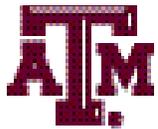


Currents

NEWS FROM THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING



**ELECTRICAL & COMPUTER
ENGINEERING**
TEXAS A&M UNIVERSITY

TRANSFORMING ENGINEERING EDUCATION



LETTER FROM THE DEPARTMENT HEAD

While it feels like I have been at Texas A&M University for a considerable amount of time, this is my first opportunity to address the readers of Currents. We have prepared another interesting issue for you. I would like to say that I am extremely honored to have been chosen to lead the Department of Electrical and Computer Engineering

at a time when so many good things are happening as we concurrently pursue growth and excellence in all of our programs.

In the introductory section, you will see that Professor Robert Balog has been elected Member-At-Large of IEEE PELS. As power electronics is becoming a very important part of the technological support for smart grid innovations, Balog's appointment will give him an opportunity to help shape the future of the profession from within the largest engineering organization in the world. Professor Shankar Bhattacharya was named a Foreign Member of the Academia Nacional de Engenharia (ANE), Brazil. Bhattacharya has been very actively involved in collaborative programs and study abroad programs in Brazil for Texas A&M students. Professor Jean-François Chamberland was named the William O. and Montine P. Head Faculty Fellow in recognition of his sustained research and other contributions to the college of engineering. Professor Nick Duffield was elected to the board of directors of the Association for Computing Machinery (ACM) and as specialty chief editor of the newly created journal *Frontiers in ICT*. He also received support for his proposal from the Google Faculty Research Awards program. Professor Xiaoning Qian received an NSF CAREER grant, which is a prestigious early career milestone. Professor B. Don Russell was named Fellow of the National Academy of Inventors and NAE Chair of the committee on membership, in recognition of his successful and illustrious career in research and leadership in the profession. Professor Edgar Sanchez-Sinencio was appointed a University Distinguished Professor, which is among the highest honors awarded to Texas A&M faculty members.

Our faculty member and former department head, Professor Costas Georghiades, was appointed senior associate vice president for research for the university, and Professor Narasimha Reddy was appointed associate dean for research in the college of engineering. You will also find his interesting article on university rankings that can be inferred from the patterns of inter-university faculty hiring.

In the Student Awards section, you will find a number of announcements of notable prizes that our students have won. Among them, Payman Dehghanian received IEEE's Outstanding Young Professional and Outstanding Individual Awards, and was named exceptional reviewer for *Elsevier* journal and the department's Best Ph.D. student. Congratulations, Payman.

I would like to encourage you to consider assisting the department with its development needs. Your investment enables us to continue to admit and retain the best students and faculty. Additionally, your support provides them with the infrastructure to continue to be leaders in the electrical and computer engineering field. Please recommend us to your friends and colleagues, especially those who are Aggies.

Sincerely,

Miroslav Begovic,

Department Head, Carolyn S. & Tommie E. Lohman '59 Professor

Currents

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Editorial

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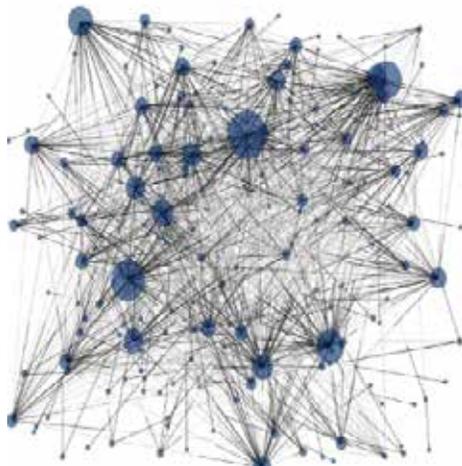
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Wood receives outstanding alumni award

Roku inventor received an Outstanding Alumni Award from Texas A&M University's College of Engineering.
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FACULTY/STAFF HONORS & AWARDS

Faculty Awards

Balog elected Member-at-Large of IEEE PELS

Dr. Robert S. Balog, associate professor, has been elected Member-at-Large of the Institute of Electrical and Electronics Engineers (IEEE) Power Electronics Society (PELS) Administrative Committee. As Member-at-Large Balog's duties include voting responsibilities as part of the Administrative Committee governing the society. The PELS is one of the IEEE technical societies with the broadest technical and social impact as electrical energy impacts nearly every single person in the world. For more than 25 years, PELS has facilitated and guided the development and innovation in power electronics technology.

Begovic appointed holder of Lohman Professorship

Dr. Miroslav Begovic, department head, was appointed holder of the Caroline S. & Tommie Lohman '59 Professorship in Engineering Education. The endowed professorship is effective for a term of three years.

Bhattacharyya elected Foreign Member of ANE, invited speaker at international conference celebrating birthday of Academician Polyak

Dr. S.P. Bhattacharyya, holder of the Robert M. Kennedy Professorship I, was named a Foreign Member of the Academia Nacional de Engenharia (ANE), Brazil, at the Academy's annual meeting in Rio de Janeiro for his research career and relationship with Brazilian universities.

Bhattacharyya was also an invited speaker at the international conference titled "Optimization in

Robustness and Control," organized by the Institute of Control Science, Moscow, Russia, which celebrated the 80th birthday of Academician Boris Polyak who pioneered the use of optimization in Control Systems during his career spanning 50 years in the Soviet Union and now Russia. Bhattacharyya's talk described the new measurement based approaches to the design of static and dynamic systems, developed by him and his students and coworkers.

Braga-Neto and Dougherty publish book on Error Estimation in Pattern Recognition

Dr. Ulisses Braga-Neto and Dr. Edward Dougherty, published a book titled, Error Estimation for Pattern Recognition. The book is the first book devoted entirely to the topic of classifier error estimation in pattern recognition. Error estimation is the process of predicting the error rate of a classifier applied to future unlabeled data, and is critical for the validation of models developed in pattern recognition, machine learning and data analytics applications.

Chamberland named William O. and Montine P. Head Faculty Fellow

Dr. Jean-Francois Chamberland, professor, was named a William O. and Montine P. Head Faculty Fellow by the college of engineering. "I believe that excellence should be recognized and rewarded," said M. Katherine Banks, vice chancellor and dean of engineering. "This year 50 faculty and 17 staff members were honored for their contributions, their passion and commitment to elevating our programs."

Han interviewed about One Health Grand Challenge, receives E.D. Brockett Professorship, NIH grant



Dr. Arum Han, associate professor, is featured in an interview on the One Health Grand Challenge

website discussing his research. The One Health Grand Challenge is an opportunity for Texas A&M schools and colleges to plan and implement an inter/transdisciplinary collaborative approach to helping improve the lives of all species — Human and Animal Health — by addressing health and their connections between natural and man-made environments. In the "Accessible & Affordable Quality Healthcare," section Han discusses his research "Development of next-generation biologics through microphysiological systems."

Han also received the E.D. Brockett Professorship from the college of engineering and received a grant from the National Institutes of Health (NIH) to develop brain-on-a-chip for drug development against neurological disorders. Through this new NIH grant, Han and his collaborators, Jianrong Li, professor in veterinary integrative biosciences, and Yoonsuck Choe, professor in computer science, will develop a brain-on-a-chip system that will be the first high-throughput myelination model system of the central nervous system. This system will have physiologically relevant responses and will be amenable to high-throughput drug screening applications.

Cui named IEEE Communication Society Distinguished Lecturer, TEES Fellow

Dr. Shuguang (Robert) Cui, associate professor, was named an IEEE Communication Society (ComSoc) Distinguished Lecturer. The IEEE ComSoc Distinguished Lecture program recognizes the most active researchers and best speakers in the society, and sponsors selected individuals to travel and educate IEEE local branches on specific research topics. Each lecturer serves a two-year term.

Cui was also named a Texas A&M Engineering Experiment Station (TEES) Fellow. "I believe that excellence should be recognized and rewarded," said M. Katherine Banks, vice chancellor and dean of engineering. "This year 50 faculty and 17 staff members were honored for their contributions, their passion and commitment to elevating our programs."

Ehsani elevated to IEEE Life Fellow

Dr. Mehrdad Ehsani, the Robert M. Kennedy '26 Professor II, has been elevated to Life Fellow of the Institute of Electrical and Electronics Engineers (IEEE). The Life Fellow designation is granted to an IEEE Fellow who is at least 65 years old and for whom the sum of the member's age and the number of years being an IEEE member exceeds 100. Ehsani became a member of IEEE in 1970. He was named an IEEE Fellow in 1994, a designation given to those with an extraordinary record of accomplishments in any of the IEEE fields of interest. He has received more than 100 awards and recognitions from IEEE, including the IEEE Outstanding Teaching Award.

Kezunovic invited to serve on review panel of the Physical Measurement Laboratory at NIST

Dr. Mladen Kezunovic, the Eugene E. Webb Professor, was invited to serve on the review panel of the Physical Measurement Laboratory at the National Institute of Standards

and Technology (NIST). Kezunovic, director of the Power System Control and Protection Laboratory in the department and the Texas A&M Engineering Experiment Station Smart Grid Center, will serve on the panel, which is charged with assessing the scientific and technical work performed by the NIST Physical Measurement Laboratory.

Kumar featured in NSF video, publishes monograph on designing secure protocols for wireless ad-hoc networks

P. R. Kumar, professor and holder of the College of Engineering Chair in Computer Engineering, was featured in an interview on the National Science Foundation's (NSF) website in which he lectured about the challenges of cyber-physical systems (CPS), or systems in which physical processes are tightly intertwined with networked computing.

Kumar, along with Jonathan Ponniah and co-author Yih-Chun Hu, also published a monograph on designing secure protocols with provable security

Duffield receives DARPA grant and numerous other honors



Dr. Nick Duffield, professor, is part of a group that was awarded a multi-million dollar contract from the Defense

Advanced Research Projects Agency (DARPA) to help develop new networking and security technologies at the Wide Area Network (WAN) edge. The awards fall under DARPA's Edge-Directed Cyber Technologies for Reliable Mission or Edge-CT program that the agency says will combine real-time network analytics, holistic decision systems and dynamically

configurable protocol stacks to mitigate WAN failures and attacks on the fly. Duffield's involvement in the project stems from his research in Network Tomography, in which end-to-end performance measurements between network edges can be correlated to identify common origins of performance degradation.

Duffield also was elected to the Board of Directors of the Association for Computing Machinery's (ACM) Sigmetrics, a special interest group of ACM that is concerned with computer systems performance evaluation.

Duffield was also announced as specialty chief editor of the newly created journal *Frontiers in ICT*.

Frontiers in ICT is an international, multidisciplinary, peer-reviewed open-access journal that brings all specialisms across information and communications technologies together on a single platform. He is specialty chief editor of the section on Big Data.

Duffield was also chosen by the Google Faculty Research Awards Program as a recipient of financial support for his proposal, "Traffic Measurement from High-level Names in Software Defined Networking." The project is a collaboration between Duffield and Dr. Minlan Yu, assistant professor in the Department of Computer Science at the University of Southern California.

FACULTY/STAFF HONORS & AWARDS

guarantees for wireless ad-hoc networks infiltrated with adversarial nodes.

The monograph is titled "A Clean Slate Approach to Secure Wireless Networking." The authors note that the current process of designing secure protocols is tantamount to an arms race between attacks and patches that does not provide any security guarantees. Motivated by this, they introduce a system theoretic approach to the design of secure protocols with provable security as well as optimality guarantees.

Michalski receives prize paper award from IEEE's APS

Dr. Krzysztof Michalski, associate professor, received the Sergei A. Schelkunoff Transactions Prize Paper Award from the IEEE Transactions on Antennas and Propagation Society. He won the award for his paper "On the Plane Wave-Excited Subwavelength Circular Aperture in a Thin Perfectly Conducting Flat Screen." In his paper, Michalski says the electromagnetic field transmitted by a subwavelength circular aperture in a perfectly conducting screen of infinitesimal thickness and illuminated by an obliquely incident plane wave is analyzed based on the Bethe-Bouwkamp quasi-static model of the field in the aperture plane.

Miller receives Charles Crawford Distinguished Service Award

Dr. Scott Miller, professor and holder of the Debbie and Dennis Segers '75 Professorship, received the Charles Crawford Distinguished Service Award from the college of engineering. "I believe that excellence should be recognized and rewarded," said M. Katherine Banks, vice chancellor and dean of engineering. "This year 50 faculty and 17 staff members were honored for their contributions, their passion and commitment to elevating our programs."

Narayan named IEEE Fellow, receives Dean of Engineering Excellence Award

Dr. Krishna Narayanan, professor, was named an Institute of Electrical and Electronics Engineers (IEEE) Fellow for his research contribution. IEEE Fellow is the highest grade of membership and is recognized by the technical community as a prestigious honor and an important career achievement. The IEEE grade of Fellow is conferred by the IEEE board of directors upon a person with an outstanding record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year cannot exceed one-tenth of one percent of the total voting membership. Narayanan is being recognized "for contributions to coding for wireless communications and data storage."

Narayanan also received a Dean of Engineering Excellence Award from the college of engineering. "I believe that excellence should be recognized and rewarded," said M. Katherine Banks, vice chancellor and dean of engineering. "This year 50 faculty and 17 staff members were honored for their contributions, their passion and commitment to elevating our programs."

Palermo named faculty fellow by college of engineering

Dr. Sam Palermo, associate professor, was named a William Keeler Faculty Fellow by the college of engineering. "I believe that excellence should be recognized and rewarded," said M. Katherine Banks, vice chancellor and dean of engineering. "This year 50 faculty and 17 staff members were honored for their contributions, their passion and commitment to elevating our programs."

Qian awarded USDA grant aimed at forging collaborations between the colleges of engineering and agriculture & life sciences

Dr. Xiaoning Qian, assistant professor, was awarded a grant from the U.S. Department of Agriculture (USDA) entitled, "Molecular and biochemical mechanisms of oxidized lipids signaling in regulating drought tolerance in maize." In the project, Qian, who also is a member of the newly formed Center for Bioinformatics and Genomic Systems Engineering (CBGSE), will collaborate with Dr. Michael V. Kolomiets from Texas A&M AgriLife Research to help develop analysis pipelines for next generation sequencing data to understand the changes in plants under biological (biotic) and non-biological (abiotic) stresses, for example drought and insects.

Russell named Fellow of National Academy of Inventors, NAE chair of the committee on membership

Dr. B. Don Russell, Jr., the Harry E. Bovay, Jr. Chair Professor, Regents Professor and Distinguished Professor, was named Fellow by The National Academy of Inventors (NAI). Russell was among 170 new Fellows to be inducted during the NAI's 4th Annual Conference. NAI Fellows are academic inventors and innovators who are named on U.S. patents and who were nominated by their peers for outstanding contributions to innovation.

Russell was also named chair of the committee on membership of the National Academy of Engineering (NAE) in Washington D.C. In this capacity, Russell will be responsible for the election of new members of the most prestigious engineering organization in the United States. The academies serve and provide

advice to the President, Congress and government agencies on matters of science and engineering.

Sanchez receives University Distinguished Professor title

Dr. Edgar Sánchez-Sinencio, professor and holder of the TI Jack Kilby Chair, was appointed University Distinguished Professor. The title, which is bestowed in perpetuity, is among the highest honors awarded to Texas A&M faculty members.

Serpedin wins Best Paper Award at prestigious conference

Dr. Erchin Serpedin, professor, along with Professor Khalid Qaraq and Associate Research Scientist Dr. Muhammad Ismail, both from Texas A&M University at Qatar, received the Best Paper Award for their paper "A semidistributed V2V fast charging strategy based on price control." Their paper was ranked third out of more than 2,700 submissions, and was sponsored by Qatar National Research Foundation via a National Priorities Research Program (NPRP) Grant.

Singh receives Professor Visitante Especial award

Dr. Chanan Singh, Regents Professor and Irma Runyon Chair Professor, received a Professor Visitante Especial award from the Brazilian Research Council. The award, based on a competitive research proposal, is for a two-year period and supports collaborative research with faculty members in Brazil. Singh's collaborators are Professor Carmen Lucia Tancredo Borges from UFRJ-Universidade Federal do Rio de Janeiro and Professor Mauro Augusto da Rosa from UFSC - Universidade Federal de Santa Catarina. The goal of this collaboration is to investigate the reliability of the power grid in the presence of high penetration of variable generation sources.

Weichold named IEEE Fellow

Dr. Mark Weichold, Regents Professor and executive director for the Halliburton Global Engineering Program within the Dwight Look College of Engineering, was named IEEE fellow for his educational contribution. IEEE Fellow is the highest grade of membership and is recognized by the technical community as a prestigious honor and an important career achievement. The IEEE grade of Fellow is conferred by the IEEE board of directors upon a person with an outstanding record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year cannot exceed one-tenth of one percent of the total voting membership. Weichold is being recognized "for contributions to international development of engineering education."

Wright elected vice president of IEEE - EMBS

Dr. Steve Wright, professor and holder of the Royce E. Wisenbaker Professorship II in Engineering, was elected vice president for member and student activities of the IEEE Engineering in Medicine and Biology Society, the world's largest international society of biomedical engineers.

Xie invited speaker at a prestigious future grid workshop in China, named Dean of Engineering Excellence Award Assistant Professor

Dr. Le Xie, associate professor, was one of the keynote speakers at the International Workshop on Today's Research for Tomorrow's Grid, which was organized by Tsinghua University in Beijing, China. Entitled "Closing the Loop Around Smart Grid Data," Xie spoke about intelligent and efficient utilization of big data in the smart grid for better power system operations, a research thrust he has been active

Wang named ACerS Fellow, receives O'Donnell Award, AFS Distinguished Achievement Award



Dr. Haiyan Wang, professor, has been named a Fellow of the American Ceramic Society (ACerS). Wang was one of

16 members elevated to the Fellow status. The Fellow designation recognizes ACerS members who have distinguished themselves through outstanding contributions to the ceramic arts or sciences, broad and productive scholarship in ceramic science and technology, conspicuous achievement in ceramic industry, or by outstanding service to the society.

Wang was also named a recipient of the 2015 Edith and Peter O'Donnell Award. The award, which is presented by The Academy of Medicine, Engineering & Science of Texas, recognizes rising Texas researchers who are addressing the essential role that science and technology play in society, and whose work meets the highest standards of exemplary professional performance, creativity and resourcefulness. Wang was honored in the engineering category and is recognized for her innovative research at the frontier of nanostructured materials in the areas of high temperature superconductors, microelectronic and optoelectronic devices, solid oxide fuel cells, nuclear materials, in situ TEM characterizations, and for her exceptional potential in inspired education and future leadership.

Wang was also selected to receive the 2015 Texas A&M Association of Former Students Distinguished Achievement Award for "exhibiting the highest standards of excellence at Texas A&M." Wang was selected for her exemplary research.

FACULTY/STAFF HONORS & AWARDS

with in the past several years along with many of his collaborators.

Xie was also named a Dean of Engineering Excellence Award Assistant Professor by the college of engineering. "I believe that excellence should be recognized and rewarded," said M. Katherine Banks, vice chancellor and dean of engineering. "This year 50 faculty and 17 staff members were honored for their contributions, their passion and commitment to elevating our programs."

Zhang receives Best Paper Awards at IEEE GLOBECOM

Dr. Xi Zhang, professor, was selected as winner of the prestigious Best Paper Award at the IEEE GLOBECOM conference. Zhang and his Ph.D. student co-author, Jingqing Wang, won the Award for their paper "3D Percolation Theory-Based Exposure-

Path Prevention for Optimal Power-Coverage Tradeoff in Clustered Wireless Camera Sensor Networks."

Zou has paper published in prestigious publication

Dr. Jun Zou, associate professor, and a Ph.D. student under his supervision, Chih-Hsien Huang, along with several co-authors, had their paper published in the prestigious research publication Nature Methods. Their research paper "High-Speed Label-Free Functional Photoacoustic Microscopy Of Mouse Brain In Action," is based on a four-year joint work between Zou's Micro Imaging/Sensing Devices and Systems Lab in the department and Dr. Lihong Wang's Optical Imaging Lab at the Washington University in St. Louis. Their work was funded by the National Science of Foundation and the National Institutes of Health.

Staff Awards.

Carda receives department's Outstanding Staff Award

Tammy Carda, senior academic advisor II, received the department's Outstanding Staff Award, "for outstanding performance and willing readiness to assist students, colleagues, faculty and administrators in a manner that consistently exceeds expectations."

Loe receives Staff Excellence Award from college of engineering

Sharon Loe, program coordinator, received the Staff Excellence Award from the college of engineering. "I believe that excellence should be recognized and rewarded," said M. Katherine Banks, vice chancellor and dean of engineering. "This year 50 faculty and 17 staff members were honored for their contributions, their passion and commitment to elevating our programs."

Watson named ABET Fellow



Dr. Karan Watson, provost and executive vice president of Texas A&M University, has been appointed an ABET Fellow for her significant

contributions to the organization.

The Accreditation Board for Engineering and Technology (ABET) accredits college and university programs in the disciplines of applied science, computing, engineering and engineering technology at the associate, bachelor and master degree levels.

The ABET Fellow Award was established in 1988 to recognize individuals who have given sustained, meaningful service to applied science, computing, engineering or engineering technology education and to their respective professions through

their work in accreditation.

"The fact that only two Fellows were named for 2015 is a testament to Dr. Watson's numerous and diverse contributions to the field and the high esteem in which she is held by her peers around the nation," said Texas A&M President Michael K. Young. "We are fortunate to have her as provost at Texas A&M during this time of unprecedented growth and development in engineering and so many other areas."

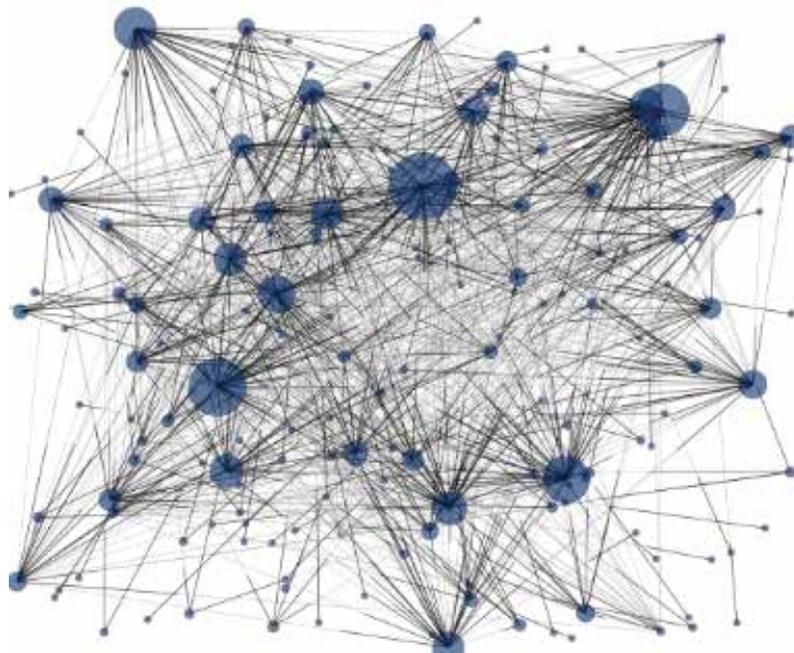
"Karan Watson is most deserving of this honor as her insightful contributions and leadership have made significant impacts on the ABET organization and its accreditation programs," said M. Katherine Banks, vice chancellor and dean of Texas A&M Engineering. "Dr. Watson's engagement at the national level and recognition by this prestigious organization brings

Texas A&M great visibility among our peers."

Watson, who is also a professor in the Department of Electrical and Computer Engineering, joined ABET as a program evaluator more than 20 years ago and was ABET's 2012-13 president.

According to the organization, one of Watson's most significant contributions was the recent restructure of ABET governance. Realizing that having more than 50 members was not an efficient enough structure to lead the organization into the future, the board of directors created a Governance Structure Task Force with Watson as the chair.

Watson's leadership was instrumental in successfully restructuring the board of directors, and she has been commended by her peers on the board as being vitally integral to the formation of the new more nimble and responsive board structure.



Electrical and computer engineering professor creates new graduate school ranking algorithm

In March, *U.S. News and World Report (USNWR)* releases the latest version of its graduate school rankings, which includes engineering programs. While the *USNWR* ranking is widely followed, some researchers believe that it may not be the most accurate indicator.

For *USNWR* graduate engineering rankings programs at 215 engineering schools that grant

doctoral degrees are surveyed.

Engineering specialty rankings are based solely on peer assessments by department heads who rate the other schools that offer a doctoral degree in the specialty on a five-point scale.

Other rankings have used different metrics including number of publications and citation counts to rank graduate programs.

Dr. Narasimha Reddy, the J.W. Runyon, Jr. '35 Professor I in the Department of Electrical and Computer Engineering at Texas A&M University, believes a more accurate ranking could be based on faculty hiring from peer institutions.

Reddy, who is also the assistant agency director for national and global initiatives at the Texas A&M

Capstone Design Laboratory Builds Student, Industry Ties

The Capstone Design laboratory (ECEN 403-404) is an industry sponsored program that provides students applicable experience in the design process and project engineering as practiced in industry. Through testing and evaluation, student teams apply the design process to develop a project proposed by our industry supporters. During the two-semester class, students get to work with products of the sponsoring company and form relationships with company representatives as they near graduation. At the end of the semester, students are given a final chance to leave a lasting impression on company representatives as they present their innovative design projects to be judged.



To learn the latest from Texas A&M Electrical and Computer Engineering visit our website at engineering.tamu.edu/electrical

“...this metric we’re using would say that the more people you place the better program you are..”

Engineering Experiment Station (TEES), said that the best people to measure a program’s value are the people in the program because they know about their field more than anyone else.

“If I assume that universities are going to try and hire from programs that are better than them, or at least as good as them, this metric we’re using would say that the more people you place the better program you are,” he said.

Reddy and his research team devised a statistical and mathematical approach to rank graduate programs using algorithms deployed on a mutual

“hiring graph” among universities.

They collected faculty data from top 50 departments across the United States (according to *USNWR*) to construct their hiring graph.

Reddy said the new rankings were generally consistent with *U.S. News* rankings, but they did expose some new observations about some particular programs.

“The interesting thing is our results vary from *U.S. News* in a few categories,” he said. “*U.S. News* seems to favor private programs over public programs. The programs that are rated higher by them and lower by us are private programs and the programs

that are rated higher by us and lower by them are public programs.”

In addition to the discrepancies between public and private institutions, Reddy said *USNWR* rankings tend to favor colleges with a reputation that may no longer exist. Reddy’s algorithm can shed light on changing reputations based on the history of hiring patterns.

“*U.S. News* has more of a lag effect — once you have a reputation it takes a long time to lose it,” he said. “Similarly newer programs are doing very well now in placing their students, but they’re not ranked as high as they should be ranked. That’s something you can measure with this data.”

While getting data for his rankings may prove difficult and has the possibility of becoming skewed if programs start concentrating on getting their graduates placed in peer institutions, Reddy believes it’s a good technique to supplement *UNSWR* rankings and reveals interesting insights.

For more information please visit: <http://bit.ly/2aMAFlz>.



STUDENT HONORS & AWARDS

Abdullah named winner in engineering category of SUT student paper contest

Ahmad Abdullah, graduate student, was the winner in the engineering category of the first Society for Underwater Technology (SUT)-TAMU chapter Student Paper Contest with his paper "A Cost Effective and Environmentally Attractive Approach for Cable Protection in Off-Shore Wind Farms."

Aimone named best thesis winner for TAMU Undergraduate Research Scholars Program

Connor Aimone, a senior majoring in electrical engineering and minoring in mathematics, was named the best thesis winner for the Texas A&M Undergraduate Research Scholars Program for the STEM field.

A group of 170 students completed the Undergraduate Research Scholars Program, which is open to any Texas A&M student with a GPR of 3.0 or better who is interested in undertaking a research project under the mentorship of a Texas A&M faculty member over the course of consecutive fall and spring semesters. Undergraduate research scholars present their work publicly at TAMU Student Research Week or a professional conference in their field and submit a final scholarly piece. Honors and undergraduate research staff evaluate student engagement and accomplishment to select two best thesis award winners — one in humanities/arts/social science and one in science/technology/engineering/mathematics (STEM) disciplines.

Aimone completed his thesis work under the mentorship of Dr. Le Xie, and focused on developing and testing mathematical models for voltage source converter based DC lines for transmission and distribution of power.

Bae wins Student Challenge Award at premier RF and microwave event in Europe

Juseok Bae, Ph.D. student, won the Student Challenge Award at the European Microwave Week (EuMW), the premier RF and microwave event in Europe.

The Student Challenge is an opportunity for undergraduate, graduate and Ph.D. students from all over the world with a variety of academic backgrounds, to work together on a specific topic in the wide and challenging field of microwaves. The aim is to promote innovative thinking, teamwork and proactive behavior.

Bae, whose advisor is Dr. Cam Nguyen, led a team that included three other graduate students from Telecom ParisTech University, Paris, France; Chalmers University of Technology, Gothenburg, Sweden; and Petersburg Electrotechnical University, St. Petersburg, Russia. Their poster was "Phased Array Formation using Drones for Space Applications."

Chen named exceptional reviewer for prestigious journal

Po-Chen Chen, Ph.D. student, was named exceptional reviewer for the journal of IEEE Transactions on Power Delivery. He is a student under Dr. Mladen Kezunovic, the director of the Texas A&M Engineering Experiment Station Smart Grid Center and the Eugene E. Webb Professor in the department.

Dehghannasiri receives Best Paper Award from premier bioinformatics conference

Roosbeh Dehghannasiri, Ph.D. student, received the Best Paper Award from the Midsouth Computational Biology and

Bioinformatics Society (MCBIOS) 2015 conference. He won the award for his paper "Efficient experimental design for uncertainty reduction in gene regulatory networks." His co-authors are Dr. Edward Dougherty and Dr. Byung-Jun Yoon.

In his paper, Dehghannasiri proposes a new experimental design framework for uncertainty reduction in gene regulatory networks. The method utilizes the concept of mean objective cost of uncertainty and incorporates a network reduction scheme to reduce the computational complexity.

Esmailian receives fellowship for energy research

Ahad Esmailian, Ph.D. student, was awarded the 2015 ConocoPhillips Graduate Fellowship.

The Texas A&M Energy Institute awards the fellowship, which is funded through ConocoPhillips, to recognize outstanding energy research work performed by Ph.D. students under the supervision of affiliated faculty members of the institute. Each graduate fellowship consists of a \$5,000 stipend.

Esmailian is working as a research assistant under the supervision of Dr. Mladen Kezunovic in the Power Systems Control and Protection Laboratory. His main research interests are wide area power system protection, fault location and application of intelligent methods to power system monitoring and protection.

Kim wins first prize at microwave conference

Kyoungwoon Kim, Ph.D. student, won first prize at the prestigious Asia Pacific Microwave Conference (APMC) in Japan.



ELECTRICAL & COMPUTER ENGINEERING TEXAS A&M UNIVERSITY

Gift and Endowment Opportunities

Gifts and endowments help attract and educate top quality students, reward and retain top quality faculty and promote the growth of the department. We would be delighted to meet with you to discuss how you can make a gift or establish an endowment in your name or in the name of a loved one. Endowments may also take the form of naming a laboratory or the department.

Gifts of any size may also be made to the Electrical & Computer Engineering Development Fund to support the growth of the department. Please contact us for more information.

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Your gift can enhance one of four areas in the department:

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Support Texas A&M electrical and computer engineering students through scholarships and fellowships. Donors may contribute to existing programs or design a scholarship/fellowship based on their own criteria.

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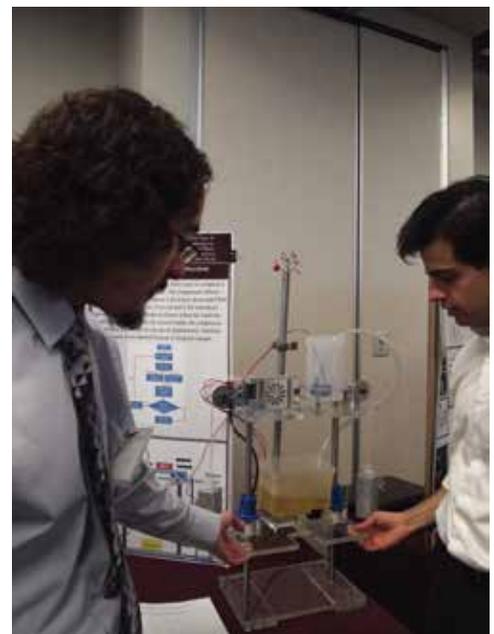
Top faculty members attract not only other superb professors but also the best quality students. Invest in the potential of one faculty member and you affect the lives of hundreds of students.

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An endowed discretionary gift allows the department head to decide how to best use your gift. This is especially valuable and can help shape the future of your department.

Facilities

The construction and maintenance of our facilities is critical to accommodate our growth and continue to attract the best and brightest students and faculty. Construction of a new home for engineering undergraduate education, the Engineering Education Complex. This modern, technology-enabled facility will help us transform how we educate students to better prepare them for the workforce.



STUDENT HONORS & AWARDS

Kim, whose advisor and co-author is Dr. Cam Nguyen, the TI Professor II in Analog Engineering, won first prize for his paper "Design of a K-Band Power Amplifier for High Gain, Output Power and Efficiency on 0.18- μ m SiGe BiCMOS Process."

The APMC is the largest microwave conference in the Asia-Pacific region, bringing together international researchers, engineers and students to showcase the most advanced research and development in microwave technologies. It is organized and sponsored by The Institute of Electronics, Information and Communication Engineers (IEICE).

Lei receives Best Poster Award at premier engineering meeting

Hangtian Lei, Ph.D. student, won the Best Poster Award at the Power Systems Engineering Research Center (PSERC) Industry Advisory Board Meeting.

Lei, whose advisor is Dr. Chanan Singh, won for his poster that

describes the research from a collaborative project "Reliability Assessment and Modeling of Cyber Enabled Power Systems with Renewable Sources and Energy Storage." Singh and Dr. Alex Sprintson from the electrical and computer engineering department at Texas A&M, and Dr. V. Aravinthan of Wichita State University were the other investigators.

As the largest National Science Foundation Industry-University Cooperative Research Center, PSERC draws on university capabilities to creatively address the challenges facing the electric power industry. Its core purpose is to empower minds to engineer the future electric energy system.

Mohsenizadeh receives First Place Post-Doctoral Award at prestigious conference

Daniel Navid Mohsenizadeh, post-doctoral student, was given the First Place Post-Doctoral Award at the Twelfth Annual Conference of the

MidSouth Computational Biology and Bioinformatics Society.

Mohsenizadeh, a post doc student of Dr. Edward Dougherty, was given the award for his presentation "A Dynamical Modeling Methodology for Uncertain Genomic Networks," with co-authors Jianping Hua, Michael Bittner and Dougherty. He currently is in the NIH Training Program with the Department of Statistics.

Ramirez selected as student ambassador for the National Action Council for Minorities in Engineering

Senior Anthony Ramirez was selected to be a student ambassador for the National Action Council for Minorities in Engineering (NACME).

For the past 40 years, NACME has awarded engineering scholarships to African American, American Indian and Latino students seeking a postsecondary degree. NACME distributes these awards through

Dehghanian receives numerous awards for scholastic, professional activities



Payman Dehghanian, Ph.D. student, received the 2015 IEEE-Eta Kappa Nu Outstanding Professional Award to

recognize him for meritorious service in the interests of humankind, as well as for outstanding professional achievement.

He is supervised by Dr. Mladen Kezunovic, the director of the Texas A&M Engineering Experiment

Station Smart Grid Center and the Eugene E. Webb Professor in the department.

Dehghanian was also the recipient of the IEEE Region 5 Outstanding Individual Award, which is given to those who have exceeded their responsibilities in IEEE committees and volunteer jobs for IEEE promotion, such as those who have demonstrated excellent research success and publication records and outstanding editorial and reviewing services to the IEEE conferences and journals. Region 5 covers all the IEEE activities in the Southwestern United States with more than 23,000

higher-grade members and over 3,600 student members. They are aligned with 26 sections and over 90 student branches.

Dehghanian was also named exceptional reviewer for the *Elsevier Journal of Energy*, which is extremely significant because recipients can only be nominated by editors.

He also received the Best Ph.D. Student Award from the department, which is presented to a student in the electrical and computer engineering department for "outstanding performance during his Ph.D. program."

the NACME Scholars (block grant) Program. NACME scholar ambassadors are part of a select group of students chosen from each partner institution to represent the NACME scholars on each campus.

As student ambassador, Ramirez will relay important information about NACME to the scholars and the resources it can provide. He also will represent Texas A&M at the annual NACME Symposium and Gala.

Vyas receives award for outstanding service, diversity service and UNICEF Member of the Year

Yashwant Prakash Vyas, senior, received the ISV Spotlight Award from the International Student Voice (ISV) Magazine.

The ISV Spotlight award recognizes students for their hard work and dedication to making their campus inclusive and internationalized. The award was created to put the spotlight on a student who not only cares about his/her campus community, but also takes an active leadership role. Vyas was selected because of his passion and dedication for making the community at Texas A&M a better place.

Vyas also received the Diversity Service Student Award 2015 from the Department of Multicultural Services, which acknowledges and honors the efforts of students, faculty and staff who strive to promote understanding and appreciation of diversity in its multitude of forms at Texas A&M. The recipients must have demonstrated outstanding commitment to the value of diversity, outstanding efforts to promote an environment free from bias and discrimination, and have worked to provide students, faculty

and staff a university experience rich in perspectives and opportunities to learn from each other. Only one student is selected each year.

Vyas was also awarded the UNICEF Member of the Year Award, which was presented at the UNICEF Campus Initiative Summit. He is the first student from Texas A&M to receive the award. This is a national award given every year at the annual summit to a member for his/her contribution to US Funds for UNICEF and only one award is given in this category.

Electrical and computer engineering students among top finalists in TI Innovation Challenge

A team of undergraduate students was among the top finalists in the 2015 Texas Instruments (TI) Innovation Challenge.

The TI Innovation Challenge contest is designed to encourage engineering students to submit design projects that utilize TI technology. Justin Bishop, Nathan Parish, Shelby Turner and Rachel Vaughan, seniors in the department, created CycleFit, which placed in the top 10 out of 300 teams in the TI contest.

CycleFit is designed to allow stationary bike riders to observe their workout performance and health status in real-time so that they can make their workout more effective and efficient. The system consists of a wearable biosensor interface that measures the user's heart rate, speed, hydration level and leg muscle efficiency, and an Android app that displays this information to the user. Their design also earned the Best Overall Capstone Award for the department in the Dwight Look College of Engineering's project showcase and placed third in the department's Capstone Invitational Demo Day.

Electrical and computer engineering students receive IEEE PES Award

The IEEE Power and Energy Society Scholarship Plus Scholar Award was presented to Texas A&M University undergraduates, Brian Pabst, Benjamin Jack and Lindsey Miller, all majoring in electrical engineering.

These students are recognized for their high GPAs with distinct extracurricular activities, and for their commitment to explore the power and energy field. This award includes a multi-year \$2,000 annual scholarship and opportunities for hands-on career experiences.

Jack also was selected for the Schweitzer Meritorious Scholarship given by the Schweitzer Engineering Laboratories to encourage the most promising engineering students in the United States and Canada to focus their studies on power and engineering industry, which is facing challenges such as making renewable energy sources cost effective.

Undergraduate students awarded scholarships from Gulf Coast Power Association

Hugo DeLeon and Rebecca Jones, undergraduate students, received scholarship awards at the Gulf Coast Power Association (GCPA) Spring Conference luncheon.

The Dave Olver Memorial Scholarships was awarded to DeLeon while the GCPA emPOWERing Women Scholarship was awarded to Jones.

The Gulf Coast Power Association has served Texas and the Gulf Coast for over 25 years as a regional electric power trade organization dedicated to promoting an improved understanding of the issues and opportunities impacting contemporary power markets.



Giesecke name honored with high-tech research building

Texas A&M University is rich in traditions. From the 12th Man to Muster, Silver Taps to Bonfire, the university is steeped in history.

One Texas A&M graduate encompassed these traditions and dedicated so much of his time and effort to the university that he was honored with an engineering research building being named after him.

Dr. Frederick E. Giesecke earned two of his five degrees at Texas A&M in 1886 and 1890 and served as head of the Department of Mechanical Drawing. He established the first formal architectural program in the state and led that department until 1912. He later served as director of the Texas Engineering Experiment Station (now the Texas A&M Engineering Experiment Station) from 1928 to 1939, during which time he designed several iconic buildings on the university campus.

In 2015 the Giesecke Engineering Research Building was officially opened

during a dedication ceremony. It is the first building on the Texas A&M campus named after someone for their service rather than an endowment.

The newly commissioned building serves as a one-stop location for conducting research at the forefront of micro and nano technology. Co-locating individual faculty labs with shared core facilities for micro and nanofabrication (AggieFab Nanofabrication Cleanroom) and material characterization (Material Characterization Facility) provides both flexibility and collaboration among faculty working in diverse areas of micro and nano systems technology.

Some of the labs, such as the NanoBio Systems Laboratory, are also fully equipped with capabilities to conduct biological experiments utilizing the developed micro and nano systems, providing a ground for diverse multidisciplinary collaboration.

The research park location, which is close to most of the major life science

buildings on campus — Veterinary Medicine, Health Science Center and AgriLife — also enables the location to become a vibrant place for researchers from diverse backgrounds to come together to solve complex problems facing our society, a challenge that can only be solved through intensive multidisciplinary collaborations.

Several faculty members in the Department of Electrical and Computer Engineering share this high-tech facility, giving them the opportunity to take their research to a higher level, just like the building's namesake.

Dr. Arum Han

Dr. Arum Han's NanoBio Systems Laboratory focuses on solving grand challenge problems in the broad area of health and energy through the use of micro/nano systems technology. His micro/nano systems research includes developing organ-on-chips, developing high-throughput microsystems accelerating microorganisms-based

biomanufacturing, accelerating drug/vaccine development against infectious diseases through the development of high-throughput screening lab-on-a-chip platforms and developing single-cell physiochemical analysis systems for detecting high-risk cancer.

Organ-on-a-chip

Organs-on-chips are microfabricated miniature systems that can accurately mimic the functions and responses of the physiological systems of animal and human. These miniature tissues and organs, also called microphysiological systems, are expected to have a huge impact in a broad range of applications as they can overcome the limitations of currently used biological assays and animal models. Having the capability to better predict human physiological responses without having to use animal or human models can lead to better understanding of disease mechanisms and accelerate drug development and toxicity screening.

Han's current focus area is in developing in vivo like in vitro systems of developing brains using microfabrication technologies. They have been developing various brain-on-a-microchip models for deciphering the mechanisms of neurodegenerative diseases (e.g., Parkinson's disease, Multiple Sclerosis and Alzheimer's disease) and screening molecules for new drug development against those diseases.

"The impact to the research community is that we have demonstrated the possibility of developing such in vitro neurodevelopmental model with significantly higher level of physiological relevance," he said. "These models are currently being applied for drug screening and development applications, where the ultimate impact will come from discovering next-generation therapeutics for various neurodegenerative diseases and better understanding the underlying mechanisms."

High-throughput microsystems accelerating microorganisms-based biomanufacturing

Microorganism-driven bioproduction has long been used as a means for generating products of high commercial value, including pharmaceuticals. Han's research focuses on developing

microalgae and other photosynthetic microorganisms to produce economically and environmentally sustainable biofuel, which he hopes will provide a new source of renewable energy. These microorganisms can also be engineered to produce other high-value specialty chemicals and pharmaceuticals.

He employs microfluidic lab-on-a-chip systems, systems that integrate tiny fluidic channels on a microchip fabricated through semiconductor microfabrication processing, to handle tiny amounts of liquid samples down to pico-liter and single-cells, and integrate various functionalities into a single user-friendly platform to automate the entire process of a biological assay. These systems are currently being used to develop microorganisms that are better and more efficient in turning sunlight, carbon dioxide and water into high-quality fuel and specialty chemicals.

Accelerating vaccine development against infectious diseases

Han's research group has also been accelerating drug and vaccine development against infectious diseases by developing high-throughput single-cell resolution microfluidic lab-on-a-chip systems that discover antimicrobial products, understand antibiotic resistance, develop therapeutics against select agents, develop safer vaccines and understand evolutionary emergence of virulence and host-pathogen interactions. Some of the emerging infectious diseases his group is targeting are middle eastern respiratory syndrome (MERS), Brucella and dengue virus. These microscale devices are also being developed as a portable point of care diagnosis tool that can provide diagnosis anywhere anytime.

High-throughput single-cell analysis of high-risk metastatic cancer cells

Tumors are highly varied. A subpopulation of tumor

cells exists that possesses high rates of proliferation and survival ability, leading to more aggressive cell types that can cause tumor invasion and metastasis. Identifying these highly aggressive subpopulations in solid tumors has been one of the major challenges in understanding the physiology of tumor and improving cancer therapy.

In Han's research they are developing two technological platforms to distinguish and quantify these highly aggressive cancer cells, one based on measuring the cell's physiochemical property based on their electrical impedance and one based on the cells' vibro-acoustic properties. Neither method requires labeling of target samples since it measures the intrinsic properties of samples requiring only simple instrumentation, a significant difference from current practices that require complicated sample preparation steps. By integrating such technology into microfluidic systems, on-site diagnosis of high-risk cancer could be a possibility in the future.



Dr. Jun Kameoka

Dr. Jun Kameoka's research team is using a microfluidic flow-proteomic platform to analyze individual cellular signaling complexes in tumor tissue. These complexes are made up of mostly proteins and nucleic acids, and play a critical role in signal transduction that coordinate basic cancer development process. The signal transductions are mainly relayed through protein-protein and protein-nucleic acid interactions.

"We have developed the microfluidic flow-proteomic platform for high throughput screening applications," Kameoka explained. "This platform consists of a single molecule fluorescent detection system, a microfluidic array device and an automated XY-stage with automated electrical potential application system via relay management systems that can automatically and continuously detect specific molecules and dissect molecular interactions with single molecule accuracy."

Kameoka said delineating the underlying mechanisms of cancer signal transduction, which is often regulated, relies highly on the analysis of specific protein-protein and protein-nucleic acid interactions. Conventional methods, such as Western blot, can detect protein-protein and protein-nucleic acid interactions through molecular separations in gel structures, and normally requires long processing time qualitatively. Their multiplex flow-proteomic platform can analyze individual signaling complexes directly

from tumor tissue, and thus enable accurate and rapid acquisition of the molecular interaction information quantitatively.

"We expect this system to have 16-fold increase in efficiency for point of care, drug screening and personalized medical treatment applications," he said. "Drug screening throughput will be increased significantly, and as a result, the drug development cost such as anti-cancer drug will be reduced. In addition, new and more reliable cancer biomarkers for early detection based on multiple protein interactions (never studied before) will be discovered."

Dr. Pao Tai Lin

Dr. Pao Tai Lin's group has investigated mid-infrared photonic circuits for chip-scale and label-free sensing that will enable detection of early-stage diabetes, asthma and other chronic diseases.

His research focuses on developing flexible optoelectronics and multifunctional mid-infrared materials that will lead to wearable biomedical sensors for remote health monitoring.

"My team expects to demonstrate revolutionary wearable biomedical sensors for remote health monitoring," Lin explained. "Many present sensors require specific reagents to trace biomolecules associated with different diseases.

"On the other hand, sensors created from my team utilize fingerprint absorption so it can identify biomarkers without labels and screen numerous diseases without post

treatment. Integrating our label-free sensor devices with present wireless modules will lead to a unique medical network that can provide low-cost point-of-care for patients with chronic diseases and prevent further infection spread across nations."

Lin, who joined the department less than a year ago, said the first-class facilities in the Giesecke building was one of the reasons he wanted to work at Texas A&M.

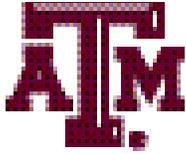
"Texas A&M has state-of-the-art nanofabrication and material centers," he said. "For my present research in wearable sensors, it is critical to scale down from a bench-top optical system to chip scale. The keys to create such delicate sensor components are the micro/nano fabrication and the material integration. My group is very excited to utilize the research facilities here.

"My research has been very productive since becoming a part of the Aggie family. Since arriving at Texas A&M University, we have demonstrated a label-free glucose sensor utilizing nitrite based mid-infrared optical waveguides. This device is able to perform real-time glucose monitoring highly demanded for a wide population of diabetes patients. We also have great progress in developing infrared metamaterials, an engineered nanostructure that can manipulate the behavior of light that cannot be observed in nature (like negative index)."

Lin's research has led to collaborations within Texas A&M and other well-known institutes, and extensive collaborators in the fields of computer engineering, physics and biomedical, with more hopefully around the corner.

"Though my team presently is focused on developing integrated photonics and chip scale sensors, the research eventually will lead to a platform that accommodates multidiscipline efforts and numerous applications such as infrared material syntheses and environmental toxins detection. We are always welcoming new collaborators to explore something exciting," he said, adding that much of it wouldn't be possible without the top notch facilities he's working with in the Giesecke building. "My team is moving forward in exploring new fields and certainly there will be more exciting results announced on the way."





ELECTRICAL & COMPUTER ENGINEERING

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Wood receives College of Engineering Outstanding Alumni Award



Anthony Wood '90, was one of eight former students to receive a 2015 Outstanding Alumni Award from Texas A&M University's College of Engineering.

The Outstanding Alumni Honor Award was established in 1981 to recognize engineering graduates who have brought honor to their profession by outstanding leadership in engineering activities, by enhancing the professional development of engineers or by their creativity or ingenuity in the field of engineering.

Wood is considered a pioneer and innovator in television and digital media. He currently is the founder and chief executive officer of Roku, a name that means "six" in Japanese, to represent his sixth company. Wood also served as the vice president of Internet TV at Netflix, where he developed what is known today as the Roku streaming player, originally designed as the first video player to

stream Netflix. Today, Roku players offer the most extensive collection of streaming entertainment to TV with more than 2,000 channels featuring movies, TV shows, live sports, news, music, casual games and more.

Prior to Roku, Wood invented the digital video recorder (DVR) and founded ReplayTV, where he served as president and chief executive officer before the company's acquisition and subsequent sale to DirecTV. Before ReplayTV, he was co-founder and chief executive officer of iBand, Inc., an Internet software company that was sold to Macromedia. The code base developed by Wood at iBand became a central part of the original core code of Macromedia now known as Adobe Dreamweaver. After selling iBand, Wood became the vice president of Internet authoring at Macromedia. Earlier in his career, Wood was founder and chief executive officer of SunRize Industries, a supplier of hardware and software tools for non-linear audio recording and editing.

Wood holds a bachelor's degree in electrical engineering from Texas A&M.