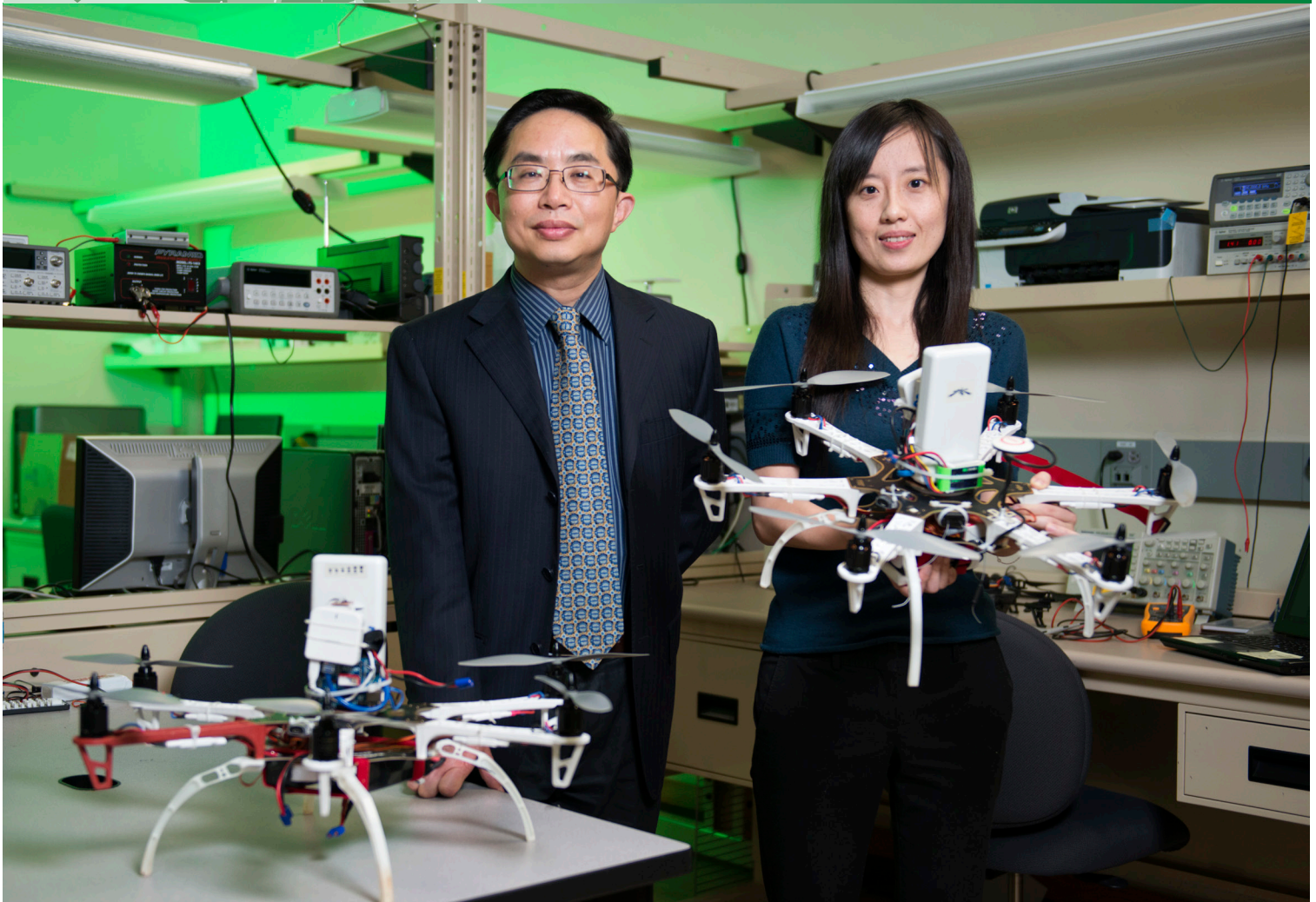


THE NORTH TEXAS Engineer

A publication of the UNT College of Engineering
Spring 2015



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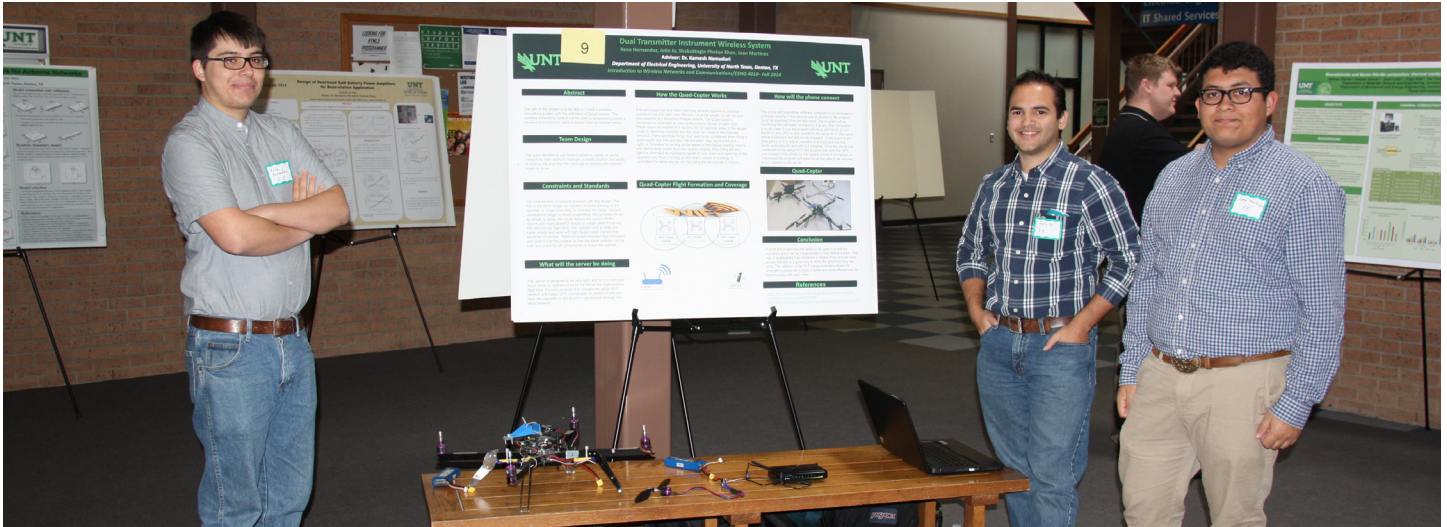
NASA COMPETITION, PAGE 11

The Electrical Engineering Department ends the spring semester with a new department chair, a new CAREER award receipt, and a new Ph.D. program.

SEE PAGE 4 for more.

[<engineering.unt.edu/newsletter>](http://engineering.unt.edu/newsletter)

<Showcase for Undergraduate Researchers>



Undergraduate researchers in the College of Engineering brought their projects, poster presentations, and enthusiasm for their work to the 2nd Annual Showcase for Undergraduate Research in Engineering (SURE), held Nov. 11, 2014.

SURE provides undergraduates an opportunity to share the knowledge they have gained through research while giving a poster presentation. Presenters were required to design a poster displaying their research projects, presenting their research in a professional manner.

“SURE gives our undergraduate researchers a chance to display their research to the UNT community. They

work with College of Engineering faculty on these projects and do excellent work, and we think it is important for them to gain experience presenting and to receive recognition for the work they do.” said Kathryn Beasley, the College’s Graduate Recruiter and Retention Coordinator.

For 2014, members of the College of Engineering Industrial Advisory Board (which includes UNT Engineering alumni as well as managers and business leaders working in engineering across the DFW Metroplex) met with the students during the poster presentations, and the SURE participants were invited to a luncheon with the board members. At a similar post-

er presentation event the previous year, a student was offered a job by an advisory board member, so the benefits of being a participant are definitely worthwhile.

During the luncheon, awards were given to the two most outstanding undergraduate research presenters: Nathan Ley, who was the winner of the Materials, Mechanical, and Construction category for his project “Synchrotron X-ray Diffraction of an Al0.1CoCrFeNi HEA,” and Shawn Kennedy, who was the winner of the Computer & Electrical category for his project “A High-Sampling Rate Wireless Sensor Network for Structural Health Monitoring.” Both winners received a \$250 scholarship.

THE NORTH TEXAS Engineer

//contributors

Editor:
Angela Nelson
Publications Specialist

Contributors:
Costas Tsatsoulis
Dean

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//alumni connect

We would like to hear from our alumni! Please help us tell the story of the College of Engineering and promote the achievements of our alumni by completing the form at:
<http://engineering.unt.edu/alumni-update>

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Undergraduates recognized for their research: [Page 2] students Rene Hernandez, Julio Jo, and Juan Martinez; [Page 3] (top left photo) College of Engineering Advisory Board Chair Etta Clark and student Catherine Dickson; (top right photo) Advisory Board Member Mario Garza and student Wes Solomon; (lower left photo) student Adam Hair and Dr. Rodney Nielsen; (lower center photo) Shawn Kennedy; and (lower right photo) Nathan Ley.



College of Engineering Advisory Board Meeting, November 11, 2014

From left to right in photo:

Devin Joll, PepsiCo and College of Engineering Recent Graduate Advisory Board Chair
 Andrew Toth, Triumph Group (substituting for Casey Litaker)
 Keith Seawright, L-3 Communications (substituting for James Gibson)
 Mario Garza, AT&T
 Rick Beutter, Stryker Communications
 Etta Clark, PepsiCo and College of Engineering Advisory Board Chair
 John Randall, Zyvex Labs
 Dave Faller, Sprint (board candidate)
 Michael Morris, Bell Helicopter (substituting for Michael Severson)
 Siva Gopalnayaranan, Peerless Manufacturing Co.
 Costas Tsatsoulis, Dean of the College of Engineering
 Bill Kahn, Peterbilt Motors Co.
 Don Burgio, Verizon
 Landon Sproull, Peterbilt Motors Co.
 Brian Reid, Odyssey Aerospace



Advisory Board members not in the photo:
 Craig Berry, Siemens PLM Software, Inc.
 Charles Campbell, Labinal
 Jason Cinek, TDIndustries
 Larry Eckersley, Freese and Nichols Inc.
 James Gibson, L-3 Communications
 Jeremy Green, Zodiac Aerospace
 Lettie Haynes, BNSF Railway
 Ashley Ledbetter, CBS ArcSafe Inc.

Casey Litaker, Triumph Aerostructures -Vought Commercial Division
 Sean McMenamin, Peerless Mfg Co.
 Lee Palmer, Hitachi Consulting
 Chris Pearce, Cisco Systems
 Michael Severson, Bell Helicopter
 James Stikeleather, Dell
 Jim Womack, Cowtown Angels

<Electrical Engineering>



<New Ph.D. Program>

The College of Engineering now offers a Ph.D. in electrical engineering, which will allow students the opportunity to gain in-depth knowledge in research areas such as communication,

signal processing, analog and digital circuit design, radio frequency and microwaves, and control system design.

“This is a major milestone for Electrical Engineering, for Engineering, and for the University of North Texas,” said Costas Tsatsoulis, dean of the College of Engineering. “In less than two years, we have added four degrees and one department to our young College: Biomedical Engineering B.S. and M.S., and doctoral degrees in Mechanical and Energy Engineering and Electrical Engineering.”

Dr. Shengli Fu (standing in the photo), chair of the Department of Electrical Engineering (EE), said, “We have been

“ The new Ph.D. program is critical for us because it will leverage our research productivity and help attract highly talented faculty and graduate students.

– Shengli Fu

this happen.”

The new Ph.D. EE program has the unique feature of an integrated entrepreneurship component. The goal of this program is to educate highly talented Ph.D. students for the competitive workforce and national laboratories, as well as to produce the next generation of entrepreneurs. By teaching students essential skills and effective strategies for working in and managing innovative organizations and for starting new ones, the new Ph.D. EE program will provide human resources with blended skills.

The degree program’s first students will begin their studies in Fall 2015.

working on (the Ph.D. program) since at least 2009. I want to take this opportunity to thank all the support from the College, the University and the UNT system that made

New Department Chair

Dr. Shengli Fu has been named the new chair of the Department of Electrical Engineering (EE).

Fu has been a faculty member at the University of North Texas since 2005 and has served as interim chair of the department. His research areas include coding and information theory (space-time coding and decoding, distributed coding, network coding, joint encryption and error-correction coding), wireless communication (cooperative communications, wireless sensor networks, and security in wireless networks), and speech and visual signal processing (speech driven facial animation and speaker location).

Last year, Fu and Dr. Yan Wan, an EE Assistant Professor, received the “Best Use of Advanced Wireless” award for their project “Drone-Carried On-Demand WiFi Networks” during the US Ignite Application Summit. This project also was featured at the June 2014 SmartAmerica Expo.

<NSF CAREER>

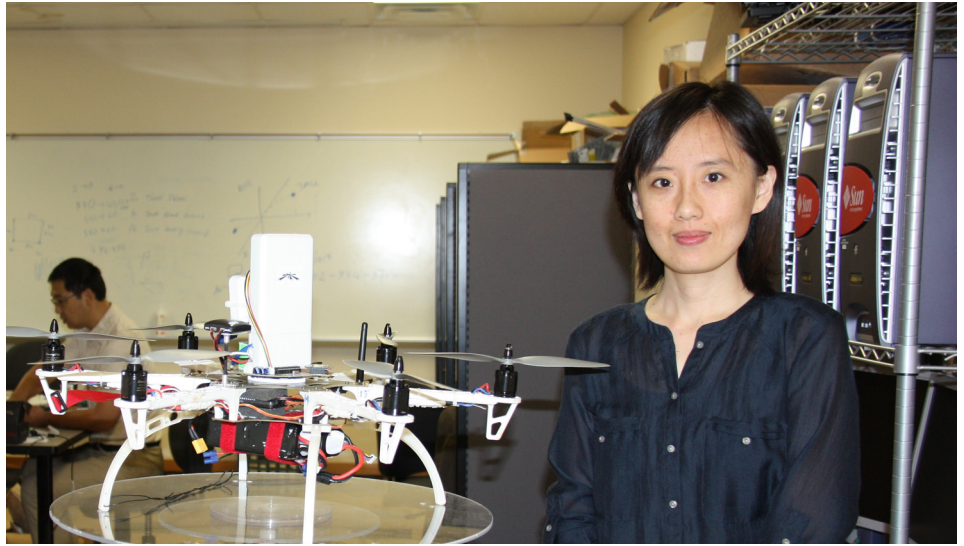
Dr. Yan Wan, an assistant professor in the Department of Electrical Engineering, has received a National Science Foundation (NSF) Early Career Development (CAREER) award for 2015.

The CAREER Award is the NSF's most prestigious award for junior faculty members who demonstrate outstanding research, excellent teaching and mentoring, and the integration of education and research within the context of their organizations' mission.

Over the next five years, Wan will receive \$442,000 from the NSF to develop an innovative theoretical framework for cyber-physical systems (CPS) to enable airborne networking, which utilizes direct flight-to-flight communication for flexible information sharing, safe maneuvering, and coordination of time-critical missions.

This research will contribute to a safer airspace by equipping unmanned aerial vehicles (UAVs) with low-latency communication and situational awareness capabilities. It will also enable new civilian UAV applications that rely on the robust tasking of multiple UAVs.

"Robust networking of airborne networks is challenging, considering the high mobility of UAVs, safety constraints, and the uncertain airspace environment," Wan said. "The fundamental theory is lack-



“ CPS is a broad name for systems of integrated cyber- and physical-components. Many modern systems such as smart power grids, traffic systems, and smart health systems fall in this category. I am excited about developing the fundamental theory that contributes to the core science of managing CPSs.

– Yan Wan

ing. My research develops a theoretical paradigm that exploits the mutual benefits of networking and decentralized mobility control, instead of viewing them as constrains for each other. The paradigm exploits uncertainty, mobility, and network structure to achieve high-performance networking and decentralized control.”

This research is timely considering recent news coverage on UAVs in com-

mercial applications. “The UAV industry is fast growing,” Wan said. “Existing applications on UAVs are mostly concerned with a single UAV. My fundamental research on the networking of multiple UAVs will significantly enhance the safety of UAVs and expand their capabilities for civilian applications. Example applications include on-demand emergency communication and environmental monitoring.”



“ Yan Wan has been a good advisor and has provided a lot of support. It is good to have two women advisors, Dr. Yan Wan and Dr. Yan Huang from the CSE Department, who are both role models for me.

– Junfei Xie

<Scholarship>

Junfei Xie, a Ph.D. candidate student of the Department of Computer Science and Engineering (CSE), is the 2015 recipient of the Wanda J. Shafer Graduate Scholarship, awarded by the Dallas/Fort Worth Chapter of the Women's Transportation Seminar (WTS) to encourage women to pursue career paths in transportation.

The Wanda J. Shafer Graduate Scholarship was established in 2002 in honor of the first chapter president of the Dallas/Fort Worth WTS. It is issued to one awardee per year in the North Texas-Oklahoma area. Xie said she found out about the scholarship in an email sent to her by her research advisor, Dr. Yan Wan.

Xie's research aim is to provide automation solutions to improve the safety and efficiency of next-generation air transportation systems. She said Wan helped get her interested in this research area when she came to UNT for her master's degree.

<Security Research>



<NSA, DHS Designation>

The National Security Agency (NSA) and Department of Homeland Security (DHS) have designated the University of North Texas (UNT) a National Center for Academic Excellence in Cyber Defense Research. UNT is one of about 60 designated research centers in the U.S.

UNT is one of only a few Texas universities to be named both a Center for Academic Excellence in Cyber Defense Research as well as a Center for Academic Excellence in Information Assurance Education.

Cybersecurity research at UNT spans several colleges and departments. UNT researchers focus strongly on network security and human behavior in relation to cybersecurity. Additionally, UNT is the only institution in the U.S. to receive National Science Foundation funding for a Scholarship for Service program exclusive to Ph.D. students studying cyber security.

Playing a role in these achievements is the Center for Information and Computer Security (CICS), an interdisciplinary center which strategically brings together individuals and organizations with an interest in the areas of information security, computer security, information assurance, and cybercrime. The faculty affiliated with the center are all experts in areas related to computer security and cybercrime, and

“ This type of recognition is very advantageous for UNT researchers, who now will have an extra edge when applying for research funding.

– Ram Dantu

many are recognized leaders in their field.

The CICS director is Dr. Ram Dantu, a professor in the Department of Computer Science and Engineering (CSE) who has extensive research and teaching experience in network security. He also is director of the Network Security Lab at UNT. During 2011, Dantu was a visiting professor at MIT working on collaborative research in securing vehicles in the cloud, and in securing emergency 9-1-1 services. Dantu used the research results for a field trial with Action Ambulance (a company serving the Boston community). Also, he published papers in the Cyber and Information Security Research conference organized by Oak Ridge National Laboratory. In addition, Dantu published papers in security conferences such as the 2014 International Conference on Privacy, Security and Trust, the 2013 Workshop on Learning from Authoritative Security Experiment Results, and the Research in Attacks, Intrusions and Defenses (RAID 2013) conference.

The National Science Foundation’s (NSF) website featured a press release and videos about Dantu’s research on a 9-1-1 software system. The NSF also invited Dantu and Dr. Henning Schulzrinne, Chief Technology Officer for the United States Federal Communications Commission and Professor at Columbia University, to conduct a webcast on emergency response smartphone apps.

Workshop

CICS faculty leverage their scholarly expertise to provide service and expertise in information and computer security to the university and to the North Texas area. This includes organizing workshops and seminars to promote security awareness.

On March 27, CICS hosted HoNeST (Hot Topics in Network and Security workshop), which drew more than 220 registrants to the Ericsson Inc. campus in Plano, Texas, for a day of information sessions by academic and industry leaders.

Because of the attendance, the workshop was a great networking opportunity. Seventy percent of the audience was from industry, which included managers, directors, and software developers. More than 50 companies were represented at the event. Other attendees included faculty from universities and students.



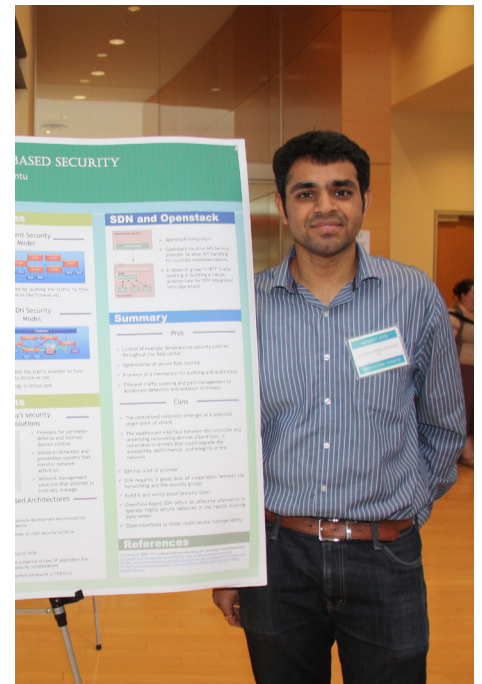
(Above left photo) Jeremy Epstein, Program Director at the National Science Foundation, gave the morning keynote speech. (Above right photo) Geoff Hollingsworth, Director of Business Development at Ericsson, talked about “Data and System Security.” (Below left photo) 2014 UNT Ph.D. Graduate Mohammed Fazeen presents a poster on “Another New App: Does it Have the Right Intentions.” (Right photo) Graduate student Jagganadh Vempati presents a poster on “Software Defined Networks Based Security.”

“This is the first time the Department of Computer Science and Engineering organized such a large conference for a single topic,” Dantu said.

Speakers from UNT, Verizon, AT&T, Sprint, IBM, Cisco, Ericsson and Huawei Technologies conducted information sessions at the event. The keynote speakers were Jeremy Epstein, Program Director, National Science Foundation, and Henning Schulzrinne, a professor at Columbia University and Chief Technical Advisor of the Federal Communications Commission.

The event also included poster presentations by students from the Department of Computer Science and Engineering. “Our students got very good visibility with posters and active participation,” Dantu said.

The workshop’s steering committee included Dantu, as well as David Keathly and Dr. Mark Thompson, CSE lecturers.



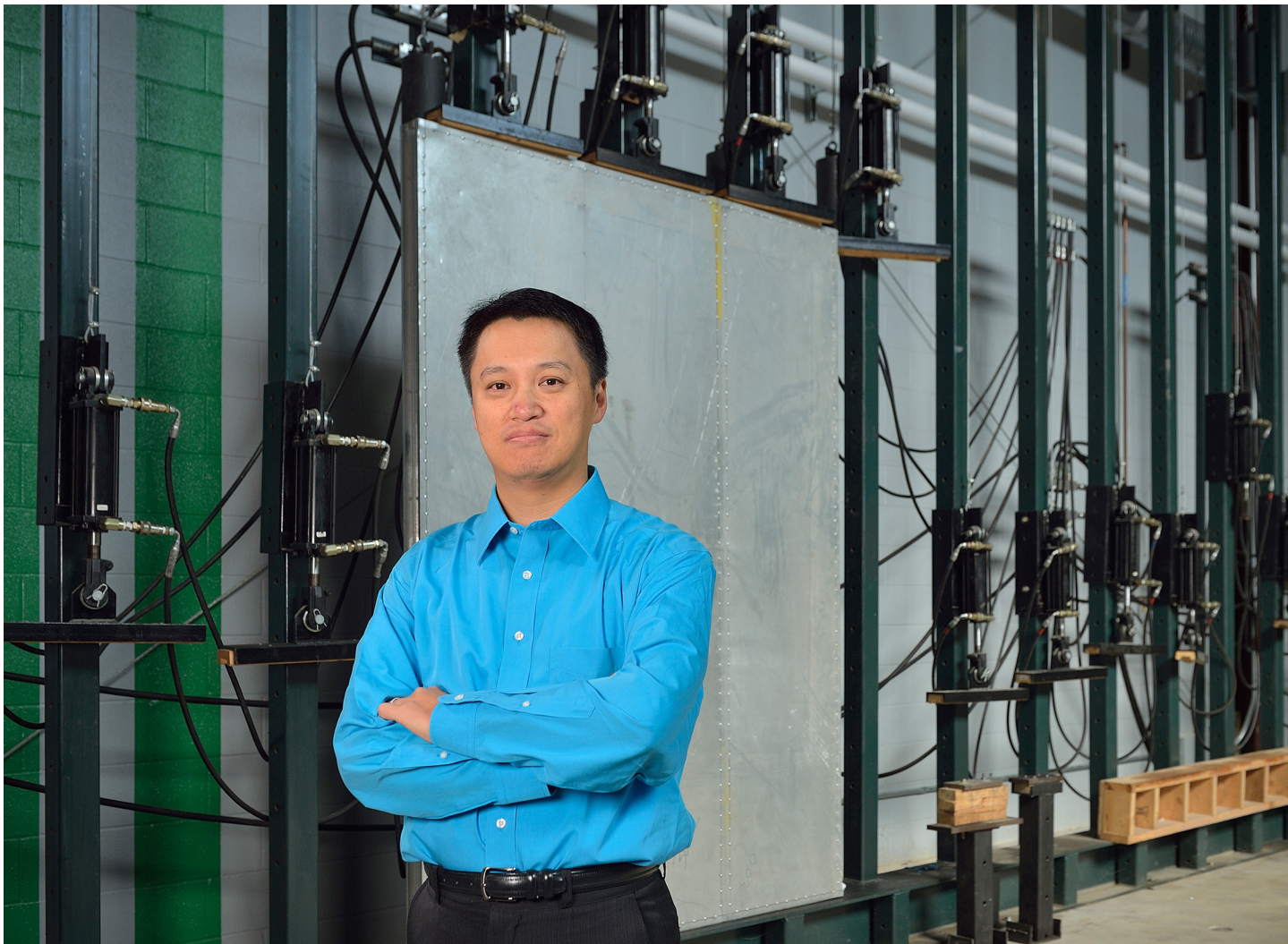
Student wins Spirit of Innovation Competition

Shanti Thiyagaraja, a Computer Science and Engineering graduate student in Dr. Ram Dantu’s Network Security Lab, took first place in the Spirit of Innovation Competition, sponsored by the US India Chamber of Commerce DFW (USICOC), on Dec. 4, 2014. Thiyagaraja received \$5,000 for her presentation on “Smart Phone Monitoring of Second Heart Sound Split.”

This is the second year that theUSICOC has hosted the Spirit of Innovation Competition, which seeks to encourage technology innovation and entrepreneurship and to support professional and business development throughout the Dallas-Fort Worth Metroplex. This competition brings together students from local universities and gives them the opportunity to showcase their innovative business ideas. For 2014, 29 submissions were reviewed by a panel of judges. Ideas were assessed based on feasibility, originality and background research. Eight finalists were selected to present their concepts to the judging panel at Texas Instruments.



<Cold-Formed Steel Research>



Researching cold-formed steel and its applications as a construction material could make buildings and other structures as well as types of equipment more structurally sound and less susceptible to damage caused by natural disasters such as earthquakes and hurricanes.

Dr. Cheng Yu, associate professor and coordinator of the Construction Engineering Technology (CNET) program, is leading that research at the College of Engineering, which recently joined the Cold-Formed Steel Research Consortium. The consortium brings together leading research teams across North America to provide the world's most comprehensive research on cold-formed steel structures.

Cold-formed steel is an economical and recyclable material used in buildings, bridges, storage racks, car bodies, transmission towers, and various other types of equipment and structures. The consortium's mission is to provide world-leading research and training capabilities to realize the full potential of cold-formed steel in construction.

Consortium partners and members include the University of North Texas (UNT), Johns Hopkins University, Virginia Tech, McGill University, Northeastern University, and others.

“Joining the consortium gives UNT and partner institutions an opportunity to combine our expertise and research facilities to advance research and knowledge on cold-formed steel.

– *Cheng Yu*

Yu's research focuses on structural behaviors of and mitigation approaches for light framed steel buildings subjected to multi-hazards, design methods for unique cold-formed steel structures, innovative construction materials and systems, and next generation building information modeling. Yu is a recipient of the 2010 Faculty Early Career Development Award from the

National Science Foundation (NSF).

Small Project Fellowship Program

One of Yu's projects was among the four winning research proposals selected by the American Iron and Steel Institute (AISI) Standards Council for its 2015 Small Project Fellowship Program. The project, “Advancing Building Information Modeling (BIM) for Cold-Formed Steel Structures,” will develop a series of open BIM models that AISI committees, researchers, manufacturers, engineers, and interested third parties may use for exploration and demonstration of cold-formed steel solutions. The objective is to advance BIM for cold-formed steel structures.

“I am excited about the opportunity to work with the industrial partners to advance the BIM technology in cold-formed steel

applications in buildings,” Yu said. “The construction engineering technology program at UNT was among a few pioneering undergraduate programs in the U.S. to replace traditional CAD by BIM in the curriculum. We started teaching Autodesk Revit 3 in 2006, and since then we have been seeing the BIM technology taking over the traditional construction project delivery approach and becoming the industrial standard design method. I am glad that our curriculum enables our graduates to be the leaders during the technology transition period.”

Yu stated that the AISI small project is aimed at further advancing the BIM technology in the steel industry particularly in cold-formed steel building applications. “We plan to develop cold-formed steel member and system families for Revit, a BIM platform software, so that the architects, engineers, and builders can have access to a comprehensive database,” he said. “The cold-formed families will not only allow the professionals to model cold-formed steel in their projects but also provide possibilities for them to conduct in-depth analyses such as energy efficiency analysis, structural performance analysis, project cost and schedule analysis, and so on.”

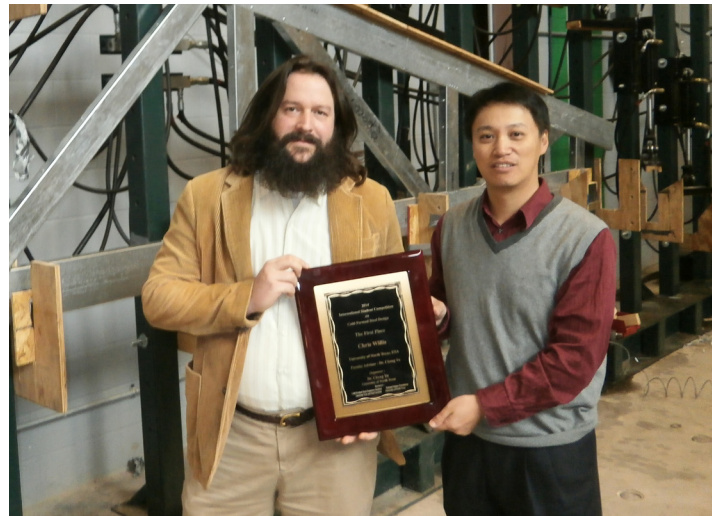
The Small Project Fellowship Program provides a streamlined mechanism for AISI’s standards development committees (the Committee on Specifications and the Committee on Framing Standards), industry stakeholders, academics, and students to collaborate on relatively short-term, highly focused, and mutually beneficial projects. Project selections are based on several factors including the potential for long-term impact on the industry; steel industry engagement and co-funding; and results for the AISI standards development committee, the student, and the academic institution.

International Student Competition

Yu also launched an international student competition to help promote a professional interest in cold-formed steel. The competition is open to undergraduate and graduate students in any major who are creative and eager to learn new technologies.

The 2014 International Student Competition on Cold-Formed Steel Design competition received 42 entries from:

- Chongqing University, China
- Chulalongkorn University, Thailand
- Drexel University, U.S.
- State University of Campinas, Brazil
- Tongji University, China
- UNT
- University of Waterloo, Canada
- Virginia Tech, U.S.



“ I felt that I actually had a pretty good design. I still didn’t expect to win, but I thought I might be able to at least make the top 10.

– Chris Willis

The competition called for entrants to design an optimal cross section shape for a 96-inch long cold-formed steel stud column which provides adequate compression strength and utilizes the least amount of material. The judging panel carefully reviewed all entries and chose a UNT student, Chris Willis (to the right in the above photo), as the first place winner. Willis majored in Integrative Studies and graduated in December 2014.

For his undergraduate degree plan at UNT, Willis took several CNET courses including Yu’s Light Gauge class, where he was first presented with the problem for the competition. He said he plans to pursue a Master’s in Civil Engineering.

“By the time I had the assignment done, all I really needed to do was write the essay to have the submittal package for the competition complete, so I figured, ‘Why not?’” Willis said.

Second and third places went to Zongya Xu, Tongji University, and Benjamin Dow, University of Waterloo, respectively. The top three students were recognized with a plaque and monetary award. The winning designs also will be exhibited at professional conferences. The top 10 students received a one-year Cold-Formed Steel Engineers Institute (CFSEI) membership.

Co-sponsors of the 2014 competition included AISI, CFSEI, National Science Foundation, UNT, and the American Society of Civil Engineers (ASCE).

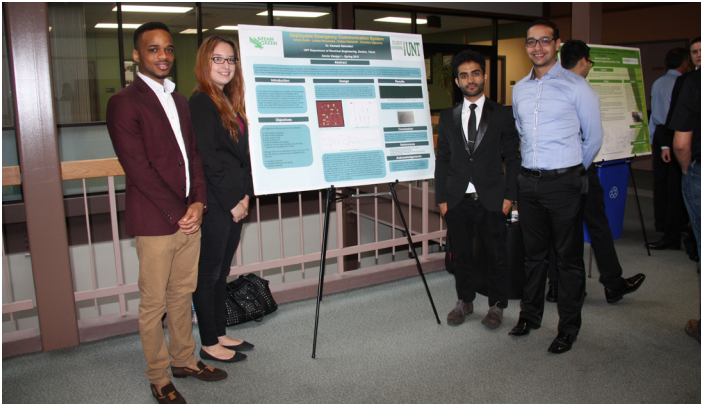
2015 Cold-Formed Steel Design Competition

Undergraduate and graduate students are invited to use their creative thinking skills to solve engineering problems in the 2015 International Student Competition on Cold-Formed Steel Design.

The competition is now in its fifth year, and this time, the competition focuses more on industrial needs, according to Dr. Cheng Yu. “This year’s competition adopted a clip angle design method which was newly developed by me and two University of North Texas graduate students,” Yu said.

The submission deadline is Sept. 30, and winners will be announced in December. The top three students will be recognized with a plaque and monetary award. The winning designs also will be exhibited at professional conferences as well as promoted on websites and in newsletters.

For more information regarding the 2015 International Student Competition on Cold-Formed Steel Design, please visit www.cfsei.org/student-competition.



Team Wi-Fi Access Point Communication System from left to right: Christian Ogonna, Leticia Hernandez, Sultan Alobaishi and Amine Sadik.



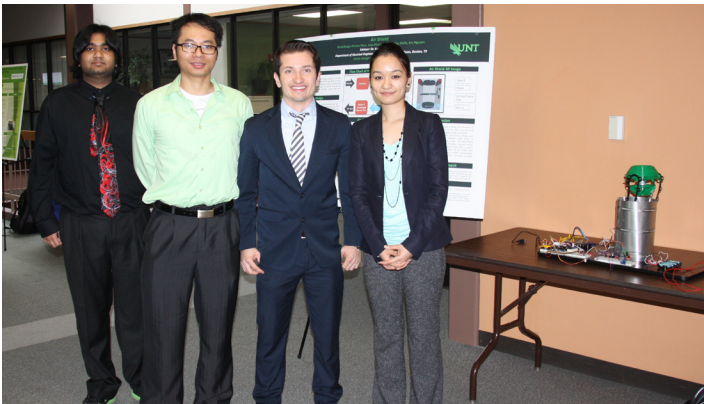
Materials Science and Engineering students from left to right: Tammy Tancharoensuksavai, Sarah Michelle Gilbert, Zachary Hoyt, Apurva Patel, Brandon Jarvis, Chris Yannetta, Calvin Mikler, and Jacob Scott.

<Design Day>

Students graduate from the UNT College of Engineering with a readiness to find solutions for industrial engineering needs, and they displayed their depth of knowledge and enthusiasm for technological innovation during Design Day 2015. For more information, visit <http://engineering.unt.edu/2015-design-day>.



Students Evan Fritts and Andrew Koehler.



Team Air Shield from left to right: Shabuktigin Photon Khan, Eric Nguyen, Juan Pineda-Aguirre, and Tika Malla.



Students Michael Stoddard and Alec Wells.



Team Modification of a Treadmill: Hallie McDonald, Dana Chesley, and Rachel Mahlow.



Students Randall McCullough and Xun Li with Team RAX Construction and Dr. Diane DeSimone.

<NASA Design Challenge>

Four teams from the University of North Texas (UNT) College of Engineering took home several awards from the Spring 2015 Texas Space Grant Consortium Design Challenge (TSGC), held April 27 in League City, Texas.

Sponsored by NASA and administered by the Texas Space Grant Consortium, the TSGC Design Challenge is a unique academic experience offering undergraduate students an opportunity to propose, design and fabricate a solution to a topic of importance to NASA and its mission. In addition to competing, the teams also had the opportunity to meet NASA astronaut Fred Haise from the Apollo 13 mission.

Team illuminUNTis

The UNT team that received the most awards was illuminUNTis, which was recognized as the Top Design Team and the Audience Forum Favorite (Second Semester, a designation for those teams who have previously competed in the TSGC challenge), as well as 1st place for the Best Model (Second Semester) category, 2nd place for the Best Poster (Second Semester) category, and 2nd place for the Best Oral Presentation (Second Semester) category. The team was comprised of students (from left to right in the first photo) Paul-Marie Yapobi-Attie, Marina Nishimura, Alex Moore, Maria del Mar Moreno (team leader), and Jackson Tyler Brown, with faculty advisors Drs. Vijay Vaidyanathan and Kamesh Namuduri and mentor George Salazar, NASA Johnson Space Center (JSC).

Team HINES

UNT also was represented by Team HINES, which took 3rd place for the Best Model (Second Semester) category, 3rd place for the Best Poster (Second Semester) category, and 3rd place for the Top Design Team (Second Semester) category. The team consisted of (from left to right in the second photo) (sitting) Hollie King (team leader), Alexandra Woods, (standing) Zikra Toure, Houston Chapman, and Jeremy Tinker, with faculty advisor Dr. Mark Thompson and mentor Christie Sauers, NASA JSC.

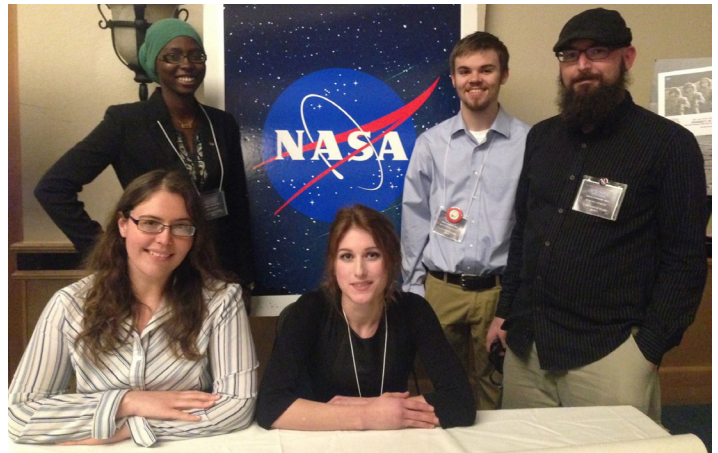
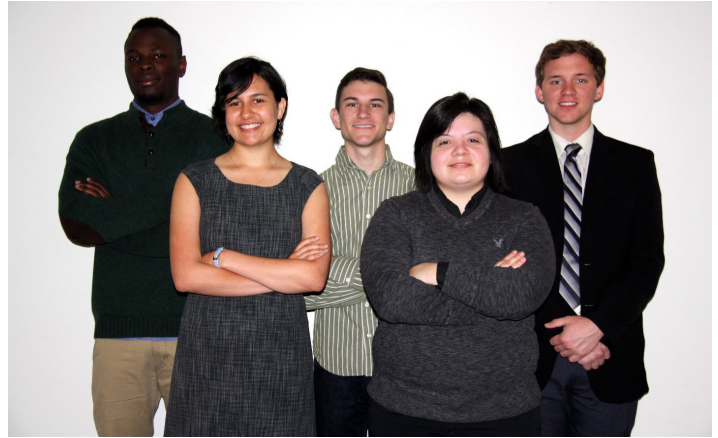
Team ROCKET

Additionally, UNT's Team Rocket received 2nd place in Best Oral Presentation (First Semester, a designation for those teams competing for the first time in the TSGC challenge). The team consisted of (from left to right in the third photo with Fred Haise third from the right) Julio Jo, Li Huang, Gustavo Alvarez (Team Leader), Shahan Hameed, Kidist Hailemariam, and Juan Martinez, with faculty advisor Namuduri and mentor Chatwin Lansdowne, NASA JSC.

Team AD ASTRA

Team AD ASTRA took 2nd place in Top Design Team (First Semester). The team consisted of (from left to right in the fourth photo) (top row) Sarah Hagerman, Jordan Essman, Lawson Faris, (bottom row) Andrew Carr, Rudy Nagasimha (Team Leader), and Ahmad Shabbar, with faculty advisor Dr. Kyle Horne and mentor Joe Chambliss, NASA JSC.

For more information on the teams, visit engineering.unt.edu/unt-engineering-students-win-nasa-design-challenge.





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<in the news>

Dr. Marcus Young, an Assistant Professor in the Department of Materials Science and Engineering, is using a focused ion beam (FIB) system to examine metal museum artifacts and to learn about the manufacturing of silver and silver-plated pieces from the Dallas Museum of Art. His research was recently featured on KERA News, a public broadcasting station in Dallas/Fort Worth area.

Young (right) and graduate student Matthew Carl (left) developed a novel technique, using the FIB system, that makes it possible to image the plating thickness and the plating and base metal texture of a cross-section measuring about 30 x 30 x 90 microns.

The FIB system also is equipped with a scanning electron microscope with electron backscattered diffraction and energy dispersive spectroscopy, which enables the researchers to see what materials the artist used to create the object.

Visit engineering.unt.edu/category/news-tags/news for additional news-making UNT engineering research.