TEXAS TECH UNIVERSITY
Department *of* Electrical & Computer Engineering™

Fall 2012 Texas Tech University - Edward E. Whitacre Jr. College of Engineering

Message from the Chair

Giesselmann

Dear friends, colleagues, and alumni:

I am pleased to share with you some exciting news from the Department of Electrical and Computer Engineering (ECE).

Texas Tech received official notice in May that it has met the necessary criteria and is now eligible to receive a share of the state's National Research University Fund (NRUF). Texas Tech received $7.877 million from NRUF in early June. Additional funding will come each year in the future. Inclusion to the fund moves the university a step closer toward its ultimate goal of becoming a nationally competitive research university.

The department is home to approximately 450 undergraduate students complemented by approximately 175 graduate students. We currently have 24 full time faculty, four instructors, and five full time staff members. I have been privileged to lead the department since September 2010, assisted by Dr. Brian Nutter, associate chair for undergraduate studies, and Dr. Richard Gale, associate chair for graduate studies.

Our graduate programs are ranked 65th in the Computer Engineering category and 69th in the Electrical/Electronic/Communications category by U.S. News and World Report. The department's host college, the Whitacre College of Engineering, is one of the Wall Street Journal's Top 25 schools that produce the best graduates, according to recruiters for the nation's largest public and private companies, non-profit organizations and federal agencies. The college is named for Edward E. Whitacre Jr., who graduated from Texas Tech with a degree in industrial engineering in 1964 and is former chairman of the board and CEO of General Motors Company and former chairman, CEO, and president of AT&T.

The department is very fortunate to have a total endowment of 3.2 million dollars for student scholarships through a generous donation of approximately $1.7 million from the estate of Dr. Richard Saeks, who was a former ECE faculty member.

Our faculty members have been very active in research endeavors. To support these activities, the faculty has been able to attract more than $8.3 million in external research grants for FY 11. For current updates please visit our website http://www.depts.ttu.edu/ece/ often, and of course you are always welcome to visit in person.

Dr. Michael Giesselmann, P.E.
Professor and Department Chair

The Llano Estacado RoboRaiders FIRST® Robotics Team 1817 won five awards at the FIRST® Robotics Competition in Dallas.

Llano Estacado RoboRaiders Score Big at Regional Competition, Advance to Nationals

The Llano Estacado RoboRaiders FIRST® Robotics Team 1817 won five awards at the FIRST® Robotics Competition Dallas Regional on March 31, 2012.

The team, mentored by Texas Tech engineering students, advanced to the FIRST Championship held in April, in St. Louis, Mo.

The team won the Regional Chairman's Award, the Engineering Excellence Award sponsored by Delphi, and the Industrial Safety Award sponsored by Underwriters Laboratories. Travis Ray, a Texas Tech graduate electrical engineering student, received the Woodie Flowers Finalist Award and Kenyan Burnham, a senior at Lubbock High School, won the Dean's List Finalist Award.

This is the first time the team has won the prestigious Woodie Flowers Finalist Award and Regional Chairman's Award. Since its founding in 2005 by two undergraduate Texas Tech engineering students, the team has quadrupled in size and has matured in all aspects of starting, funding, and growing an education-based competition team.

The RoboRaiders include students from Texas Tech University, Lubbock High School, Coronado High School, Frenship High School, Levelland High School, Southcrest Christian School, and home school students.

The team received this year's challenge, "REBOUND RUMBLE™" and a kit of parts made up of motors, batteries, a control system, a PC and a mix of automation components – but no instructions.

Undergraduate and graduate student mentors, working with high school students from Lubbock and surrounding communities, had six weeks to design, prototype, trouble shoot, and build a robot that can play basketball. Balls scored in higher hoops score teams more points in the two-minute and 15-second match. Bonus points are awarded for each robot that can balance on bridges at the end of the match. Competitions measure the effectiveness of each team's robot and the students' ability to collaborate effectively.

Student News

Laity Receives Outstanding Student Award


Laity

George Laity, a doctoral student conducting research in the Center for Pulsed Power and Power Electronics, was named the recipient of the Tom R. Burkes Award at the 2012 IEEE International Power Modulator and High Voltage Conference in San Diego, Calif. This award was established to recognize contributions by a graduate student in engineering, science, or technology associated with power modulation, power electronics, or repetitive pulsed power.

He was also selected as a 2012-2013 Graduate Directed Energy Scholar by the Directed Energy Professional Society (DEPS). This award offers partial scholarships of $10,000 for the school year. Laity was the first student from Texas Tech to receive this scholarship when he received it previously in 2010.

Laity is conducting research this summer as a visiting scientist at the Air Force Research Laboratory (AFRL) Directed Energy Directorate at Kirtland Air Force Base.

Beeson Receives SMART Scholarship


Beeson

Sterling Beeson, a doctoral student, has been awarded a scholarship from the Science, Mathematics And Research for Transformation (SMART) Scholarship for Service Program from the Department of Defense.

The SMART program is an opportunity for students pursuing an undergraduate or graduate degree in Science, Technology, Engineering, and Mathematics (STEM) disciplines to receive a full scholarship and be gainfully employed upon degree completion.

Participants in the SMART Scholarship for Service Program receive a scholarship that pays for full tuition and education related fees, a cash award paid at a rate of $25,000 - $41,000, paid summer internships, health insurance reimbursement, book allowance, mentoring, and employment placement after graduation.

Beeson is conducting his graduate research on high power microwave breakdown in the Center for Pulsed Power and Power Electronics.

Texas Tech Hosts "Get Excited about Robotics" Competition

More than 500 robots motored onto the Texas Tech University campus in April for a fun robotics competition. This event, Get Excited About Robotics (GEAR), invites elementary and middle school students to compete in an eight-week challenge that involves programming LEGO robots to do a series of tasks.

"Their goal is to inspire future generations to consider a career in engineering, science or technology," said Dr. Tanja Karp, associate professor of electrical and computer engineering.

Karp has organized the competition since 2006, when it was merely a trial run held at Harwell Elementary School. It has grown since then. For the past five years, Texas Tech has served as a local GEAR hub for the competition in Lubbock.

The theme this year was "Power Up," in response to corporate sponsors, Halliburton and Alpha Industries. More than 500 students from 50 schools around the Lubbock area and across the South Plains participated.

"Through participation and LEGO Mindstorms NXT kits, the students learn robot design and programming, problem solving, the application of math and physics," Karp said.

One of the student mentors who assisted was Megan Nicole Conway, a junior mechanical engineering major from Plano. Conway said she is happy to share her love of science with children who may one day follow her into the engineering field.

"I got involved through a service learning course and mentor for an hour a week at the schools," she said. "It's fun to see them get excited when a robot does what they want it to on this eight-foot-by-eight-foot field."


GEAR

Faculty News

Department Hosts Research and Engineering Apprenticeship Program


Bayne

The department is pleased to be the host of an Army Research and Engineering Apprenticeship Program (REAP) for a second summer.

Led by Dr. Stephen Bayne, an associate professor, the program provides opportunities for high school students, including underrepresented groups, to gain hands-on work experience in scientific research and development programs on a university level.

The program pushes students to enhance their knowledge, and continue their education in the STEM (Science, Technology, Engineering, and Math) fields.

REAP is managed by the Academy of Applied Science through funding contributed by the Army Research Office and sponsors around 120 students at over 50 universities in the nation annually.

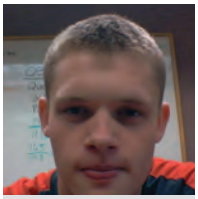
In its first year the REAP students developed a care robot equipped with a skeleton tracking Kinect camera that had the capability of moving with medical patients.


Anderson

Texas Tech's 2012 REAP students designed a quad-copter that has the capability of recording video and streaming the live video feed to an Apple iPhone.

The average unmanned aerial vehicle used in the military is not optimized to help in close combat, unable to hover, and cannot be deployed in a timely manner. The quad-copter is capable of performing all these tasks. Using commercially available technology, a better system of airborne surveillance can be achieved through the integration of quick retrieval of vital information. The students factored in the weight of the payload, wind resistance, and the ability to keep a steady flight attitude.


Gollahon


Mortensen

With the students' knowledge and support provided by Texas Tech professors, mentors, and graduate students, their device recorded ground video and provided an excellent learning experience.


White

Participants in the 2012 program included Roy Gollahon, a recent graduate from Heath Careers High School in San Antonio; Jeff Anderson and Jace Mortensen, seniors at Frenship High School in Wolfforth, Texas; and Exree White, a senior at Estacado High School in Lubbock.

Neuber Elected Fellow of IEEE


Neuber

Dr. Andreas Neuber, AT&T Professor of Electrical and Computer Engineering, was recently elected as a fellow of the Institute of Electrical and Electronics Engineers (IEEE).

He was elected for "Contributions to the physics of dielectric surface flashover in high electric fields." The award was presented at the 2012 IEEE Power Modulator and High Voltage Conference in San Diego.

Karp Receives Harriett B. Rigas Award from the IEEE Education Society


Karp

Dr. Tanja Karp, an associate professor, recently received the Hewlett-Packard/Harriett B. Rigas Award from the IEEE Education Society. The award recognizes outstanding female faculty members who have made significant contributions to electrical and computer engineering education.

Karp was also named this year's Butler Distinguished Educator Fellow of the college.

Jiang and Lin Receive $2 Million Grant from Army Research Office


Jiang

The Center for Nanophotonics at Texas Tech, led by Drs. Hongxing Jiang and Jingyu Lin, has been awarded a $2 million grant from the High Energy Laser Multidisciplinary Research Initiative program supported by the High Energy Lasers-Joint Technology Office and Army Research Office.


Lin

In this five-year research program, novel gain materials will be developed for next generation solid-state high-energy lasers. These materials and devices are likely to become parts of solutions of a wide variety of problems ranging from improved efficient lighting for energy savings, energy generation, detection of nuclear agents, missile defense, to communications. Since 2008, the team has secured a total of $9 million in competitive federal research funding to Texas Tech.

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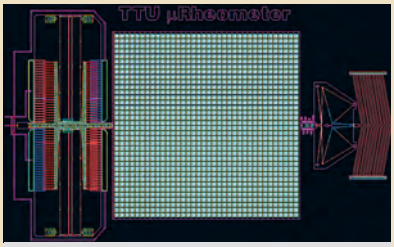
STEM Outreach

Students Win "Novel Design" Category at Sandia National Laboratories MEMS Contest



Texas Tech MEMS Device

Texas Tech students won the "Novel Design" Category for the third straight year at the Sandia National Laboratories MEMS Student Design Contest. Teams from Texas Tech have been winners in the competition in six of the last eight years.

Student researchers presented their microelectromechanical system (MEMS) designs to the scrutiny of Sandia engineers. Sandia National Labs hosts an annual MEMS design competition for their University Alliance member universities. Texas Tech won the Novel Design category for a microscale rheometer that is 1.2 mm x 2.0 mm.

Rheometers are used to measure material properties. The microscale device incorporates an electrothermally actuated microstage and an integrated capacitance measurement structure to allow more efficient and effective quantification of biological materials and technologically relevant thin films. The Texas Tech MEMS group, led by Dr. Tim Dallas, associate professor of electrical and computer engineering, teamed up with Dr. Gordon Christopher, assistant professor of mechanical engineering, and his research group to produce the winning design. The students that contributed to the design submission included electrical and computer engineering students Gautham Ramachandran and Ashwin Vijayasai, as well as mechanical engineering student Zhenhuan Zhang.

Alumni News

Watson Named Distinguished Engineer and President of ABET


Watson

Dr. Karan Watson was named a Distinguished Engineer of the Whitacre College of Engineering in 2012. She is provost and executive vice president for academic affairs at Texas A&M University. She is currently president-elect for ABET and will serve as the president for ABET from October 2012 until October 2013.

Watson graduated from Wichita Falls High School and then earned a Bachelor of Science in 1977, a Master of Science in 1981, and a Doctor of Philosophy in 1982, all in electrical engineering from Texas Tech.

She joined the faculty of Texas A&M University in 1983, eventually serving in associate dean positions in the Dwight Look College of Engineering from 1991 to 2002. She worked in the provost's office in associate provost, vice provost, and interim positions from 2002 until 2011.

Watson is a fellow of the Institute of Electrical and Electronic Engineers and the American Society for Engineering Education. Her awards and recognitions include the U.S. President's Award for Mentoring Minorities and Women in Science and Technology, the American Association for the Advancement of Science mentoring award, the IEEE International Undergraduate Teaching Award, the College of Engineering Crawford Teaching Award, and two University-level Distinguished Achievement Awards from The Texas A&M University Association of Former Students—one in Student Relations in 1992 and one in Administration in 2010.

Keeping in Touch

The Texas Tech Department of Electrical and Computer Engineering would like to know what is happening in your professional life. Visit the following website to update your information or let us know about your accomplishments: **www.coe.ttu.edu/info**