH TOWER, HALF OF LEVEL 5**

UT ECE researchers in the Electromagnetics, Antennas, and Acoustics Research Neighborhood continue to expand our knowledge in this important and deep-rooted area of study. This includes the study of wave propagation ranging from ultralow frequencies to microwaves. It involves investigations of electrical geophysics, antennas and scattering, radar target identification, wireless communications, microwave and millimeter-wave integrated circuits, and guided wave devices and systems. The activities in acoustics involve research in transducers, atmospheric and underwater acoustics, and noise vibration control. There are 14 full-time faculty in this area and numerous graduate students. Recently Assistant Professor Andrea Alù gained international attention for his work making a three-dimensional object invisible from all angles for the first time using a technique dubbed “cloaking”.

*Example of Research Neighborhood in the EERC*
Wireless Networking and Communications Research Neighborhood. ........................................ $3 million

SOUTH TOWER, LEVEL 6 AND HALF OF LEVEL 7

With leadership from Dr. Robert Heath, UT’s interdisciplinary Wireless Networking & Communications Group (WNCG) is fast becoming the foremost group of its kind in the nation. In 2006, a team led by Professor Jeff Andrews beat out UC Berkeley and MIT for a major multi-million dollar grant to develop information theory for mobile ad-hoc networks for DARPA, putting our young WNCG on the map.

Our 20 faculty members are gaining momentum, attracting top faculty and graduate students from around the world. We recently just announced the addition of Dr. Alex Dimakis, whose pioneering work at USC on algorithms for computation and communication in large system distributed systems will complement the current research of our WNCG. Current research projects are diverse and applicable, relating to improvements in the fields of networking, communications, signals, and systems. It includes:

- Analysis and synthesis of systems and the processing of information for the purposes of identification, communication, control, and security.
- Heterogeneous cellular networks.
- Linear and non-linear systems and modeling techniques.
- Analysis, simulation, and experimental research on information theory, digital communications, wireless communications, digital signal processing, antennas and propagation, ad-hoc and sensor networks, queuing theory, stochastic processes, probability, networking control theory and active networks, optimization, nonlinear systems, estimation, and signal, image, and video processing.

While our vibrant and enthusiastic professors are making their mark in the industry, it is their drive and passion to enable the human desire to communicate that separates them from their peers. Breakthroughs in wireless and mobile technologies by our WNCG will continue to affect the way we share and access knowledge for generations to come.

Power and Energy Research Neighborhood. .......................... $1 million

SOUTH TOWER, HALF OF LEVEL 7

After witnessing the massive effects of the 2012 India Blackout where over 600 million people were left without power for days and the economy ground to a halt, the relevancy of research in the area of Power & Energy becomes apparent. As brownouts and rolling blackouts have become common phrases in our society, the United States is no stranger to the challenges of supplying an ever growing demand for reliable energy. Researchers and adjunct professors from industry working in Power & Energy at UT ECE are focused on addressing issues of power quality solutions through simulation and modeling, efficient electrical energy conversion and storage, optimization of renewable and alternative energy, economic theory applied to electric power system operations, public policy and technical issues associated with electric transmission under deregulation, the robustness of the electricity system subject to terrorist interdiction and natural disasters, energy efficiency and demand side management, electromechanical devices for pulsed power applications, and advanced electrical machines.

Through partnerships with the National Renewable Energy Lab and major utility companies our researchers are addressing these issues and more in relation to real world practices. Our society must transform how it interacts with and consumes energy sources in order to continue the technological progress made in the 20th century. At UT ECE our researchers are focused on moving next-generation energy technologies to the forefront of the 21st century.
IN CLOSING

Be part of a transformative facility that will drive our country’s economic growth by fostering groundbreaking discoveries. The EERC project will cost $310 million with two-thirds coming from the UT System Board of Regents, The University of Texas at Austin and/or the State of Texas. The Board of Regents has committed $105 million in Permanent University Fund (PUF) bond funding, and in August 2012 the Board approved the building design – a significant milestone. Unlike the past, state universities nationwide now need support from the private sector for new facilities. The last step for the EERC to become a reality is for the Cockrell School to finish raising $105 million, about 1/3 of the project cost, in donations from individuals, foundations and corporations. Depending on fundraising progress, the construction could begin in 2013, and faculty and students could move into the EERC by 2017. There will be a multitude of opportunities to recognize gift commitments while the building is under construction, and once the building is open, donor names will be permanently and prominently displayed. Please keep in mind that commitments to UT are payable over five years. A gift in support of UT Engineering will be a gift of lasting power, one that will transform UT today and the world tomorrow.

*For questions regarding the EERC, please contact Maureen Brown at (512) 471-9888 or mbrown@austin.utexas.edu.*
In addition to naming the South Tower, there are seven ECE research neighborhoods available for naming. By naming a highly visible space in the EERC, donor names will be seen daily by thousands of students, faculty, alumni, corporate recruiters and industry executives.
RESEARCH NEIGHBORHOOD DONOR RECOGNITION

ABC COMPANY
WIRELESS NETWORKING & COMMUNICATIONS RESEARCH NEIGHBORHOOD

Elevation - Level 6 South Tower (shown as typical)
scale: 1/4" = 1'-0"