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On the cover: Post-doctoral student Robert McIntosh and Master’s graduate student Debabrata Mazumder using a Doppler vibrometer to measure vibration in electronic materials.
Engage, collaborate, and grow. These are the words we live by during this season of ongoing transformation. In this edition of the bi-annual departmental news, you will find our students, faculty, and staff engaged in a variety of academic and professional activities, collaborating with academic, governmental, and industry partners, and expanding our global presence.

In May 2014, fourteen student senior design teams from the department participated in the newly created college event, named Technology Symposium, where students proudly displayed their year-long hard worked engineering projects to over five hundred attendees from industry, government, and local high schools. Many of these projects have been sponsored by partners from industry and government organizations, providing our students opportunities to gain firsthand experiences working with engineers and scientists from the beginning design stage to the final technology delivery phase. Groundbreaking technology from one of these projects, developing a three-dimensional camera, has been patented, and adopted, by a local company and will be integrated into future commercial products. The department once again hosted a National Science Foundation sponsored Research Experiences for Undergraduates (REU) program on computer engineering, witnessed over 69 students publishing and making presentations through professional societies, and applauded its student organizations as they ramped up their engagement activities, including peer-to-peer tutoring at the newly established Electrical and Computer Engineering Learning Lounge (ECELL).

The department celebrated honors and recognitions received by several of its faculty members – Dr. Agaian, IS&T Fellow; Dr. Guo, IEEE Fellow; Dr. Jamshidi, IEEE Career Achievement Award; Dr. Pack, Professor of Emeritus from the United States Air Force Academy; and Dr. Wang, the William M. Portnoy Award. We welcomed three new faculty in the areas of communications and undergraduate education, strengthening the faculty body that includes eight professional society fellows, three NSF Career Award winners, and two state-wide and national teaching awardees. We plan to hire three more tenure-track professors and two additional research assistant professors in the areas of computer engineering and cloud computing during the coming year, which will increase the department faculty to 31 full-time professors. Over the course of the year, three new staff members joined the department, supporting the continuous efforts to enhance the programs and operation of the department.

During the past summer, a new integrated Bachelor of Science and Master of Science program in Electrical and Computer Engineering, we have been preparing for, was approved by the University of Texas system and Texas Higher Education Coordinating Board. We are excited about its potential to assist us in recruiting more of our undergraduate students to pursue graduate degrees. The enrollments in both undergraduate and graduate programs continued to grow to over 500 and 230 students, respectively. Research collaborations by faculty within and outside of the university also continued on a wide range of subjects including gene regulation on computational systems, power network systems, ultra-low power integrated circuits, smart cameras, computer security, and robotic system, and new efforts expanded to include hybrid filters and transformers, cloud computing, unmanned systems, piezoelectric sensors, and cyber-physical systems. In addition to 247 book, journal, and conference publications and numerous presentations throughout the world by our faculty, the department signed Cooperative Agreements with eight universities in France, Korea and Turkey.

On a related note, the growth of the department in size and reputation reflects the overall rapid growth of the College of Engineering at UTSA, identified as the fastest-growing engineering college in Texas. The college’s diverse student demographics was recognized by the Hispanic business community (Hispanic Business Magazine) as one of the top five college programs for Hispanic students in the nation. More broadly, the university was ranked 53 out of the top 100 universities in the world with less than 50 years of history and among the top 400 universities in the world by Times Higher Education.

The department’s research budget continued its upward pattern, faculty research productivity has been high, and companies are eager to hire our graduates despite the economic uncertainty. We are indeed living through a season of transformation in the department, college, and university. It has been an exciting academic year during which time we have made major strides in many programmatic areas. I invite you to join us as we continue to engage, collaborate, and grow.
The University of Texas at San Antonio College of Engineering
Department of Electrical and Computer Engineering

DEPARTMENT AT A GLANCE

DEPARTMENT GOALS:
The goals of the Electrical and Computer Engineering Department are:

• To offer an innovative, design-oriented, internationally recognized undergraduate program with concentrations in computer engineering, systems and control, communications, signal processing, and electronic materials and devices.
• To attain domestic and international prominence for quality graduate programs in emerging research areas.
• To serve our multicultural society and the nation through excellence in education, research, and technological innovation.

ACADEMIC PROGRAMS:
• B.S. in Computer Engineering
• B.S. in Electrical Engineering
• Integrated B.S./M.S. in Electrical and Computer Engineering
• M.S. in Advanced Materials Engineering
• M.S. in Computer Engineering
• M.S. in Electrical Engineering
• Ph.D. in Electrical Engineering

CONCENTRATIONS AND FOCUS AREAS:
• Communications
• Computer Engineering
• Computer Architecture
• Computer and Network Security
• Digital Systems Design
• Embedded Systems
• FPGAs and HDL
• VLSI Design
• Digital Signal Processing
• Electronic Materials and Devices
• Electric Power Engineering
• Systems and Control Engineering
• Power Electronics
DEPARTMENT AT A GLANCE

Over 20 Research Labs

- Advanced Computer Architecture and Parallel Processing Lab
- Autonomous Control Engineering (ACE) Lab
- Brain Machine Interaction Lab
- Cardiovascular Systems Bio-medicine Lab
- Communications Lab
- Computational Genomics and Proteomics Lab
- Control, Computation, and Cybernetics (C3) Lab
- Cyber Security Research Lab
- Energy Systems Lab
- Low Power VLSI Lab
- Materials Research Lab

Average Enrollment Per Year*

- 618 B.S.
- 179 M.S.
- 67 Ph.D.

Degrees Awarded**

- Multifunctional Electronic Materials & Devices Research Lab
- Multimedia and Mobile Signal Processing Lab
- Photonics Research Lab
- Power Electronics and Electrical Power Research Lab
- Sensor Wireless Networks Lab
- Software Communication and Navigation Systems Lab
- Translational Materials Lab
- Unmanned Systems Lab
- Wireless Next Generation Systems (WINGS) Lab

Corporate & Government Research Partnerships

$2.97 Million (FY 2013)
$2.44 Million (FY 2012)
in Research Grant Funding

69 Student & 247 Faculty Publications***

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*2012-2014 Academic Years
**Does not include Summer 2014 Graduates

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The University of Texas at San Antonio College of Engineering
Dr. Eugene John, 2013 Faculty Award for Excellence in Teaching

A member of UTSA’s ECE faculty since 2001, Dr. Eugene John was awarded the Faculty Award for Excellence in Teaching from the UTSA College of Engineering in May 2012, and was nominated for the Regents’ Outstanding Teaching Award in 2013 and 2014. Dr. John began his career in engineering education in 1995, shortly after graduating with his doctoral degree from Pennsylvania State University and joined the faculty at UTSA’s sister institution, UT-Pan American, where he also received the Presidential Outstanding Faculty Award for Teaching. “I enjoy interacting and working with the students. I enjoy sharing my enthusiasm for learning,” says Dr. John.

His research contributions not only affect the industry, but also the quality of education students in the Electrical and Computer Engineering programs at UTSA receive. He has developed three new undergraduate and graduate computer engineering courses during his tenure and has made significant contributions toward improving undergraduate programs at UTSA. Dr. John’s work with low-power VLSI design, and high performance computers, has provided ECE students with hands-on experience to work on state-of-the-art simulation tools. Through his research projects, his students have been exposed to modern integrated circuit designs (electronic chips), and have been selected for highly competitive internships and full-time employment with high-tech companies and universities, such as Intel, IBM, California State University – Fullerton and Rochester Institute of Technology. In addition to teaching, Dr. John serves as the faculty advisor for the UTSA chapter of Eta Kappa Nu, the electrical and computer engineering honor society. He is also an officer of the UTSA chapter of the Phi Kappa Phi honor society, one that recognizes and promotes academic excellence in all fields of higher education.

Dr. John’s research interests include low-power CMOS VLSI circuits and systems, low-power VLSI architecture and implementation, computer performance evaluation and computer architecture. One of his current low-power VLSI design projects titled “Ultra Low Power Integrated Circuits and Systems for Cardiac Pacemakers” is funded through the National Institute of Health (NIH), and aims to explore low-power electronics for biomedical applications. Through collaboration with Dr. Manoj Pande, a cardiologist who specializes in clinical cardiac electrophysiology at the University of Texas Health Science Center San Antonio (UTHSCSA), Dr. John aims to decrease the amount of invasive surgeries needed to replace depleted batteries in cardiac pacemakers, by reducing the amount of power each electrical component inside the pacemaker uses, thereby reducing battery power consumption and extending battery life.

Dr. John has several collaborators in academia and in the industry and his research has been supported by NSF, NIH, Army Research Office (ARO), Texas Higher Education Coordinating Board (THECB-ATP), Air Force Office of Scientific Research (AFOSR), Center for Infrastructure Assurance and Security (CIAS) at UTSA and IBM Corporation. He continues to promote scholarship by inspiring, enhancing, and motivating student learning in the UTSA community.
The faculty members in the Department of Electrical and Computer Engineering are continuously making great strides in research and assistant professor Dr. Shuo Wang is a perfect example of that fact. In the past year, Dr. Wang has established a Joint Research Lab with CSR Zhuzhou Institute Co. Ltd., received a research grant from Huawei Technologies, Co. Ltd., delivered an academic tutorial at the IEEE International Symposium on Electromagnetic Compatibility, and was awarded his second prestigious William M. Portnoy Award by the Power Electronics Devices and Components Committee of the IEEE Industry Applications Society.

“Good research helps to build [a] good reputation,” said Dr. Wang. “My aim is to bring UTSA and the ECE Department to the forefront of innovative research, technology development, and academic experience.”

Dr. Wang’s current research efforts focus on the interdisciplinary research covering power electronics, power systems, and electromagnetic interference with applications in electric vehicles, aircraft, and telecom power supplies. His transformative research brings real-world applications into his classroom and laboratory. The results he and his students generate bring both technical and economic benefits to the electrical engineering industry. Dr. Wang is also active in recruiting aspiring STEM students directly from high school to intern in his lab, the Power Electronics and Electrical Power Research Laboratory (PEEPRL), during the summer.

“Dr. Wang tries to make his students learn the uncompromising way of research,” said Rajib Goswami, a doctoral student. “He also tries to build up a clear thought process in his students. [He] is very meticulous in every aspect of his research and that is very helpful for the students.”

Several notable international companies are currently supporting Dr. Wang’s research lab’s investigation on the modeling, prediction, and optimization of EMI/EMC performance for the motor drive systems in electric vehicles. CSR Zhuzhou Institute, Co. Ltd. recently awarded Dr. Wang the “Electric Vehicle Drive System EMC Simulation” grant to pursue the first phase of the company’s electric vehicles research. Another international company, Huawei Technologies Co. Ltd., awarded Dr. Wang a research grant for “Active Filter Research for DC/DC Power Converters” to develop a control model of and to perform stability analysis of active filters within DC/DC power converters.

In October 2012, Boeing awarded Dr. Wang a three-year grant to develop advanced techniques for the high-power density and low-weight filters in the electrical power systems of Boeing’s current generation airplanes, future generation more electric aircrafts (MEA), and all electric aircrafts (AEA). The high-density power for aircraft will allow a reduction to the weight and size of the aircraft by lowering the weight and size of the electrical power systems.

Dr. Wang’s efforts are a true reflection of the mission of the ECE Department - to attain domestic and international prominence for quality graduate programs in emerging research areas. His research generates valuable learning and research opportunities for students, expands collaborative opportunities with prominent industry partners, promotes education and trains ECE students to be experts in their fields, and attracts gifted engineering minds to the ECE programs.

**About Dr. Wang**

Dr. Wang joined the UTSA Department of Electrical and Computer Engineering in August 2010 as an Assistant Professor and was promoted to Associate Professor in 2014. In March 2012, he received the esteemed National Science Foundation CAREER Award, a faculty early career development award. His high research productivity has led the way for UTSA’s ECE programs to engage students, collaborate with other academics and industry minds, and promote global recognition of our programs.
UTSA receives $750K grant to develop solar technology, train minorities for energy jobs

by Christi Fish

(Oct. 30, 2013) -- The Texas Sustainable Energy Research Institute at The University of Texas at San Antonio has been selected to receive a three-year, $750,000 competitive award through the U.S. Department of Energy SunShot Initiative to develop solar energy technology and to recruit and train underrepresented minorities for jobs in the solar energy industry. UTSA was one of two U.S. universities to receive the SunShot DISTANCE (Diversity in Science and Technology Advances National Clean Energy in Solar) award, which pairs science and technology research advances with the development of a diverse and innovative workforce.

UTSA and St. Philip’s College will partner to achieve the three overarching goals of their unique DISTINCT program, which supports President Obama’s broad-based plan to cut carbon pollution and support clean-energy innovation across the nation. Program goals include:

• Increasing the diversity of students pursuing solar careers
• Providing research opportunities to faculty and students in solar energy
• Enhancing and expanding the solar curriculum of both organizations

According to the National Solar Jobs Census, the U.S. solar industry employs 119,000 workers across the nation. The solar energy industry has created nearly 20,000 new American jobs since 2010.

Both UTSA and St. Philip’s College are minority-serving institutions with a strong heritage of working together to train students for successful STEM-related careers. Each organization maintains an active pipeline of underrepresented students who are interested in pursuing STEM-related careers. Additionally, both universities proactively recruit highly qualified students from underrepresented communities across Texas.

To encourage more underrepresented students to pursue solar energy careers, UTSA and St. Philip’s will expand upon existing STEM-related recruitment strategies to develop a pipeline of high school and college-aged students who are interested in renewable energy. The organizations also will offer generous financial support to second-year community college students, undergraduates and graduate students.

At UTSA, students will receive financial assistance by conducting solar energy research through the program. Additionally, UTSA will offer opportunities such as technical forums, invited talks and professional conferences to give students face-time with potential employers.

Providing research opportunities to faculty and students in solar energy, UTSA and St. Philip’s College own a sum of four grid-connected photovoltaic systems with a combined rating of more than 700 kW. The installations are already capturing high-resolution solar data about power generation and their cost and energy savings.

As part of the DISTINCT program, UTSA will develop photovoltaic systems research opportunities for undergraduate and graduate students. Specifically, students will contribute to the development of an N-port power electronic converter, which
could ultimately reduce the cost of a PV system, maximize energy output and limit PV ramps using short-term forecasts.

Enhancing and expanding the solar curriculum of both organizations, UTSA and St. Philip’s College also will use funding from the grant to enhance and expand their combined solar curriculum. Currently, UTSA offers 15 courses with a varying focus on solar energy through its Architecture, Engineering, Business, Public Policy and Sciences colleges. St. Philip’s College is home to the Power Generation and Alternative Energy program, a two-year associate degree in science program that boasts a 78-percent minority student population and emphasizes the technical and installation aspects of solar energy technology.

As the DISTINCT program progresses, UTSA and St. Philip’s College plan to work with solar energy industry stakeholders to develop entire courses devoted to solar energy theory, practice and policy. At the same time, the two institutions will enhance the amount of instruction related to solar energy in related courses, and they will offer teaching laboratories and field experiences to enhance students’ understanding of course curriculum. Additionally, UTSA and St. Philip’s College plan to revise and align the requirements of both institutions, facilitating the admissions process for solar energy transfer students.

“This opportunity to research for a green cure to higher energy prices is an opportunity for the serious students of solar energy technologies in our service area,” said Daniel Sherry, chair of the Department of Applied Electrical and Mechanical Technology at St. Philip’s College. “Students who are ready to research, innovate and give back at the same time as part of their St. Philip’s College experience with UTSA will be a perfect fit for this mission.”

“We are thrilled that the Department of Energy has recognized the combined strengths of UTSA and St. Philip’s College in solar energy education and research,” said Hariharan Krishnaswami, UTSA assistant professor of electrical engineering and DISTINCT project principal investigator. “We aim to create a top-tier solar energy program that allows students to recognize the impact of renewable energy, the strength of the San Antonio solar energy market and the exciting career opportunities available to them.”

The Texas Sustainable Energy Research Institute was established at UTSA in 2010 to serve as a catalyst coalescing the many energy research and education projects underway at UTSA. The institute maintains strong partnerships with CPS Energy, the National Renewable Energy Laboratory, private energy companies, universities and nonprofits.

Researchers leading the interdisciplinary project include Krishnaswami; Les Shephard, director of the Texas Sustainable Energy Research Institute at UTSA; Afamia Elnakat, associate professor of research at the institute; and Daniel Sherry, chair of the Department of Applied Electrical and Mechanical Technology at St. Philip’s College.

During President Obama’s first term, the nation more than doubled generation of electricity from wind, solar and geothermal sources. Additionally, over the last three years alone, the cost of a solar energy system has dropped by more than 70 percent, allowing more American families and businesses access to affordable clean energy.

About the SunShot Initiative

The U.S. Department of Energy SunShot Initiative is a collaborative national effort that aggressively drives innovation to make solar energy fully cost-competitive with traditional energy sources before the end of the decade. Through SunShot, the Department of Energy supports efforts by private companies, universities and national laboratories to drive down the cost of solar electricity to $0.06 per kilowatt-hour.
Dr. Brian Kelley has been a Summer Research Faculty Fellow with the Office of Naval Research for the past two summers. In the summer of 2013, Dr. Kelley investigated GNU software radio platforms, an open-source software, for underwater communications, which integrates radio frequency (RF) underwater antennas, developed with collaborators at Georgia Tech, underwater containers, developed by the United States Navy, and his own communication radio protocols.

As part of the Chief Technology Officer’s Summer Lecture Series, Dr. Kelley gave a lecture on “RF-Broadband Underwater Communication Network Applications on GNU Software Radio Platforms.” He collaborated with Dan Nagle, Ph.D., and William Craig, both from Naval Undersea Warfare Center Division Newport, to elaborate new broadband-RF communication pathways that enable high-speed underwater data-links. “Our approach supports data rates of 1-10 Mbps over underwater single-hop distances of 100-2000m. We also demonstrate the feasibility of creating very large-scale local area networks of underwater RF-nodes. Finally, we share our insight regarding the prototyping of advanced experimental systems in which communication protocols are distilled as GNU Software Radio applications residing on an Ettus Research SDR Platform.”

Dr. Kelley is very interested in analyzing the measured performance of the digital RF channel integrated with undersea antennas developed by his collaborators at Georgia Tech, while developing underwater communications. Additionally, Dr. Kelley is interested in pursuing the use of software radio as a test bench to explore the effect of underwater multiple input, multiple output (MIMO), broadband Orthogonal Frequency Division Multiplexing (OFDM), and frameworks for Mbps data links from 100-1000m. He would also like to launch real-data links in ocean tests.

Showing particular interest in RF-local area networks (LAN), Dr. Kelley proposes to assign each underwater node its own internet protocol (IP) address. This would give him the ability to network unmanned underwater vehicles (UUVs) in real time with a wireless underwater router. He and Mehdi Roopaei, a post-doctoral fellow in UTSA’s ECE Department, have published theories for scale-free networks with unlimited size ad-hoc networks.

Dr. Kelley’s future research will focus on RF isolated ocean test-benches, digital channel measurements, and GNU radio system software for real-time measurement for RF-underwater. This system will utilize undersea antennas developed by Dr. Kelley’s collaborators at Georgia Tech.

About Dr. Kelley

Dr. Kelley joined UTSA in Fall 2007 as an Assistant Professor of Electrical Engineering in Wireless Communications. He was promoted to Associate Professor in Fall 2013. He previously served as a Distinguished Member of the Technical Staff at Motorola. Dr. Kelley graduated from Cornell University with his Bachelor of Science degree in Electrical Engineering and was an Office of Naval Research Fellow at Georgia Tech. He received his Master’s and Ph.D. in Electrical Engineering from Georgia Tech, the latter in 1992. Dr. Kelley holds nine U.S. patents and continues to promote the next generation wireless communication systems research.

Featured faculty: Dr. Brian Kelley

Dr. Chunjiang Qian appointed to Assistant Department Chair

Dr. Chunjiang Qian has been appointed to the position of Assistant Department Chair, following his service as the Graduate Advisor of Record. Dr. Qian earned his doctoral degree in 2001 from Case Western Reserve University in Cleveland, Ohio. His research areas are nonlinear control, flight control, modeling and aerospace systems, and bio-dynamic modeling.
Dr. David Akopian receives National Institute of Health grant

Dr. David Akopian, Associate Professor of Electrical and Computer Engineering, has been awarded a five-year grant totaling $275,000 from the National Institute of Health’s (NIH) Eunice Kennedy Shriver National Institute of Child Health and Human Development. This grant is being funded through The University of Texas Health Science Center at San Antonio’s (UTHSCSA), a $2.9 million collaborative grant for the development of a new obesity management program. Dr. Akopian’s team will implement a tailored texting system that enables programming of multiple messaging threads, and provides grouping, broadcasting and polling features for interaction with the participants. The system analyzes usage statistics and provides web-based user interface to the health professionals at UTHSCSA and others in the San Antonio medical community.

Dr. Yufei Huang collaborates with ARL on neuroimaging research

Dr. Yufei Huang, Professor of Electrical and Computer Engineering, is partnering with the Army Research Laboratory (ARL), University of California at Santa Barbara (UCSB), DCS Corporation, and others within the Cognition and Neuroergonomics Collaborative Technology Alliance (CAN CTA) to research and discover fundamental principles and transition neuroscience technologies into real-world applications. The research includes real-world neuroimaging, to understand fatigue level of soldiers within vehicle driving environments. Dr. Huang will also be looking into finding solutions for issues associated with brain-computer interface (BCI), designing BCI systems with a real-time interactive component, advanced computational analytics, and high density, dry-electrode, wireless EEG data collection systems.
Dr. Mo Jamshidi receives IEEE-USA Professional Achievement for Individuals

Dr. Mo Jamshidi, a Lutcher Brown Endowed Distinguished Professor, was selected by the IEEE-USA Board of Directors as a 2013 recipient of the IEEE-USA Professional Achievement for Individuals based on his contributions in the systems engineering profession, and for founding the IEEE Systems Journal. Dr. Jamshidi has been a Life Fellow of IEEE, and has established two very successful publications of IEEE in the control and the systems areas. In 1980, he established IEEE Control Systems Magazine for IEEE Control Systems Society, and in 2006 he established IEEE Systems Journal for IEEE Systems Council.

Dr. Ruyan Guo named IEEE Fellow

Dr. Ruyan Guo, Robert E. Clarke Endowed Professor, was selected as an IEEE Fellow in January 2013 for her contributions “to the understanding of polarization phenomena in ferroelectric solid-solution systems.” Dr. Guo’s research focuses on structure-composition-property relationships in ferroelectric, piezoelectric, pyroelectric, and nonlinear dielectric and optical materials. The IEEE Grade of Fellow is conferred by the IEEE Board of Directors upon a person with extraordinary accomplishments in any of the IEEE fields of interest. IEEE Fellow is the highest grade of membership and is recognized by the technical community as a prestigious honor and an important career achievement.

Dr. Sos Agaian awarded status of IS&T Fellow

Dr. Sos Agaian, Peter Flawn Professor, has been awarded the status of IS&T Fellow for outstanding contributions to the fields of multimedia-imaging systems and security systems, including embedded data decryption processes and data hiding methods for mobile communications. The Society for Imaging Science and Technology, which awarded him this fellowship, is an international non-profit organization whose goal is to keep members aware of the latest scientific and technological developments in the field of imaging through conferences, journals and other publications.
Spotlight on new faculty:  
**Dr. Nikolaos Gatsis**

Dr. Nikolaos Gatsis joined The University of Texas at San Antonio faculty in the Electrical and Computer Engineering Department in the fall of 2013. Dr. Gatsis’ research interests include smart power grids, renewable energy management, wireless communications, and networking with an emphasis on optimization methods and renewable management. Dr. Gatsis received his Ph.D. in Electrical Engineering with a minor in Mathematics from the University of Minnesota in June 2012.

Dr. Gatsis is thrilled to be a part of the UTSA ECE family. “I feel I have joined UTSA at a great moment for the school because it is expanding,” he says. “The school is setting high goals in terms of achieving both research and teaching excellence, and it is exciting to participate in this process.” He plans to explore research directions in the areas of demand-side management and power system scheduling in the face of renewable energy intermittency and volatility. In addition, Dr. Gatsis would like to broaden the curriculum in the department by offering courses in the areas of Communication Networks, Smart Grid Planning, and Engineering Optimization.

Prior to joining the ECE family at UTSA, Dr. Gatsis worked as a Teaching Assistant and a Research Assistant, as well as a Post-Doctorate Associate with Dr. Georgios B. Giannakis and the Signal Processing in Networking and Communications Group at the University of Minnesota. He also had a four-month internship with Mitsubishi Electric Research Labs (MERL) in Boston, Massachusetts, where he worked on parallel algorithms for large-scale convex optimization. He received the Lilian Voudouri Foundation award for his graduate studies.

**About Dr. Gatsis**

Dr. Gatsis grew up in Patras, Greece, where he also completed the five year Diploma in Electrical and Computer Engineering at the University of Patras, Greece.

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**UTSA offers new BS/MS in Electrical and Computer Engineering Degree**

Commencing in Spring 2014, The University of Texas at San Antonio (UTSA) offered a new program of undergraduate and graduate studies, allowing students to earn both a Bachelor of Science degree and a Master of Science degree in Electrical and Computer Engineering in five years, instead of the traditional six years, through the UTSA College of Engineering. Students will expedite their graduation process by enrolling simultaneously in both undergraduate and graduate courses during their junior and senior years. Course contents and credit hours required for both the B.S. and M.S. degrees will remain the same. This program has been approved by the Texas Higher Education Coordinating Board and Southern Association of Colleges and Schools (SACS), and is intended to encourage highly motivated and qualified undergraduate students to enhance their educational and research experiences at UTSA.

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**Dr. Ruyan Guo - COE Dean’s Research Excellence Award Winner, 2013**  
**Dr. Lars Hansen - COE Dean’s Teaching Excellence Award Winner, 2013**  
**Dr. Mo Jamshidi - COE Dean’s Research Excellence Award Winner, 2014**  
**Dr. Wei-Ming Lin - COE Dean’s Teaching Excellence Award Winner, 2014**
Dr. Paul Morton promoted to Full-Time Non-Tenure Track Professor

Dr. Paul Morton holds a Ph.D. in Electrical Engineering as well as an M.D. from the University of Missouri. His research interests include biologic sensors, neural networks, embedded systems, and human interfaces. Dr. Morton is a Board Certified OB/GYN physician, practicing for over 30 years full time until April 2013. He continues to treat gynecology patients one half day a month. Dr. Morton retired from the military after 3 years in the Army as an Infantry Officer and a helicopter pilot during the Vietnam War, and 21 years in the Air Force as a physician and researcher.

Dr. Yufei Huang promoted to Full Professorship

Yufei Huang received his Ph.D. degree in Electrical Engineering from the State University of New York at Stony Brook in 2001. Since 2002, he has been with the Department of Electrical and Computer Engineering at the University of Texas at San Antonio (UTSA) as first an Assistant Professor, and then promoted to Associate Professor in 2007. He has been a visiting professor at the Center of Bioinformatics, Harvard Center for Neurodegeneration & Repair. He is now also an adjunct professor at the Greehey Children’s Cancer Institute and Dept. of Epidemiology and Biostatistics at The University of Texas Health Science Center at San Antonio.

Dr. Fatma Arslan promoted to Full-Time Non-Tenure Track Professor

Dr. Fatma Arslan received her Ph.D. from The University of Texas at San Antonio in 2007. She received her Master’s degree from the University of Arizona in 2001, and her Bachelor’s from Bilkent University in 1999. Her research interests include signal and image processing, Fourier analysis, and applied mathematics.

The Electrical and Computer Engineering Department would like to welcome the following new staff members

Nguyen “Xuan” Uribe, Administrative Manager

Xuan began her service at the UTSA Electrical and Computer Engineering Department as the ECE Graduate Programs coordinator. Prior to joining UTSA, Xuan lived and worked in Tokyo, Japan, for four years as an Education Advisor with the Department of the Air Force and the Community College of the Air Force, supporting United States military enlisted, officer, dependent, and Japanese National post-secondary education.

Xuan earned her baccalaureate degree in biology, focusing in microbiology from The University of Texas at Austin. Xuan is a proud native Texan and is glad to be back in the great state of Texas.
Dr. J. Michelle Zhang promoted to Associate Professor

Dr. J. Michelle Zhang received her Ph.D. degree in Electrical Engineering from the State University of New York – Stony Brook in 2002. She joined UTSA’s ECE Department in 2007, as a Research Assistant Professor. Dr. Zhang’s research interests include signal processing for bioinformatics and biomedical applications, information theory and applications in genomics, and wireless communications.

Dr. Brian Kelly promoted to Associate Professor

Dr. Brian Kelley received his Ph.D. degree in Electrical Engineering from Georgia Institute of Technology in 1992. He joined UTSA in 2007 as an Assistant Professor of Electrical Engineering in Wireless Communications. His research interests include 4G cellular communications, signal processing algorithms for wireless communications, 3G cellular, OFDMA, MIMO, ultra-wideband communications, systems on a integrated circuit chip (SoC), digital radios, software definable radio (SDR), object-oriented modeling of large scale communication systems, application specific DSP processors, system level design, and high speed computer arithmetic.

Dr. Jeff Prevost joins ECE Faculty as Assistant Professor of Research

Dr. Jeff Prevost received his Ph.D. from The University of Texas at San Antonio in December 2013. Dr. Prevost’s research interests center around two primary areas: creation of Green Cloud through optimization of physical and virtual infrastructure, and development of applications that leverage the cloud’s scalability, flexibility and robustness.

Department of Electrical and Computer Engineering is proud to announce the addition of two new faculty members

Dr. Lide Duan and Dr. Junghee Lee will be joining the ECE Department effective Fall 2014. Dr. Duan received his Ph.D. from Louisiana State University in 2011. Dr. Lee received his Ph.D. from Georgia Institute of Technology in 2013.

Candice Contreras, Administrative Associate I

Candice provides administrative support to Dr. Mo Jamshidi, as well as, the Electrical and Computer Engineering Department Operations, including ECE Undergraduate Programs. She has several years of experience in administrative services, in the education, human resources, and legal fields.

Candice is a San Antonio native, and has previously worked for UTSA in the Human Resources Office, and College of Engineering Advising Office, before joining ECE in July 2013. In 2008 she earned a Bachelor of Arts in English from the University of Rochester, in Rochester, New York. Since graduation, she has lived and worked in Philadelphia and New Orleans, and returned to San Antonio in 2011. She completed a second baccalaureate degree in Criminal Justice from UTSA in December 2013.
Student Organizations open tutoring center in ECE Department

In April 2013, the Electrical and Computer Engineering Department supported the coordinated efforts of UTSA’s local chapters of Eta Kappa Nu and Tau Beta Pi to open a student-run tutoring center within the department’s main offices. The ECE Learning Lounge (ECELL) provides a space for tutoring in several freshman- and sophomore-level courses, by members of Eta Kappa Nu and Tau Beta Pi. In addition to its service as a tutoring center, ECELL functions as a meeting place for ECE students, as well as a study area. Its proximity to department offices affords students the opportunity to mingle with department staff, and connect with faculty in a more relaxed setting, promoting academic excellence and open dialogue between the student body and ECE Department.

UTSA Louis Stokes Scholar selected for summer research academy in Brazil

By Darrell Balderrama
Director of Retention Programs, Office of P-20 Initiatives

Paul Hamilton, a UTSA student double majoring in electrical and computer engineering, was selected to participate in the Louis Stokes Alliance for Minority Participation (LSAMP) Summer Research Academy. Hamilton was one of only eight students from across the UT System selected to participate in the research fellowship sponsored and funded by the National Science Foundation. He will study for eight weeks this summer in Sao Paulo, Brazil.

Hamilton is a UTSA Air Force ROTC Program Detachment 842 cadet and upon graduation will be commissioned as a second lieutenant. He recently transferred from Northwest Vista College, where he learned about the Transfer Academy for Tomorrow’s Engineers (TATE), a six-week collaborative summer program hosted by UTSA and the Alamo Colleges designed to increase the graduation rate of engineering students.

After a successful completion, Hamilton applied and was then accepted to the NSF 10-week LSAMP undergraduate research program, which is aimed at increasing the quality and quantity of students in STEM degree programs. His mentor was David Akopian, UTSA associate professor of electrical and computer engineering.

While in Akopian’s SCNS lab, Hamilton’s interest continued to grow, so he applied and was accepted to the LSAMP Summer Research Academy, which offered an all-expenses-paid research abroad program.

Under the research abroad program, Hamilton will study for eight weeks at La Universidad de Sao Paulo, Brazil, where he will work in the computer engineering department researching safety systems for Unmanned Aerial Systems. Upon his return, he and his fellow LSAMP research scholars will present their research findings at the annual statewide LSAMP conference at the University of Texas at El Paso.

“This summer experience will allow me to look into my future career and provide me with an invaluable opportunity to experience the realm of engineering before I graduate,” said Hamilton. “It will give me a new outlook on life and a global perspective in relation to the field of engineering. I’m truly honored and humbled to have been given this opportunity.”

Once the study abroad in Brazil is complete, Hamilton will move to Houston and join his classmate, UTSA engineering student Ricardo Aceves, to participate in the prestigious NASA Pathways Intern Employment program. The pair are among 150 students representing 70 universities selected to participate in the yearlong NASA internship that focuses on giving undergraduates opportunities to explore federal careers while still in school.
Dr. Dong Yue was chosen as the 2012 ECE Outstanding Graduate Research Award winner. Dr. Yufei Huang served as Dr. Yue’s faculty advisor. Dr. Yue holds both bachelor’s and master’s degrees from the University of Electronic Science and Technology of China. He received his Ph.D. in Electrical Engineering from the University of Texas at San Antonio in May 2012. Currently, Dr. Yue is a Software Engineer, with Informatica Corporation in Austin, Texas.

Dr. Yue was selected for his dedication to his studies, while simultaneously holding a full-time job outside of UTSA, and his exceptional research accomplishments. Throughout his Ph.D. studies, Dr. Yue wrote 5 journal papers (4 published and 1 accepted) and 6 conference papers, making noteworthy contributions to an emerging area in computational biology.

Dr. Yue’s dissertation addresses the prediction of functions of a recently discovered regulatory molecule in cells known as microRNA. He has worked on developing statistical models using high throughput genomics and proteomics data to predict the genes and biological processes likely to be regulated by microRNA. The prediction results help biologists better understand the functionality of the miRNAs, generate hypothesis to be tested experimentally, and possibly design intervention strategies in the treatment of related diseases.

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Claresta Solutions, a team of six business and engineering students, triumphed at the $100,000 Student Technology Venture Competition presented by The University of Texas at San Antonio (UTSA) Center for Innovation and Technology Entrepreneurship (CITE). The UTSA students developed a prototype electronic labor monitoring system and wrote a business plan to market the technology.

UTSA competitors In Line Innovations and INI Technology respectively placed second and third in the business planning competition Saturday, Dec. 7 at the UTSA Main Campus. The top three winning teams received a cash prize and in-kind business services such as marketing, consulting and office space totaling $100,000 to support the launch of their new companies.

Claresta Solutions offers the LaborGuard Monitoring System, which uses wireless technology to capture and track the electronic impulses created by the fetal heart rate and uterine contractions during labor. Capitalizing on advances in data processing capabilities paired with Bluetooth technology, the LaborGuard system was designed as a completely electronic solution. Claresta Solutions includes undergraduate business majors Somer Baburek, Margaret Mayfield, Servando Quinones and Alejandro Sosa, undergraduate electrical engineering major Nolan Manteuffel and biomedical engineering Ph.D. candidate Steven Solis.

“The competition challenged me with many engineering ‘firsts.’ Everything was new to me. New chip, new circuit, new board layout, new team and more. It was exciting,” stated Nolan Manteuffel, team member and...
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-Nolan Manteufel

electrical engineering student. Team leader and mother Somer Baburek said, “I would love to be able to wear a LaborGuard the next time I have a baby. I believe that this product can offer so much in the way of efficiency and comfort in the hospital setting. It has the potential to offer peace of mind to expectant mothers and diagnostic power to their physicians.”

Each competing team received guidance from an experienced professional within the San Antonio technology business community. Ian Clements, managing partner at Targeted Technology Fund II and CEO of ViroXis Corporation, mentored Claresta Solutions.

“The Claresta Solutions team has the passion, commitment and work ethic to make a difference with LaborGuard,” said Clements. “The team was willing to listen, improve and take action. I have recommended that Claresta and LaborGuard continue to the next step in getting seed funding and full proof of concept. The future prospects look exciting.”

In all, six teams entered this semester’s competition. The additional teams included:

- Mind Controlled Wheelchair, which uses a wireless electroencephalography headset to control the use of a wheelchair. Student team includes Graham Cull, Tanner Daniel, Yousef Failakaw, Analysa Gonzales, Nathan Gonzalez, Daniella Lerma and Carel Long.
- In Line Innovations, which offers a way to locate water pockets within an oil and gas pipeline in order to prevent undesirable corrosive effects caused by acid buildup in the water pockets. Student team includes Samantha Block, Cassie Constanzo, Nick Goodwin, Robert Hampton, Kasi Holifield, Zachary Moses, Raquel Stark and Nick Taylor.
- INI Technology, which offers a handheld mechanical surgical instrument devised to remove all or part of the uterus of a patient during a hysterectomy procedure. Student team includes Cellan Caverte, Ryan Garcia, Josue I. Cruz-Lambert, Anne Margaret, Adolfo Mijares, Pablo Pardo, Rani Putri and Ta’Mara Williams.
- Trench Winch, a towable trenching device that attaches behind a riding lawn mower. Student team includes Clark Carpenter, Frank Duran, Efrem Holley, Garth Morrison, Eduardo Rivera, Kevin Schielack and Johnathan Vela.
- U-Cane, a device that enhances the function of the white cane used by a blind person by using ultrasonic waves to increase the detection of obstacles, particularly eye-level obstructions.

Student team includes William Cochran, Moses Duggirala, Leonardo Espinoza, Ana Munoz, Cliff Paul and Ryan Waugh.

About CITE $100K Student Technology Venture Competition

Established in 2007 and held semi-annually, the $100K Student Technology Venture Competition at UTSA offers the largest award of all undergraduate business planning competitions in the nation. It offers UTSA’s undergraduate senior business and engineering students the opportunity to build a technology, patent it, create a business and launch it in a rigorous incubator program.

Since the competition’s inception, more than 650 students have participated, more than 90 company ideas have been pitched and a dozen patent applications have been filed.

Financed by the Texas Research & Technology Foundation, the competition also receives support from Cox|Smith, the San Antonio Technology Center, Rackspace, the Whittington Group, the UTSA College of Business, the UTSA College of Engineering and the UTSA Office of the Vice President for Research.
In April 2013, the University of Texas at San Antonio College of Engineering hosted its first Technology Symposium. Under the direction of the Electrical and Computer Engineering Department Chair and Professor, Dr. Daniel Pack, the Technology Symposium was initiated to showcase senior engineering students’ projects and research accomplished across multiple disciplines and concentrations within the College of Engineering at UTSA. The Technology Symposium includes an exhibition of Engineering Capstone Projects and the Center for Innovation and Technology Entrepreneurship (CITE) $100k Student Technology Venture Competition.

The goal of the Technology Symposium is to provide engineering students with an opportunity to present their design projects to engineering industry representatives, as well as the UTSA community. The Center for Innovation and Technology Entrepreneurship fosters growth for new technology ventures by creating a channel for UTSA students, faculty, and the surrounding business community to develop new technology and coordinate resources to support new technology-based ventures.

Capstone Projects allow all senior engineering students to apply the knowledge they have accumulated throughout their programs, facilitating original student inventions from the initial design, to the development, and implementation of pioneering and ground-breaking engineering products. Of 157 senior students in civil, mechanical and electrical and computer engineering, 14 Senior Design groups from Electrical and Computer Engineering participated in the 1st Annual Technology Symposium, under the instruction of ECE faculty member Professor August (Gus) Allo. In 2014, 40 total teams across all disciplines participated in the Technology Symposium, with 13 of those teams coming from Electrical and Computer Engineering programs.

In 2013, Senior Design Team #8, comprised of Rico Jaeger, Neel Desai, Michael King, and Jorge Molina, won first prize in the Electrical and Computer Engineering competition, for their invention, the Smart Car Seat System. The Smart Car Seat System led to the development of the Nanny-Pad, a vibrating pad built into a car seat to comfort infants during travel and to detect harmful interior cabin temperature. The system will notify the caregiver immediately via SMS when a critical temperature is reached within the car cabin and to initiate first response measures.

In April 2014, the 2nd Annual Technology Symposium awarded the first prize in the electrical and computer engineering department category to Team Steelhead Spartan, comprised of students Taylor Harper, Kevin Nardo, Eric Birkelbach, and Shrey Kodinariya. Their winning design features a master-slave command system integrated with an Arduino Mega microcontroller and an Android-based graphical user interface to control a performing robot puppet using mechanical “doll” robots. The “doll” robot can perform a range of motions that would then be replicated by the puppet. The various stored motions could then be rearranged to change the puppet’s performance. This robot is sponsored by and will be used by the San Antonio’s Children’s Museum to introduce children to the basic concepts of programming, allowing children to input commands, view the commands, and to see the resulting movements from the commands performed by the puppet.
The Technology Symposium features student design, development, and application of innovative, relevant engineering ideas into purposeful products, bringing together students, prominent UTSA faculty and administrators, as well as, business and engineering leaders in San Antonio and other areas. It continues to attract major companies and representatives, such as Catherine Burzik, former President and CEO of Kinetic Concepts, Inc. (KCI) and Jeff Clarke (ECE Class of ’86), Vice Chairman of Operations and President of Client Solutions for Dell, who delivered the keynote for 2013 and 2014, respectively. The ECE Department continues to motivate and mentor student engineering design by continuing high-level participation in events such as Technology Symposium and the CITe $100K Student Technology Venture Competition and looks forward to next year’s competition and student research and designs.

Madhuparna Pal receives Presidential Dissertation Fellowship Award

The University of Texas at San Antonio Department of Electrical and Computer Engineering would like to congratulate doctoral candidate, Madhuparna Pal, for being a recipient of the Presidential Dissertation Fellowship Award in Spring 2013. Ms. Pal’s dissertation, “Nanostructure Characteristics of Ferroics in Relation to the Design Consideration of Nanosensing Elements”, was selected as one of six to receive this distinction. Ms. Pal completed and successfully defended her dissertation this summer under the supervision of Drs. Amar Bhalla and Ruyan Guo, both ECE Faculty specializing in electronic materials and devices.

Ms. Pal arrived at UTSA in August 2009 from Calcutta, India. She received her Bachelor’s of Electrical Engineering from the University of Calcutta. Ms. Pal has also been the recipient of the College of Engineering 2013 Dean’s Research Excellence Award, Valero Research Excellence Award (2012), and College of Engineering 30th Anniversary Ph.D. Student Excellence Award (2012). In the Summer of 2011 and 2012, Pal interned with Maxim Integrated Products in San Antonio, Texas. She has several publications in several journals, including Journal of Applied Physics. Pal also has given presentations at 5 international conferences, such as the Material Science and Technology Conference and Exhibition (MS&T), and International Meeting on Ferroelectrics (IMF-13).

When asked why she chose UTSA for her Ph.D. education, Pal responded, “I wanted to work in nano-engineering, and the Electrical and Computer Engineering Department at UTSA has afforded me the opportunity to work with some really great researchers in the field.”
ECE Ph.D. Graduates Fall 2012 - Spring 2014

**Fall 2012**

Savithra U. Eratne  
Major Professor: Eugene B. John, Ph.D.  
Dissertation Title: "Scheduling and Layout Techniques for Reducing Thermal Hotspots in Multi-Core Processors"

Somayeh Bakhtiar  
Major Professor: Mo Jamshidi, Ph.D.  
Dissertation Title: "The New Empirical Mode Decompositions and the Applications in Signal/Image Processing"

Mahdy Saedy  
Major Professor: Brian Kelley, Ph.D.  
Dissertation Title: "Cooperative Cluster Wireless Communications and Networks"

Dariush Shahgoshtasbi  
Major Professor: Mo Jamshidi, Ph.D.  
Dissertation Title: "Energy Efficiency in a Smart Home with an Intelligent Neuro-Fuzzy Paradigm"

Ted V. Shaneyfelt  
Major Professor: Mo Jamshidi, Ph.D.  
Dissertation Title: “Hypercomplex Number Based Automated Robotic Vanilla Pollination System with Vision Sensing”

**Spring 2013**

Robert Arthur McIntosh  
Major Professor: Ruyan Guo, Ph.D.  
Dissertation Title: “Piezoelectric Resonance Enhanced Microwave and Optoelectronic Interactive Devices”

Arsen Melkonyan  
Major Professor: David Akopian, Ph.D.  
Dissertation Title: “WLAN Positioning Methods and Supporting Learning Technologies for Mobile Platforms”

Weisong Tian  
Major Professor: Chunjiang Qian, Ph.D.  
Dissertation Title: “Generalized Homogenous Methodologies and Solutions to Control Problems of a Class of Nonlinear Systems”

**Summer 2013**

Nan Du  
Major Professor: Artyom M. Grigoryan, Ph.D.  
Dissertation Title: “Tensor Transform Based Method of Image Reconstruction by Projections”

**Fall 2013**

Sree Phani Kishore Devineni  
Major Professor: Artyom M. Grigoryan, Ph.D.  
Dissertation Title: “The Paired Representation Method of Signal De-Noising”

Omid Ghasemi  
Major Professor: Yufang Jin, Ph.D.  
Dissertation Title: “Systemic Analysis of Gene Expressions Post Myocardial Infarction Using Computational Approaches”

Khalil Naghdali  
Major Professor: Artyom M. Grigoryan, Ph.D.  
Dissertation Title: “Fast Unitary Heap Transform: Methods and Application in Digital Signal and Image Processing”

John Jeffery Prevost  
Major Professor: Mo Jamshidi, Ph.D.  
Dissertation Title: “Optimization Model for Low Power Computing in Cloud Data Centers”

**Spring 2014**

Richard Metzler  
Major Professor: Sos Agaian, Ph.D.  
Dissertation Title: “Superpredictive Modeling for Sequential Analysis”

Andre Mayers  
Major Professor: David Akopian, Ph.D.  
Dissertation Title: “Improving the Spectrum Usage Efficiency of Personal Area Devices Using Cognitive Radio Technology”

Grant Huang  
Major Professor: David Akopian, Ph.D.  
Dissertation Title: “Assistance, Channel, and Networking Models for A-GPS simulators”
Meet Kathlene Hurt

Meet Kathlene Hurt, a graduate student in the UTSA ECE computer engineering program. She has had so many amazing opportunities as an undergraduate computer engineering student at UTSA, she has decided to stick around for a little while longer.

Hurt graduated in December 2013 with a Bachelor of Science in computer engineering and continued her studies as a graduate student in computer engineering this past spring. Once she finishes graduate school, her goal is to have a career as a processor architect for a global company, such as Samsung. Down the road, she may pursue her love for teaching and research by becoming a college professor. She sees infinite potential in academia.

“The changes I’ve seen over the four years I’ve been [at UTSA] have been huge including all the research funding I’ve been personally impacted by. It’s really great to see we’re becoming Tier One,” she said.

Hurt served as president of the UTSA chapter of Eta Kappa Nu, an honor society recognizing personal, academic and professional excellence among electrical and computer engineers around the country. She also spearheaded the development of the Electrical and Computer Engineering Learning Lounge (ECELL), which ensures that any student is able to get tutoring assistance in the electrical and computer engineering disciplines.

One piece of advice that has made a big impact on her life was to take advantage of every opportunity.

“Don’t pass anything up,” she says. “Even if you fail and it is a disappointment, at least you went for it. Some of the best experiences I’ve had at UTSA have been kind of a risk going in, but it ended up being worth it.”

Electrical and Computer Engineering professor Dr. Eugene John has served as one of Hurt’s research mentors during her undergraduate years at UTSA and continues as her graduate advisor.

“I have seen Kathlene transform from an undergraduate student to a serious researcher,” said John. “She is a very hard-working, intelligent, motivated and determined student. In fact, she is one of the best undergraduate students I have ever taught here at UTSA. It will be a joy to have Kathlene as one of my graduate students.”

**UTSA ECE Alumni News**

Dr. Ruting Jia, a former ECE Ph.D. student, and Dr. Chunjiang Qian, UTSA ECE Assistant Department Chair and Professor, co-authored “Semi-Global Stabilization via Linear Sampled-Data Output Feedback for a Class of Uncertain Nonlinear Systems”, which won the “Best Poster Paper Award” at the 3rd IFAC International Conference on Intelligent Control and Automation Science, in September 2013. Dr. Jia is currently an Assistant Professor with the Department of Electrical Engineering and Computer Science at McNeese State University. The paper was also co-authored by Chuanlin Zhang (Southeast University) and Shihua Li (Southeast University).
Recent ECE Alumni Academic Promotions

Dr. Michael Frye has been promoted to Associate Professor of Engineering with Tenure at the University of the Incarnate Word in San Antonio, Texas. Dr. Frye received his Ph.D. in Electrical Engineering from UTSA in 2006, with a concentration in Systems & Control and continues to engage in autonomous vehicle research using the latest robotic vehicle technologies.

Dr. Dhireesha Kudithipudi has also been promoted to Associate Professor at Rochester Institute of Technology in Rochester, New York. Dr. Kudithipudi received her Ph.D. in Electrical Engineering from UTSA in 2006, with a concentration in Computer Engineering and is actively engaged in educational scholarship activities to retain minority students in computer engineering education.

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Online Training Development
WorldSpec Online Training