COLLEGE OF ENGINEERING | UNT

THE NORTH TEXAS Engineer

A publication of the University of North Texas
College of Engineering

CELEBRATING 125 YEARS 1890-2015

<inside>

Carnegie Classification Report Ranks UNT as One of Nation's 115 Top-tier Research Universities.

See page 2 for more.

<engineering.unt.edu/newsletter>

<UNT Ranked a Top-Tier Research University>

The University of North Texas (UNT) is ranked among the nation's 115 top-tier research universities, according to the Carnegie Classification of Institutions of Higher Education™. Tier One status is defined, in part, by how a university ranks in the Carnegie Classification.

UNT President Neal Smatresk said that this achievement is commonly considered the most significant step in the evolution of a research university and marks a key milestone in UNT's commitment toward national prominence.

Tom McCoy, UNT's vice president for research and economic development, said that being ranked in Carnegie's top tier is a result of UNT's comprehensive focus on its level of research activity and on helping doctoral students succeed.

"UNT's official Carnegie Classification as a Doctoral University: Highest Research Activity (R1) matters for many reasons," McCoy said. "Tier One universities attract top students and faculty, drive innovation and technology through high-level research and scholarship, and contribute significantly to the region and state through intellectual capital and economic development."

Dr. Costas Tsatsoulis, Dean of the College of Engineering, said the college's research, scholarship, and graduate studies directly contributed to this achievement.

Dr. Costas Tsatsoulis with students Robert Smith and Stormie Garza at the Showcase of Undergraduate Research in Engineering awards ceremony. Read more about the College's undergraduate research initiatives on pages 8-9.

Some recent activities to expand or open up new avenues of research include:

- The opening of 30,000 square feet of state-of-the-art research laboratory and teaching space,
- New Ph.D. in Electrical Engineering, and
- New Ph.D. in Mechanical and Energy Engineering.

The Carnegie Classification ranking "is the first step; an important step, a real milestone, but it's not a destination," Tsatsoulis said. "We need to continue to excel, and we will do so the same way we have operated so far, by focusing on the things that matter and which make us excellent: our students, our scholarly pursuits, our teaching, and our outreach."

THE NORTH TEXAS Engineer

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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:
engineering.unt.edu/alumni-information-form

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<Salute to Faculty Excellence>





Dr. Armin Mikler (in the first photo to the left), a professor in the Department of Computer Science and Engineering, gave the 2015 Distinguished Research Lecture at the Salute to Faculty Excellence in Research and Creativity on Sept. 30, 2015.

Mikler received the 2015 Research Leadership Award sponsored by the University of North Texas (UNT) Office for Faculty Success and the Office of Research and Economic Development. The UNT Research Leadership Award is given to a full-time UNT faculty member whose research excellence and leadership at UNT has made a substantial contribution to her/his discipline and has achieved national/international recognition.

Mikler's presentation "Finding Research in Unexpected Places: The Story of RE-PLAN" provided an overview of his research as Director of the Center for Computational Epidemiology and Response Analysis.

Other UNT Engineering researchers who were honored in 2015 are (starting from the second photo to the left):

- Dr. Nandika D'Souza
  Mechanical and Energy Engineering
  Regents Professor
- Dr. Rajiv Mishra
  Materials Science and Engineering
  Distinguished Research Professor
- Dr. Phillip Foster
  Engineering Technology
  University Distinguished Teaching Professor
- Dr. Yan Wan
  Electrical Engineering
  Early Career Award for Research & Creativity

<Faculty Accomplishments>

Dr. Enrique Barbieri, chair of the Department of Engineering Technology (ETEC), recently was elected to serve as a Director of the Engineering Technology Council (ETC) for four-year Engineering Technology programs (2015-2017).

ETC of the American Society for Engineering Education (ASEE) is the national organization that promotes quality education and creative endeavors in engineering technology. Membership in ETC is open to colleges that have accredited engineering technology programs as defined in the ASEE bylaws.

As ETC Director for four-year Engineering Technology programs, Barbieri will be a part of the ETC Executive Board which formulates the general ETC policies. "I am truly honored and excited to be part of the ETC Executive Board. In this new role, I will continue to work with a great group of individuals that seeks to stimulate all aspects of Engineering Technology nationwide."

He previously served as a Board member (2005-2008) for the Engineering Technology Leadership Institute of the ASEE and has contributed several papers on engineering technology education published in ASEE conference proceedings. For more information, please visit engineering.unt.edu/etec-chair-elected-director-asee-engineering-technology-council-four-year-et-programs.

Dr. Ian Parberry, a professor of the Department of Computer Science and Engineering, was named a Distinguished Scientist by the Association for Computing Machinery (ACM), the world's leading association of computing professionals. The 2015 ACM Distinguished Members are drawn from leading academic institutions, as well as corporate and national research laboratories around the world. The criteria for selection to the Distinguished Member grade include at least 15 years of professional experience, five years of continuous ACM membership, and significant accomplishments or impact within the computing field.

Parberry is author of more than 100 technical publications including more than 75 articles (23 as sole author) in peer-reviewed journals, conferences, and workshops. He has been teaching game programming to undergraduates since 1993, when he established the Laboratory for Recreational Computing (LARC). LARC alumni have credits on at least 66 commercial video games. The Princeton Review and GamePro Magazine ranked UNT LARC in the top 50 out of 500 game design programs in North America in 2010. For more information, please visit engineering.unt.edu/computer-science-and-engineering-professor-named-distinguished-scientist-association-computing-machi.

<Women Engineers>

UNT SWE at Region C conference (from left to right) Haley Barnes, Zikra Toure, Samantha Zellner, Amirah Suleiman, Alyssa Thurston, Roni Ramirez, Bria Miles, Mandana Hendrickson, Michelle Gilbert, Karla Lara, and Jessie Lanier.

Women student and facuty of the College of Engineering are taking on leadership roles, providing support and mentoring for current and future engineering professionals. This activity is bringing recognition to them and the organizations they represent.

Distinguished Engineering Educator

Dr. Nandika D'Souza, Regents Professor of Mechanical and Energy Engineering and College of Engineering Associate Dean of Undergraduate Studies, was named the 2015 Society of Women Engineers Distinguished Engineering Educator. The award is presented to educators who make significant contributions to the engineering field.

"The Society of Women Engineers has enabled students and professional engineers to develop the needed leadership skills to complement their educational excellence," D'Souza said. "Being nominated by the Dallas Section of SWE, where I serve as vice president for outreach, and having letters of support from two UNT SWE presidents, Britney Caldwell and Mayaria Johnson, my dean, and a current student was very encouraging."

D'Souza, who advises the student organization, said, "The future for women engineering students at UNT is bright. Enabling an educational environment where students of all races and genders can fulfill their potential requires a proactive approach from faculty, staff, and students. Ensuring academic excellence and personal confidence in diverse populations can change the demographics of our leaders."

> "UNT SWE past-presidents are leaders in a number of engineering companies, and the current group of officers are poised to build on the structured leadership that the past leaders have enabled.
>
> *– Nandika D'Souza*

D'Souza has worked with undergraduate and graduate students in the area of failure analysis, viscoelasticity and material reliability. She is a Fellow of the Society of Plastics Engineers for her contributions to the field of polymers, composites, fibers, films and coatings.

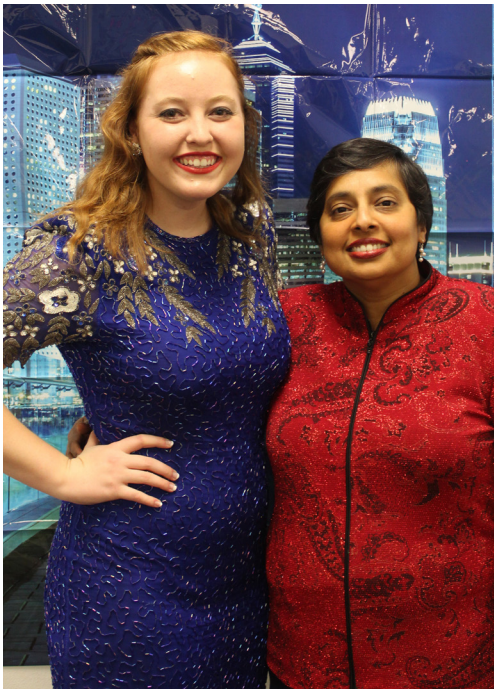
SWE Future Leader

Haley Barnes, a Materials Science and Engineering (MTSE) undergraduate, was selected to be one of 20 national Society of Women Engineers' Future Leaders for fiscal 2016.

The Society of Women Engineers Future Leader (SWEFL) Program is meant to provide promising young SWE members with opportunities, information, and encouragement to continue as an active SWE participant and leader. The program also aims to offer professional development and leadership training for each SWEFL to advance and develop individual leadership styles. SWEFLs are required to attend national and regional conferences, leadership webinars, and regional conference calls to experience the internal works of SWE.

"As it is up to the SWEFL to pursue each opportunity she is given, I am excited to network nationally, regionally, and locally with fellow SWE-sters and pursue my goals of celebrating professional women engineers in my region," Barnes said. "I would like to thank Dr. Nandika D'Souza and UNT SWE for their continuous support."

Barnes is an active SWE member, serving as the UNT student chapter's Vice President. She's also a College of Engineering Senator for the UNT Student Government Association, a member of the Discovery Park Student Affairs Advisory Board, and the founder of UNT Compliments, a positive social media experience for UNT.



(Photo on the left) Haley Barnes and Dr. Nandika D'Souza; (photo on the right) UNT SWE members with Scrappy the Turtle, a mini SWE Region C turtle, at WE15, SWE's 2015 national conference.

SWE Conferences

Members of the UNT Chapter of Society of Women Engineers (UNT SWE) attended two conferences recently and brought back two regionally recognized awards. During Oct. 21-24, UNT SWE brought 11 of their members to WE15, the 2015 national conference in Nashville, Tenn. This is a record breaking number for the UNT chapter.

At the conference, Barnes attended the Collegiate Leadership Institute. All of the UNT SWE attendees were present at the professional and collegiate meeting of Region C, as well as the Career Fair, where the majority of the girls received interviews on-the-spot with various companies. Student Michelle Gilbert stated that her most memorable success was an interview with Alcoa where the materials scientist who interviewed her took an interest in her senior design project within the college. Student Diana Pham competed in the Google Hackathon and was successful in completing coding a workable app.

Eleven members of UNT SWE also attended the 2016 Society of Women Engineers Region C Conference held on Feb. 5-7, 2016,

During the conference, all members participated in Region professional and collegiate meetings, the conference career fair, and professional development workshops including workshops hosted by D'Souza and Barnes. Materials Science graduate student Mandana Hendrickson reflected, "By attending several workshops and speeches, I've learned good tips on how to develop my academic skills and apply them in professional environments."

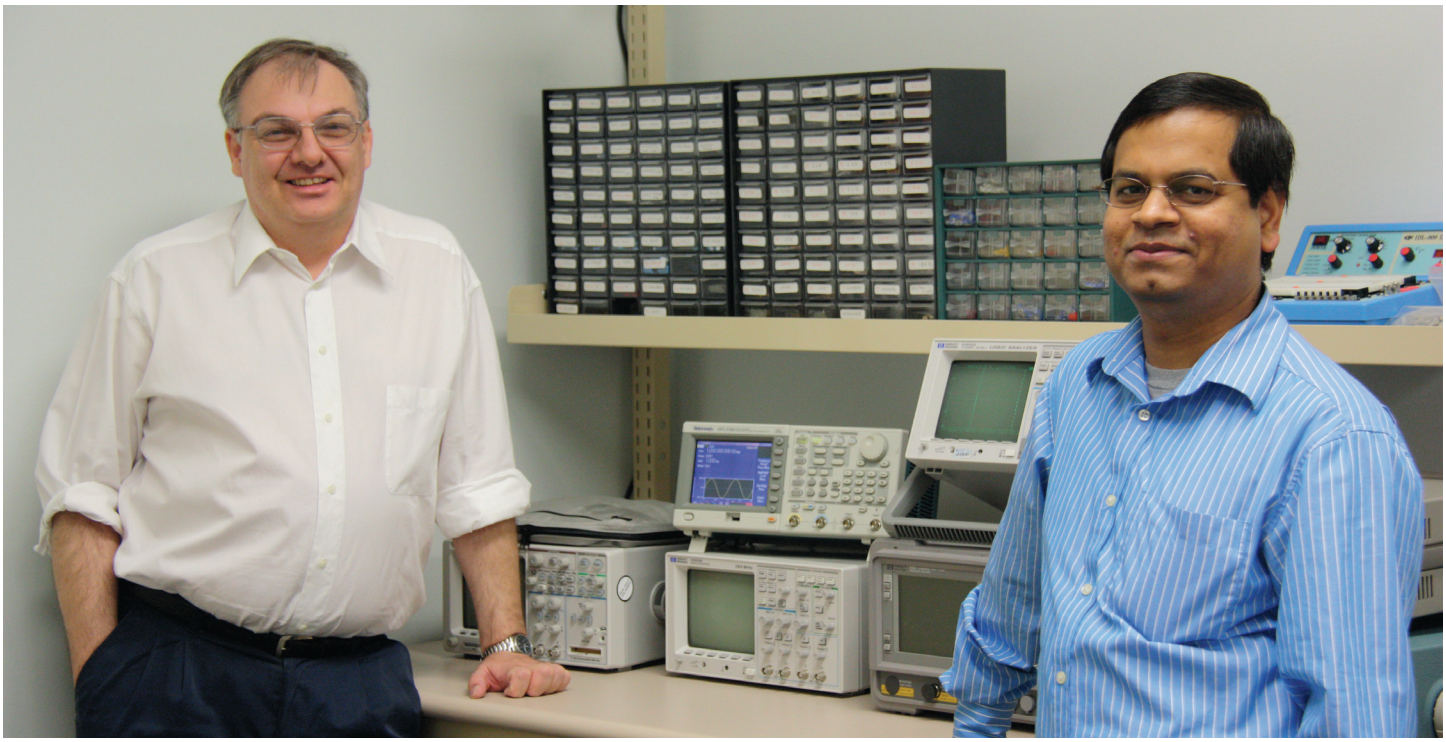
Additionally, UNT SWE was honored with 2 Region C SWE awards: an award for Most Creative Membership Campaign for Power Week, a three-day recruitment event held during the first week of the Fall 2015 semester, and an award for being the second most active collegiate section in SWE Region C.

For more information about UNT SWE, please visit engineering.unt.edu/category/news-tags/swe.

<UNT at Grace Hopper Celebration >

In October 2015, the Department of Computer Science and Engineering (CSE) sent 21 students and five faculty members to the Grace Hopper Celebration of Women in Computing in Houston, Texas. The Grace Hopper Celebration is an annual conference designed to bring together women technologists and to highlight the contributions of women in the field. CSE attended the Grace Hopper Celebration as one of only 15 computer science departments in the nation selected to participate in the Building Recruiting And Inclusion for Diversity (BRAID) initiative. As part of the initiative, the department receives $30,000 per year to help implement new approaches to increase diversity. For more information about the students and the event, please visit www.cse.unt.edu/people/AlumniNewsletters/2015_Nov_AlumniE-mailNewsletter.html.

<Faculty Research>



The College of Engineering has a great combination of nationally and internationally recognized faculty experts who are leading collaborative research while providing excellent learning opportunities for students.

Patent

Two researchers were awarded a second patent in 2015. Dr. Saraju Mohanty (to the right in the photo) and Dr. Elias Kougianos (to the left in the photo) are the co-inventors of a "Methodology for Nanoscale Technology based Mixed-Signal System Design," U.S. Patent Number: 9,053,276, issued on: June 9, 2015. This patent presents a methodology for nanoscale technology-based mixed-signal system design that can speed up the design cycle and can reduce non-recurrent design costs.

The design of complex integrated circuits that utilize nanoscale integrated circuit fabrication techniques requires extensive manual activity, which results in inefficiencies during the process. While computer modeling algorithms exist for simple designs, increases in design complexity call for simplifying assumptions in order to automate design processes.

The new methodology includes generating electronic data defining a baseline schematic design. A parameterized parasitic-aware netlist is generated using the baseline physical design, and design and process parameter statistical optimization is performed using the parameterized parasitic-aware netlist and mixed signal component specifications. If one or more predetermined design specifications are not satisfied, the parameterized parasitic-aware netlist is optimized. Otherwise, electronic data defining a schematic-optimal layout design is generated if the predetermined design specifications are satisfied.

By using the methodology described in the patent, various issues can be addressed for large, complex, and nanoscale mixed-signal systems such as how fast design space exploration can be performed at high levels of design abstraction, and how complex circuits can be simulated in a reasonable timeframe.

Find out more at engineering.unt.edu/researchers-receive-patent-method-designing-complex-mixed-signal-circuits.

Mohanty and Kougianos were previously awarded a patent in 2015 (along with Dr. Geng Zheng, who received his Ph.D. in Computer Science and Engineering from UNT) for an "Intelligent metamodel integrated Verilog-AMS for fast and accurate analog block design exploration." Please see page 11 of the fall 2015 newsletter.

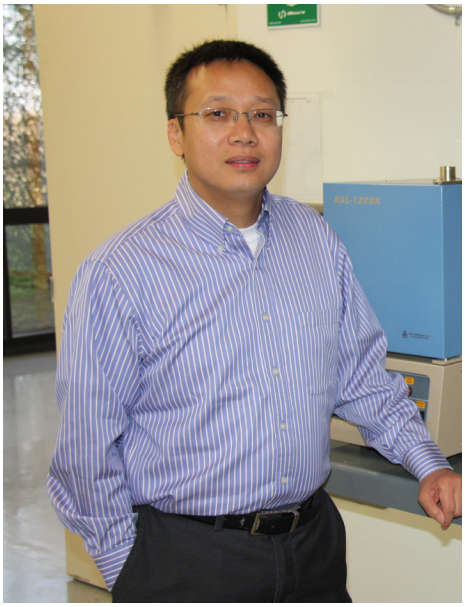
GOALI Project

Dr. Jincheng Du (in the left photo on the next page), an Associate Professor of the Materials Science and Engineering Department, received a National Science Foundation (NSF) award to study the corrosion of multicomponent oxide glasses with a focus on the mixed glass former effect on glass corrosion.

In this project, titled "GOALI: Collaborative Research: Understanding Composition-Structure-Chemical Durability Relationships in Multicomponent Oxide Glasses: Influence of Mixed Network Former Effect," Du will apply classical and first principles computer simulations to study the surface and interface of multicomponent oxide glasses, and their interactions with water, in order to understand the fundamental mechanism of corrosion of glass materials.

The outcomes of this project will benefit engineering fields such as the development of technical glasses, nuclear waste management, and development of novel biomaterials. Du will collaborate with scientists from Corning Inc. and Rutgers University on this project.

This four-year project will also provide opportunities for undergraduate and graduate students to work on technologically relevant fundamental problems with industrial collaborators. For



> This project builds on our existing expertise on computational material science, especially on the atomistic modeling of glasses and amorphous materials, and simulations of material surface and chemical reactions.
>
> *– Jincheng Du*

more information about the research, visit engineering.unt.edu/materials-science-and-engineering-researcher-receives-nsf-award-study-glass-corrosion.

Aerial Communication Infrastructure

On Sept. 14, 2015, at a White House event, the NSF announced that 12 new projects will be funded to help enable a vision of smart and connected cities and communities including a proposal from the University of North Texas (UNT) Department of Electrical Engineering.

The purpose of the UNT project, Aerial Communication Infrastructure for Smart Emergency Response, is to develop a broadband communication infrastructure that can be quickly deployed for emergency response, thus improving the efficiency of first responders and saving lives.

This project, led by Drs. Yan Wan and Shengli Fu, will build upon a previous concept for a flexible, low-cost, and drone-carried broadband long-distance communication infrastructure and will investigate its capability for immediate smart-city application for emergency response. This effort is to support the Smart Emergency Response System (SERS) cluster as it participates in the Global City Teams Challenge (GCTC). Wan presented research at the June 1, 2015, Global City Teams Challenge Expo (see the photo on the right with Wan in the center).

For additional information on this research, please visit engineering.unt.edu/researchers-receive-nsf-award-drone-carried-communication-infrastructure-emergency-response.

<Tech Titan Award>

College of Engineering faculty members Shengli Fu (in the center of the photo with award presenter Jim McGee, Senior Director, Government Relations, Huawei Technologies) and Yan Wan (to the right in the photo) received the 2015 Tech Titan of the Future – University Level award from The Metroplex Technology Business Council. The University of North Texas (UNT) also won Tech Titan awards in 2012 and 2010.

The award recognizes higher education institutions in the Dallas-Fort Worth area that perpetuate tech-related knowledge transfer and also encourage and support students to choose engineering and technology related disciplines as a preferred career path. Fu and Wan received the award for demonstrating a creative, innovative approach that reaches out to students and other learning-minded professionals and related institutions.

"We are very honored to receive this prestigious award. The judges recognized our enthusiastic efforts to reach out to emergency response professionals and young students in the nation," Wan said.

In 2014, Fu and Wan created a drone-carried Wi-Fi communication infrastructure that can be used to support emergency response missions when an emergency strikes. The professors participated in the Smart Emergency Response System project for the SmartAmerica Challenge that earned Fu and Wan a trip to Washington D.C. to present their work at the White House. For more information about the Tech Titan award, please visit engineering.unt.edu/electrical-engineering-researchers-earn-2015-tech-titan-award.

<Student Success>

Dr. Yong Tao, Chair of the Department of Mechanical and Energy Engineering (MEE), at the Fall 2015 MEE Design Day with team Ad Astra members Rudy Nagasimha, Jordan Essman, Lawson Faris. Sarah Hagerman, faculty advisor Dr. Kyle Horne, Andrew Carr, and Ahmad Shabbar.

The College of Engineering is proud to play a part in the achievements of a wide variety of talented students. The faculty and staff of the College are consistently looking for ways to help students find opportunities to succeed.

Capstone Program Relaunched

The Capstone Experience Program has been an integral part of undergraduate education at the College of Engineering, with students completing their education with a senior capstone course and project. Now, the College is streamlining the process by which sponsorships are secured for senior projects, an effort that will benefit both undergraduate students and industry partners.

Along with a uniform sponsorship process, the Capstone Experience Program also is acquiring a new name, "The Aerie," to reflect the College's commitment to graduating young engineering professionals ready to take flight to wherever their careers lead them.

Seniors graduating from the College are required to demonstrate their education and innovation through a senior capstone course. Student groups work with corporate partners to apply their knowledge and talent in developing innovative solutions to real-world problems. For example, a group of students are redesigning and improving a concrete breaking machine called an EZ Breaker (see top right photo on the next page).

> "Recognizing the fact that many companies have a variety of engineering disciplines under one roof, it is necessary that the primary external interfaces be consistent across all of the departments."
>
> *– Thomas Derryberry*

"These projects are an opportunity for the students to gain some hands-on experience in what it's like to be an engineer, and what better way to accomplish this than to partner with a sponsor-provided mentor/engineer from a sponsor company to solve a real-world engineering problem?" said Thomas Derryberry, Ph.D., PE, Assistant Dean of Corporate Relations.

Derryberry said that through the Capstone Experience, students learn not only how to apply their technical "hard skills" but also get an opportunity to both develop and apply their "soft skills" such as communications.

In the past, the College's departments used a variety of methods to work with industries. Derryberry said that one of the factors that will help the College continue its sustained growth as it continues its second decade of existence is providing a streamlined method for interacting with industry partners.

The Capstone Experience Program was relaunched during the summer after the College corresponded with the College Industrial Advisory Board and Department Chairs about the updated concept. For more information, please visit engineering.unt.edu/capstone.

(Left photo) Benjamin Karten, second-place winner of the 2015 Showcase of Undergraduate Research in Engineering; and (Right photo) Dr. Stan Case (left) demonstrating features of the hydraulic tank to students (starting with the second from the left) Victor Muro, Nick Huggins, and Jacob Essy.

NASA Design Challenge Winners

The Capstone Program has included projects that students complete for competitions. For example, the December 2015 Mechanical and Energy Engineering Design Day featured Ad Astra, one of the two teams from the College of Engineering that took home several awards from the fall 2015 Texas Space Grant Consortium Design Challenge (TSGC), held Nov. 15-16 in Houston, Texas.

The TSGC Design Challenge is sponsored by NASA and administered by the Texas Space Grant Consortium.

Team Ad Astra took the top honors for final semester teams (a designation for those teams that are competing for a second semester). The team was recognized as the Top Design Team and the Audience Favorite, as well as 1st place for the Best Poster, 1st place for the Best Oral Presentation, and 3rd place for the Best Model.

Team Ad Astra consisted of Rudy Nagasimha (Team Leader), Andrew Carr, Jordan Essman, Lawson Faris, Sarah Hagerman, and Ahmad Shabbar, with faculty advisor Dr. Kyle Horne and mentor Joe Chambliss, NASA Johnson Space Center (JSC).

The College also was represented by Team Rocket, a final semester team that received 1st place for Best Model, 2nd place for Top Design Team and for Best Oral Presentation, and 3rd place for Best Poster. Team Rocket consisted of Gerardo Alvarez (Team Leader), Paul Yapobi, Kidist Hailemariam, and Li Huang with faculty advisor Dr. Kamesh Namuduri and mentor Chatwin Lansdowne, NASA JSC.

> "Participating in this project has been a huge boon to my engineering experience. We had to respond to client specifications, make decisions based on those specification, and design and test an appropriate schematic. All of my experiences on this project had parallels in the real-world engineering process.
>
> *– Rudy Nagasimha*

Undergraduate Research Showcase

Besides Design Day, undergraduate researchers in the College of Engineering have the opportunity to share their knowledge and research successes at the Showcase of Undergraduate Research in Engineering (SURE).

SURE is a celebration of undergraduate research that allows faculty, industry representatives, other students, and guests to see first-hand the work of the College of Engineering students. SURE undergraduate participants displayed posters outlining their research projects and presented their findings to visitors.

Guests for SURE 2015, held on Nov. 6, included the College Industrial Advisory Board, which includes UNT Engineering alumni as well as managers and business leaders working in engineering across the DFW Metroplex. SURE participants were invited to a luncheon with the board members, and awards were given to the most outstanding presenters:

1st place

Nonso Chetuya, Reinforcing Concrete Composites
Mentor: Dr. Witold Brostow, Department of Materials Science and Engineering

2nd place

Benjamin Karten, Optimizing Polycarbonate with Willastonite Filler
Mentor: Dr. Witold Brostow, Department of Materials Science and Engineering

3rd place (tie)

Robert Smith, Designing a Solar Thermoelectric Generator
Mentor: Dr. Xiaohua Li, Department of Mechanical and Energy Engineering

Stormie Garza, Design of a Lower Extremity Exoskeleton to Improve Gain in Patients with Knee Osteoarthritis by Reducing Knee Joint Loading
Mentor: Dr. Vijay Vaidyanathan, Department of Biomedical Engineering

<Electrical Engineering 10th Anniversary>

The Department of Electrical Engineering commemorated its 10 year anniversary with a party at the University of North Texas Gateway Center on Oct. 16, 2015, and invited its alumni to join in the celebration. For more information, visit engineering.unt.edu/electrical-engineering-department-celebrates-10-year-anniversary.

(photos in the left column, from the top) Dr. Shengli Fu, Electrical Engineering Department Chair; Natalie Watkins, Dr. Oscar Garcia, and alumnus and doctoral student Mitchell Grabner; and Alumnus Craig Robicheaux. (photo in the right column) Audience at UNT's Gateway Center; Dr. Costas Tsatsoulis, Dean of the College of Engineering; Grabner, Tsatsoulis and alumnus Eric Ayeh; and Dr. Yan Wan and Dr. Finley Graves, UNT Provost and Vice President for Academic Affairs.

<Alumni News>

Alumna Mayaria Johnson with student Diana Pham.

Alumnus Hudson Jameson.

The University of North Texas (UNT) Career Center hosted the fall 2015 Engineering Career Fair on Oct. 1, 2015, in the Discovery Park Commons. More than 910 students were in attendance, and 89 companies and organizations registered for the event, making this a record for UNT Engineering Career Fairs.

The Career Fair provides students with an opportunity to present their resumes to a wide variety of employers as well as to learn more about the companies and what the recruiters are seeking in potential interns and employees. Students also could take advantage of services offered at the career fair including staff members who were available to take photos of attendees for their LinkedIn accounts.

Several Engineering and other UNT alumni represented their employers at the event, which offered a good networking opportunity for student attendees.

Alumnus Chris Shakesby.

Etta Clark (1980, Computer Science and Engineering) was awarded a memento of thanks for her service as the College of Engineering's Industrial Advisory Board Chair

Clark, Director of Information Technology at PepsiCo, became the Chair of the Industrial Advisory Board in 2011 and served until 2015, when she notified the College that she would soon be retiring to pursue other interests. She was recognized for her service during the Nov. 6, 2015, meeting of the College's Industrial Advisory Board.

Clark (to the left in the photo with Dr. Costas Tsatsoulis, Dean of the College of Engineering) has been and still is a strong supporter and promoter of the University of North Texas and the College of Engineering. For more information about the College of Engineering Advisory Board, please visit engineering.unt.edu/about/advisory-board.

On Oct. 8, 2015, the UNT IEEE Computer Society hosted its second speaker series featuring guest speaker Team IlluminUNTis, the Texas Space Grant Consortium NASA-sponsored Design Challenge Winner of Spring 2015. The team conducted a presentation of their winning design and talked about life after the competition, their careers after graduation, and the benefits of participating in the competition. From the left to right in the photo are: Zikra Toure, President of UNT IEEE Computer Society, Team IlluminUNTis members Maria Moreno, Alex Moore, Marina Nishimura, and Tyler Brown, and Aisha Bolomope, Secretary of UNT IEEE Computer Society.

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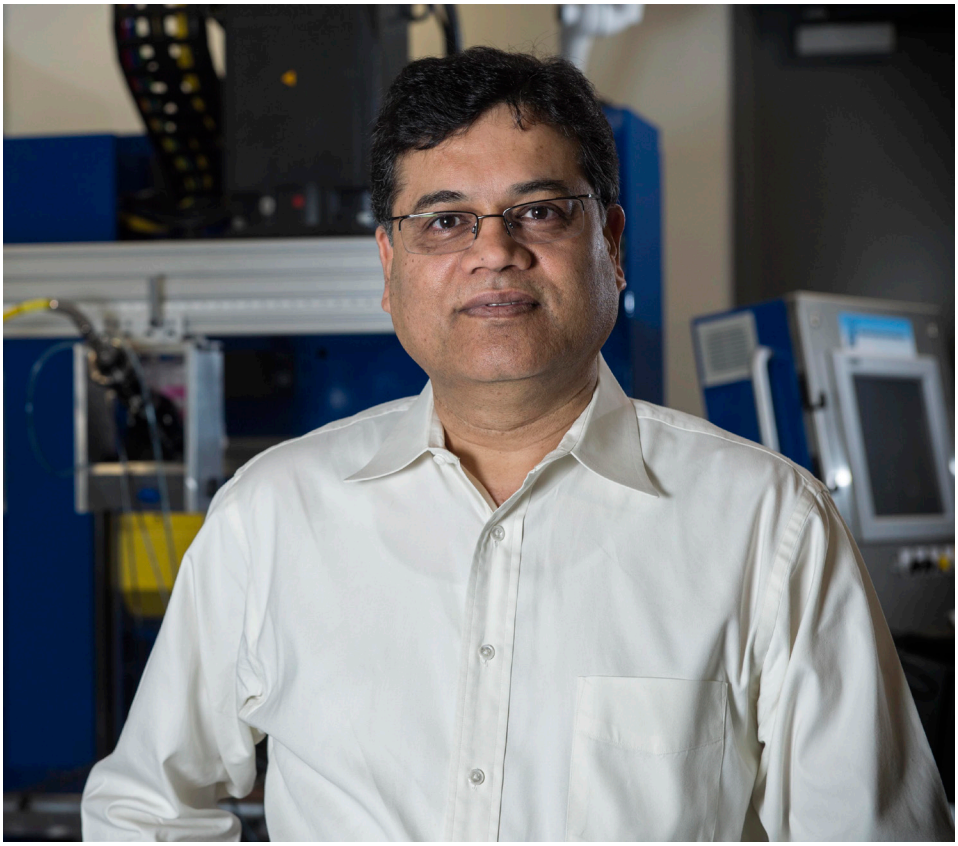
<UNT Launches Institutes of Research Excellence>



The University of North Texas (UNT) recently announced the launch of four Institutes of Research Excellence, combining a critical mass of knowledge and faculty collaborating on projects designed to create a stronger platform for interdisciplinary research as well as building partnerships with industry to design solutions and to further contribute to the North Texas region's economic growth.

One of these institutes is the Advanced Materials and Manufacturing Processes Institute, led by Dr. Rajiv Mishra (in the photo), a Professor in the Department of Materials Science and Engineering. The institute brings together a diverse group of faculty members who are focused on structural materials, functional materials, computational tools, and advanced manufacturing processes. The strength of the institute's members lies in designing high-performance materials for the aerospace, automotive and energy sectors.

For more information, visit engineering.unt.edu/unt-launches-four-institutes-research-excellence.