

# THE JONSSON SCHOOL

MAGAZINE  
Fall 2022



Leaving the Nest: Ideas Taking Flight | 22

Data, Diversity, Division III Standout

Leading at the Highest Levels of UT Dallas

Collegiate Conquests in Cybersecurity,  
Programming, Mentorship and Capstone Design

My parents tell me I have always been driven and inventive, with high standards. In these ways, the Erik Jonsson School of Engineering and Computer Science at The University of Texas at Dallas and I are a proper match!

Even during the great disruptor known as the COVID-19 pandemic, in this *Jonsson School Magazine*, you'll see Comets who responded with grit and determination as they excelled in classrooms, laboratories and student competitions. They pursued their passions on the softball field, at homecoming and, for one well-rounded student, even while wearing silky pajamas on TV!

You'll also read about the ingenuity of our faculty and staff members, who leveraged corporate relationships to allow students to bring an electronics laboratory home and hosted a national senior design capstone conference. Their innovations from quantum scale manufacturing to air quality epidemiology are taking flight — I am proud to be in their midst!

Training in engineering and computer science, with exacting standards of precision, is highly valued at UT Dallas. In this



edition of the magazine, read about engineering and computer science community members who serve across the University at several levels of leadership. These leaders inspire an environment of excellence and make decisions informed by data in order to support our ambitious students who land roles at leading technology companies, run as elected officials to represent the student body, serve as representatives to the United Nations and attract entrepreneurial partners through their excellent work.

At the Jonsson School, we are emerging from the pandemic focused on gratitude.

We are grateful you are spending a few moments of your time enjoying these snapshots of the University.

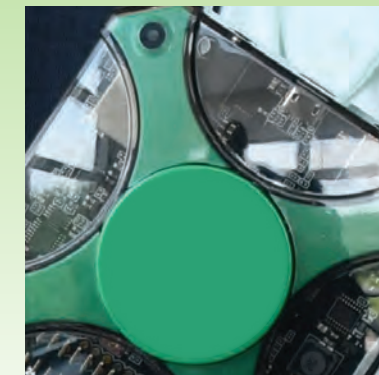
Regards,

Dr. Stephanie G. Adams  
Dean and Lars Magnus Ericsson Chair  
Erik Jonsson School of Engineering and Computer Science  
The University of Texas at Dallas  
Former President, American Society for Engineering Education

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## 38 FABRICATING THE FUTURE

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### THE JONSSON SCHOOL MAGAZINE Fall 2022

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**FEARLESS**  
engineering

**On the cover** (and on page 23): A nanoscale microelectromechanical systems device is mounted on a scanning tunneling microscope tip holder. Dr. Reza Moheimani, James Von Ehr Distinguished Chair in Science and Technology and professor of systems engineering, is working collaboratively with Zyvex Labs to develop atomically precise manufacturing methods needed to mass produce the quantum devices.

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70 A computer science major gives a first-person account of her experience as a delegate at the Space Generation Congress.

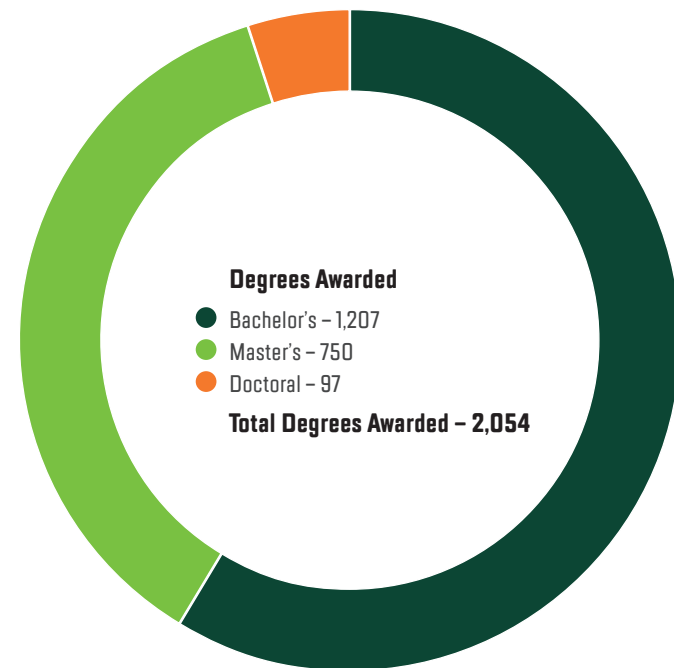
73 A tech entrepreneur and UT Dallas alumnus sponsors 17 UTDesign® Capstone and EPICS projects.

# DATA POINTS

THE JONSSON SCHOOL

## ENROLLMENT BY PROGRAM

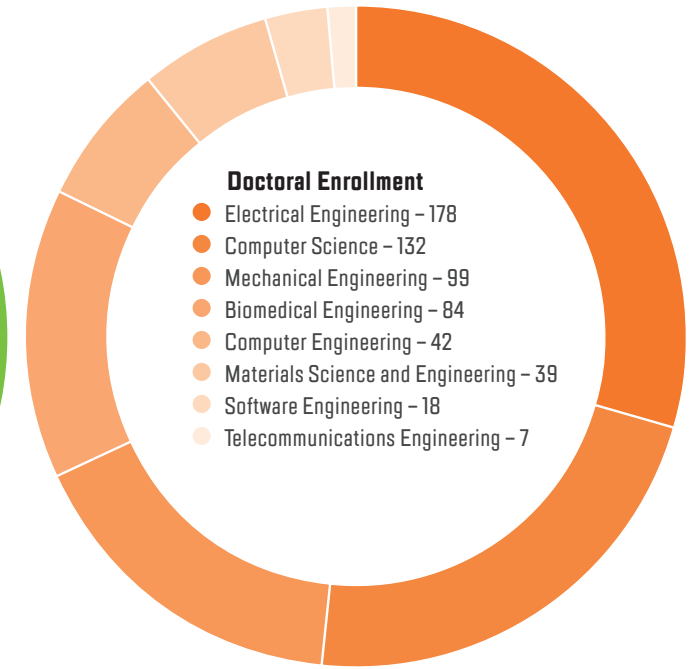
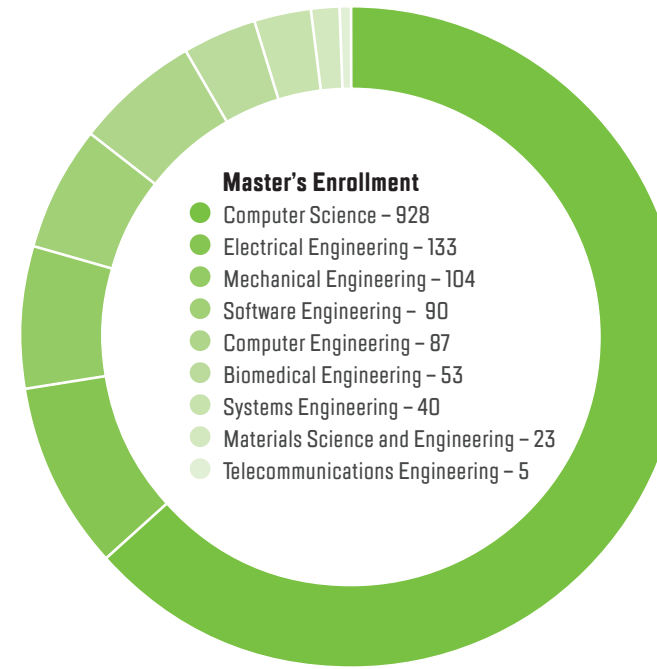
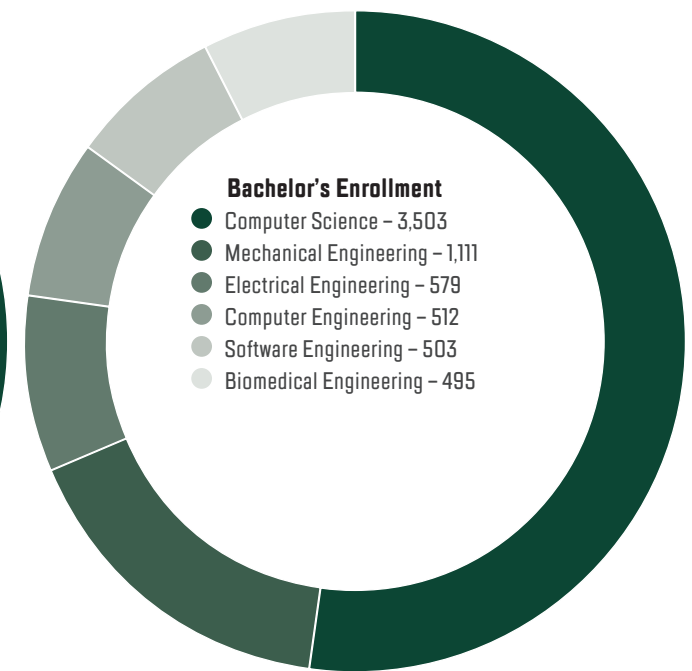
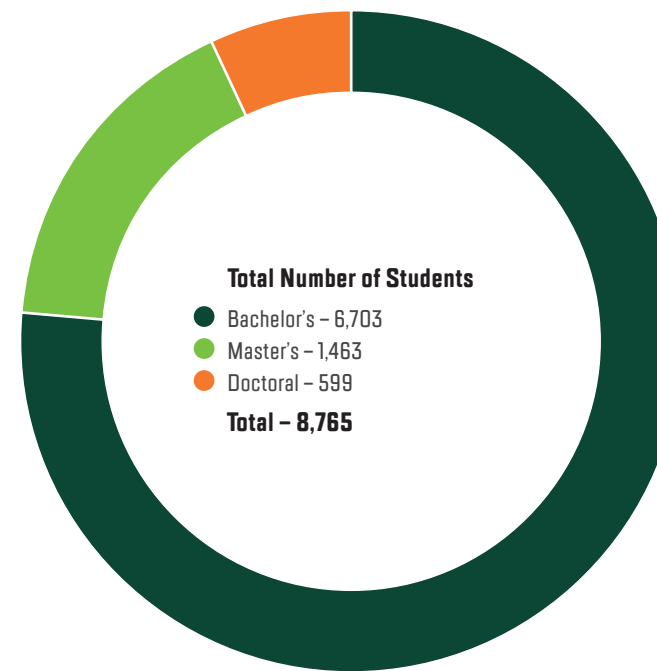
1986  
YEAR FOUNDED



**NUMBER 1**  
Jobs for international alumni in the country  
(U.S. Immigration and Customs Enforcement STEM Optional Practical Training 2020)

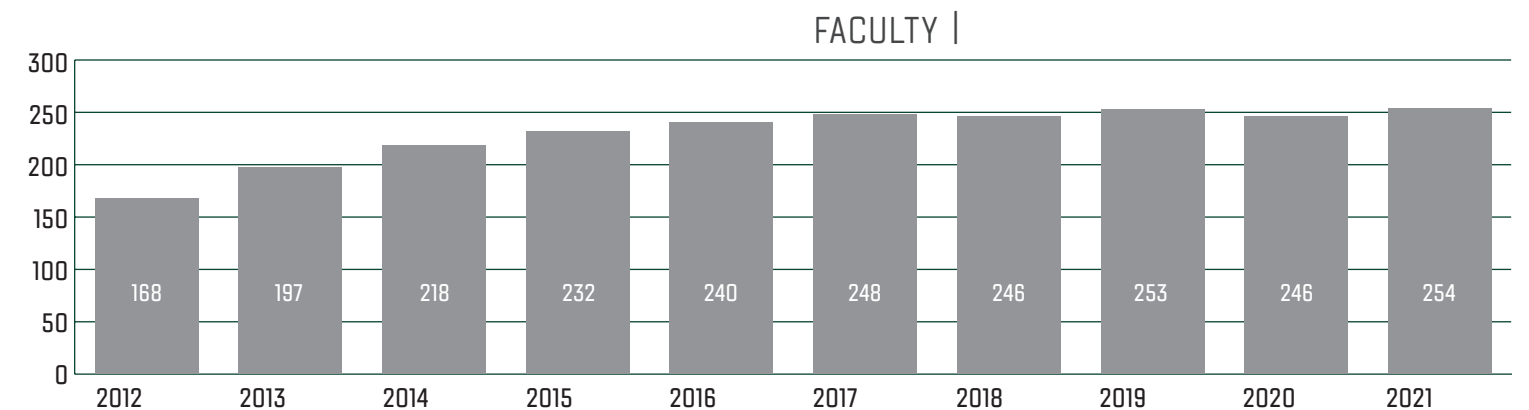
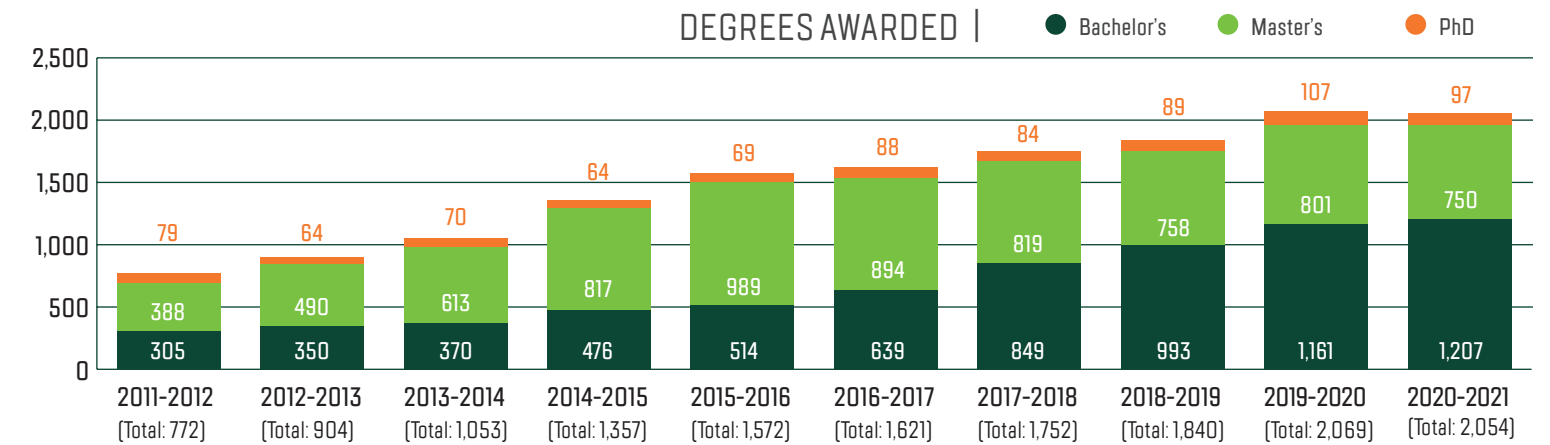
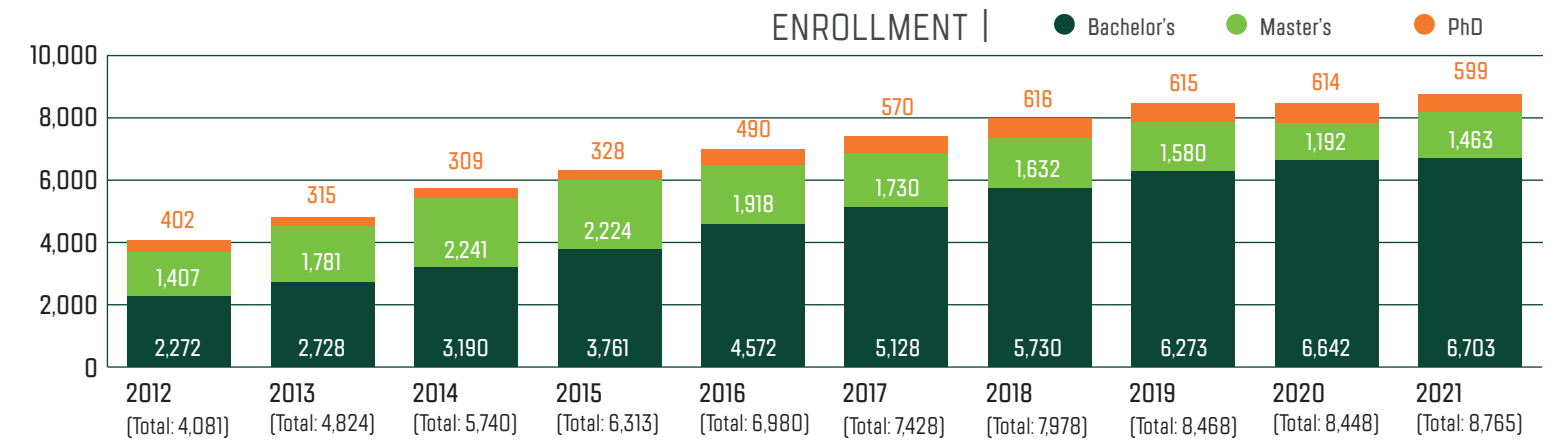
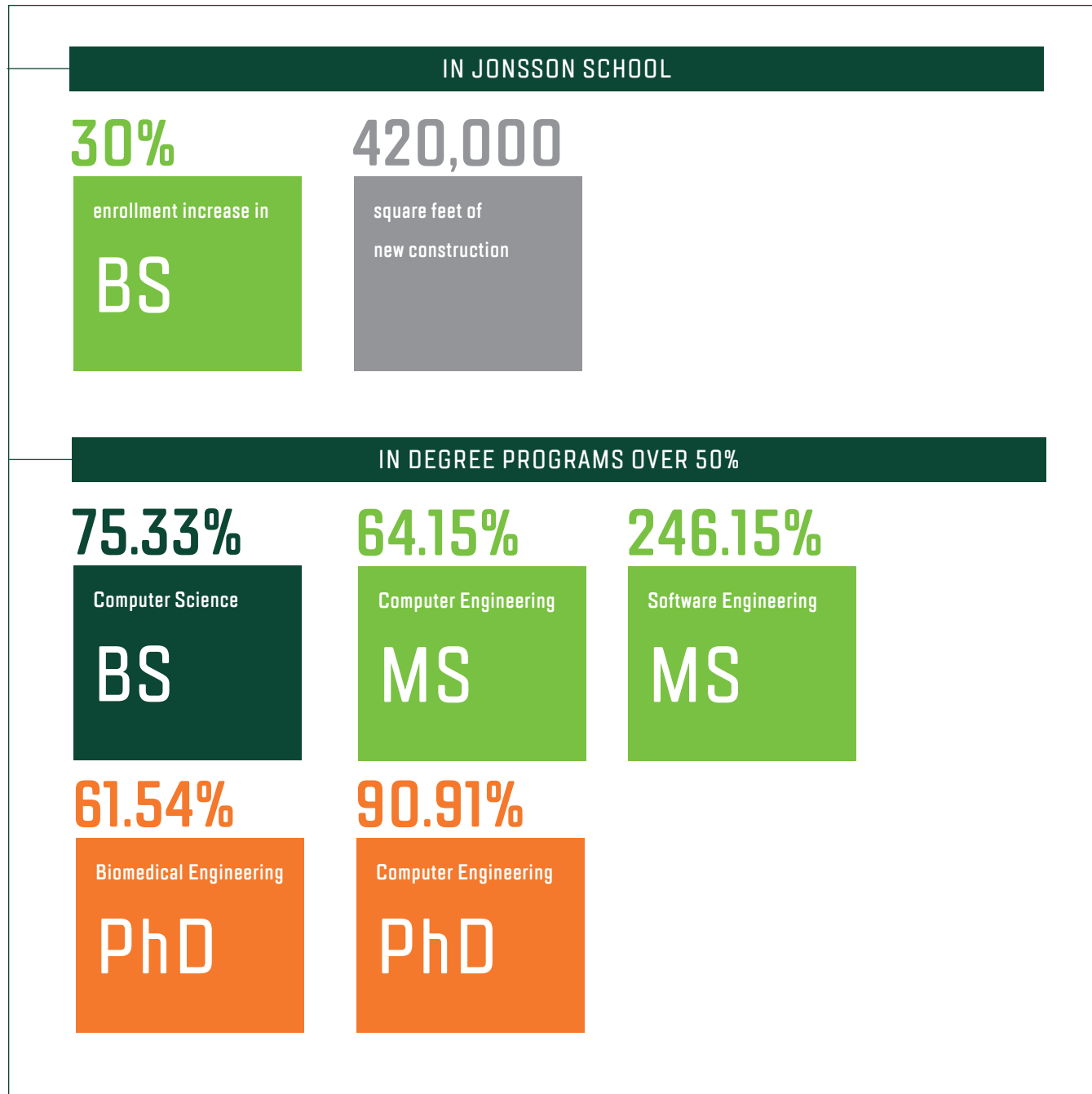
**NUMBER 2**  
Fastest-growing public doctoral university in the country  
(The Chronicle of Higher Education 2021)

**NUMBER 3**  
Public undergraduate and graduate engineering school in Texas  
(U.S. News & World Report October 2022)



## 5-YEAR GROWTH

## 10-YEAR TREND



COUNTRIES WHERE ALUMNI RESIDE (2020)

Bangladesh

Canada

China

India

Japan

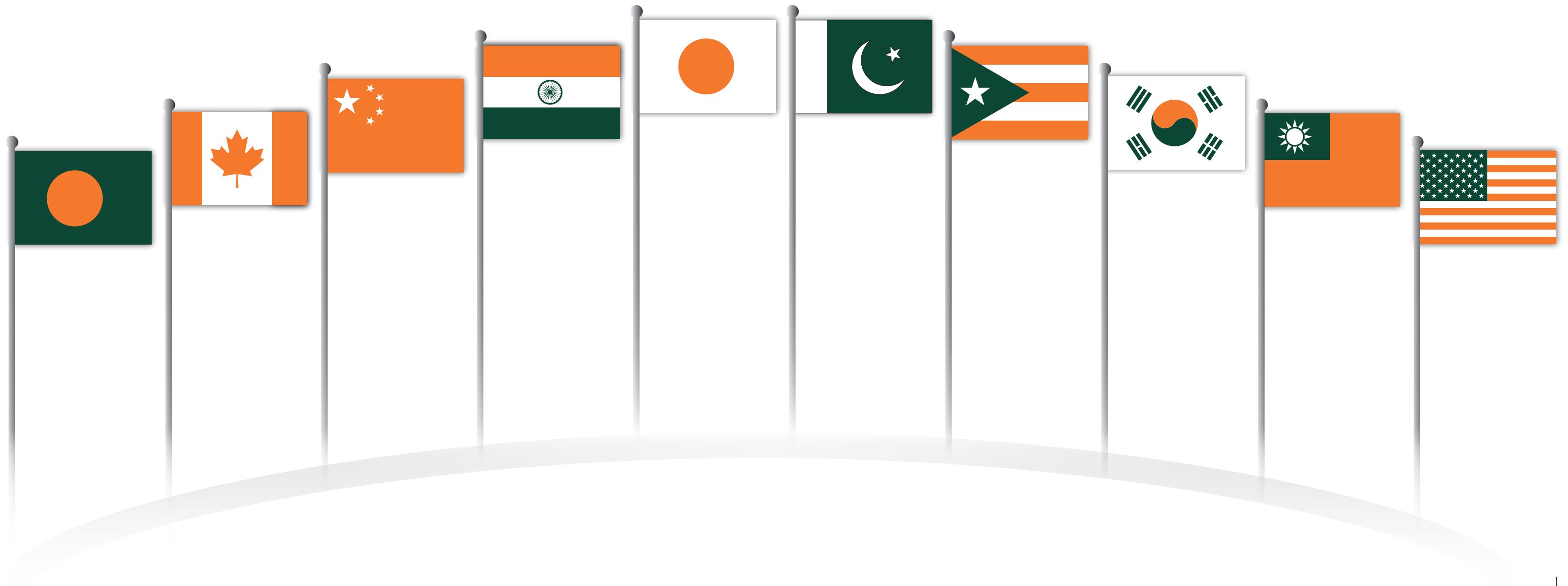
Pakistan

Puerto Rico

South Korea

Taiwan

United States



## QUICK FACTS: STUDENTS AND ALUMNI

## QUICK FACTS: PROGRAMS AND ACCOLADES

### APPROXIMATE STARTING SALARIES

**\$77,289**

average for

**BS**

**\$101,795**

average for

**MS**

**\$103,486**

average for

**PhD**

### STUDENTS

**106**

National Merit  
Scholars in the  
Jonsson School  
Freshman Class  
2021

### ALUMNI

**25,388**

total

**70%**

work locally

### TOP ALUMNI EMPLOYERS

Amazon.com  
Blu Age Corp.  
Cisco Systems Inc.  
Copart Inc.  
Epsilon

HHAeXchange  
Hoonuit  
Intuit Inc.  
Meta (formerly Facebook)  
TraxID

### DEGREE PROGRAMS

Biomedical Engineering	BS	MS	PhD
Computer Engineering	BS	MS	PhD
Computer Science	BS	MS	PhD
Electrical Engineering	BS	MS	PhD
Materials Science and Engineering		MS	PhD
Mechanical Engineering	BS	MS	PhD
Software Engineering	BS	MS	PhD
Systems Engineering and Management		MS	
Telecommunications Engineering		MS	PhD

### MAJOR ACCOLADES

**39**

National Science  
Foundation  
CAREER Awards

**17**

Young Investigator  
Program Awards

**78**

Fellows of Major  
Professional  
Organizations

QUICK FACTS: RESEARCH

RESEARCH

45%

of total research grants across the University

\$43

million total research expenditures in 2021

Top 20%

R&D expenditures in engineering (National Science Foundation 2021)

MAJOR RESEARCH CENTERS AND INSTITUTES

- Center for Applied AI and Machine Learning (CAIML)
- Center for Applied AI at the Richardson Innovation Quarter with UT Dallas Expertise (CAIQUE)
- Center for Atomically Precise Fabrication of Solid-State Quantum Devices
- Center for Control Science and Technology (CCST)
- Center for Imaging and Surgical Innovation (CISI)
- Center for Robust Speech Systems (CRSS)
- Center for Software Technologies to Improve (Human) Performance (h-STIP)
- Center for Smart and Mobility (COSMO)
- Cyber Security Research and Education Institute (CSI)
- Institute for Data Analytics (IDA)
- Institute for Intelligent Energy Systems
- Texas Analog Center of Excellence (TxACE)
- Texas Biomedical Device Center (TxBDC)
- UTD Center for Wind Energy

QUICK FACTS: RANKINGS

U.S. NEWS & WORLD REPORT RANKINGS 2023 (October 2022)

- #2 in Texas Among Schools in Undergraduate Software Engineering Programs [#18 Nationwide :: #14 Public] >>> details on p. 50
- #3 in Texas Among Public Schools in the Following Categories:
  - Overall Undergraduate Engineering School [ #75 Nationwide :: #44 Public ]
  - Overall Graduate Engineering School [ #64 Nationwide :: #37 Public ]
  - Graduate Computer Engineering Specialties [ #47 Nationwide :: #27 Public ]
  - Graduate Biomedical Engineering Specialties [ #66 Nationwide :: #38 Public ]
  - Graduate Electrical/Electronics Specialties [ #51 Nationwide :: #29 Public ]
  - Undergraduate Computer Science Specialties [ #72 Nationwide :: #41 Public ]
- #4 in Texas Among Public Schools in Graduate Mechanical Engineering Specialties [ #75 Nationwide :: #46 Public ]

TOP 35 IN AMERICAN SOCIETY FOR ENGINEERING EDUCATION (ASEE) RANKINGS (2021)

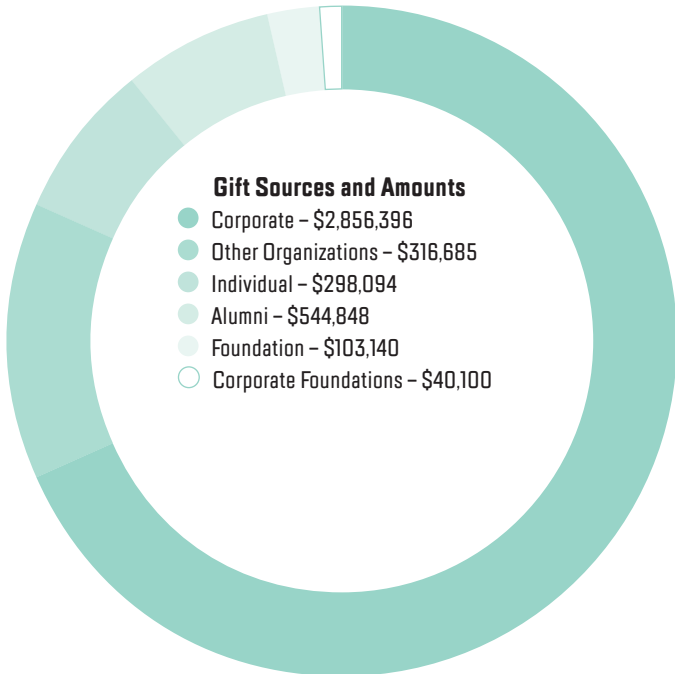
- |   |   |
|---|---|
| #13 – Highest Undergraduate Enrollment  | #25 – Materials Science and Engineering Master’s Enrollment                         |
| #24 – Highest Master’s Enrollment   | #15 – Computer Engineering Doctoral Enrollment                                      |
| #31 – Highest Graduate Enrollment   | #8 – Electrical Engineering Doctoral Enrollment                                     |
| #29 – Highest Bachelor’s Degrees Awarded in Engineering                           | #33 – Mechanical Engineering Doctoral Enrollment                                    |
| #11 – Bachelor’s Degrees Awarded to Asian Americans                               | #13 – Biomedical Engineering Bachelor’s Degrees Awarded                             |
| #29 – Bachelor’s Degrees Awarded to Underrepresented Minorities                   | #26 – Computer Engineering Bachelor’s Degrees Awarded                               |
| #25 – Engineering Master’s Degrees Awarded  | #4 – Computer Science (Inside Engineering School) Bachelor’s Degrees Awarded        |
| #11 – Biomedical Engineering Bachelor’s Enrollment                                | #22 – Electrical Engineering Bachelor’s Degrees Awarded                             |
| #15 – Computer Engineering Bachelor’s Enrollment                                  | #35 – Biomedical Engineering Master’s Degrees Awarded                               |
| #3 – Computer Science (Inside + Outside Engineering School) Bachelor’s Enrollment | #20 – Computer Engineering Master’s Degrees Awarded                                 |
| #13 – Electrical Engineering Bachelor’s Enrollment                                | #10 – Electrical Engineering Master’s Degrees Awarded                               |
| #27 – Mechanical Engineering Bachelor’s Enrollment                                | #28 – Materials Science and Engineering Master’s Degrees Awarded                    |
| #30 – Biomedical Engineering Master’s Enrollment                                  | #21 – Computer Science (Inside Engineering School) Doctoral Degrees Awarded         |
| #13 – Computer Engineering Master’s Enrollment                                    | #9 – Computer Science (Inside Engineering School) Doctoral Degrees Awarded to Women |
| #9 – Computer Science (Inside + Outside Engineering School) Master’s Enrollment   |   |
| #20 – Electrical Engineering Master’s Enrollment                                  |   |

QUICK FACTS: DEVELOPMENT

QUICK FACTS: DRIVING INNOVATION AND UTDESIGN CAPSTONE

DEVELOPMENT

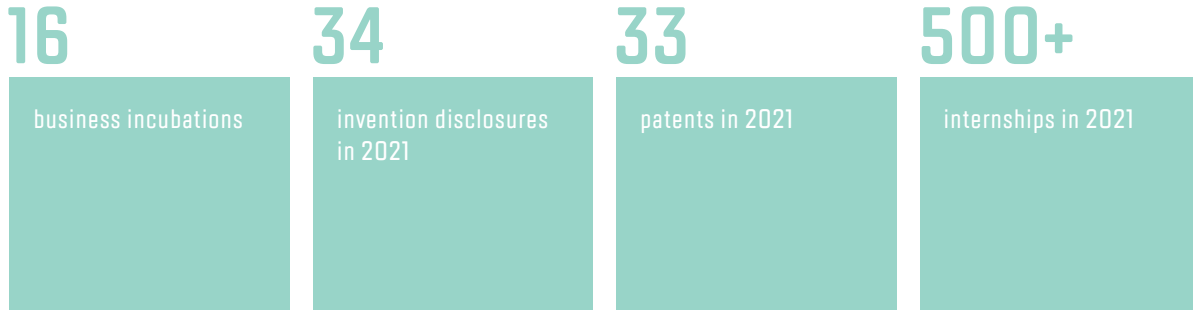
\$66,844,923  
TOTAL ENDOWMENTS



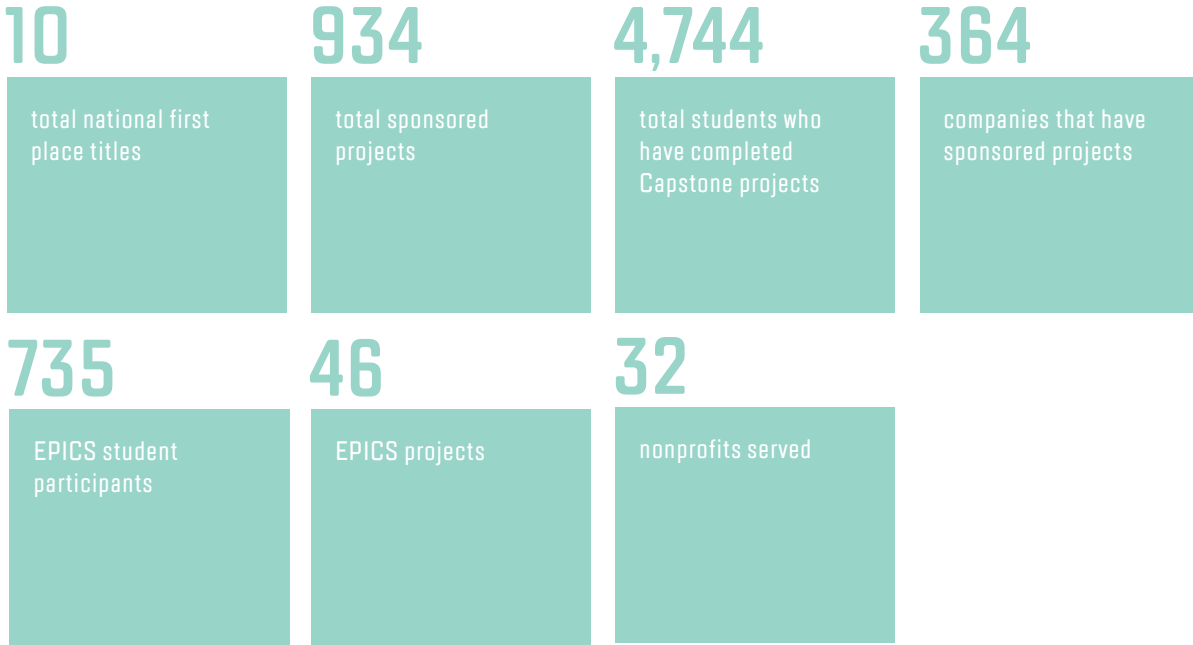
753  
total number of donors

1,143  
total number of gifts

DRIVING INNOVATION



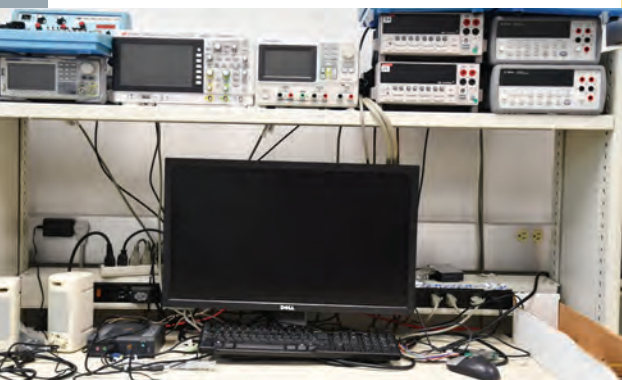
UTDesign® CAPSTONE



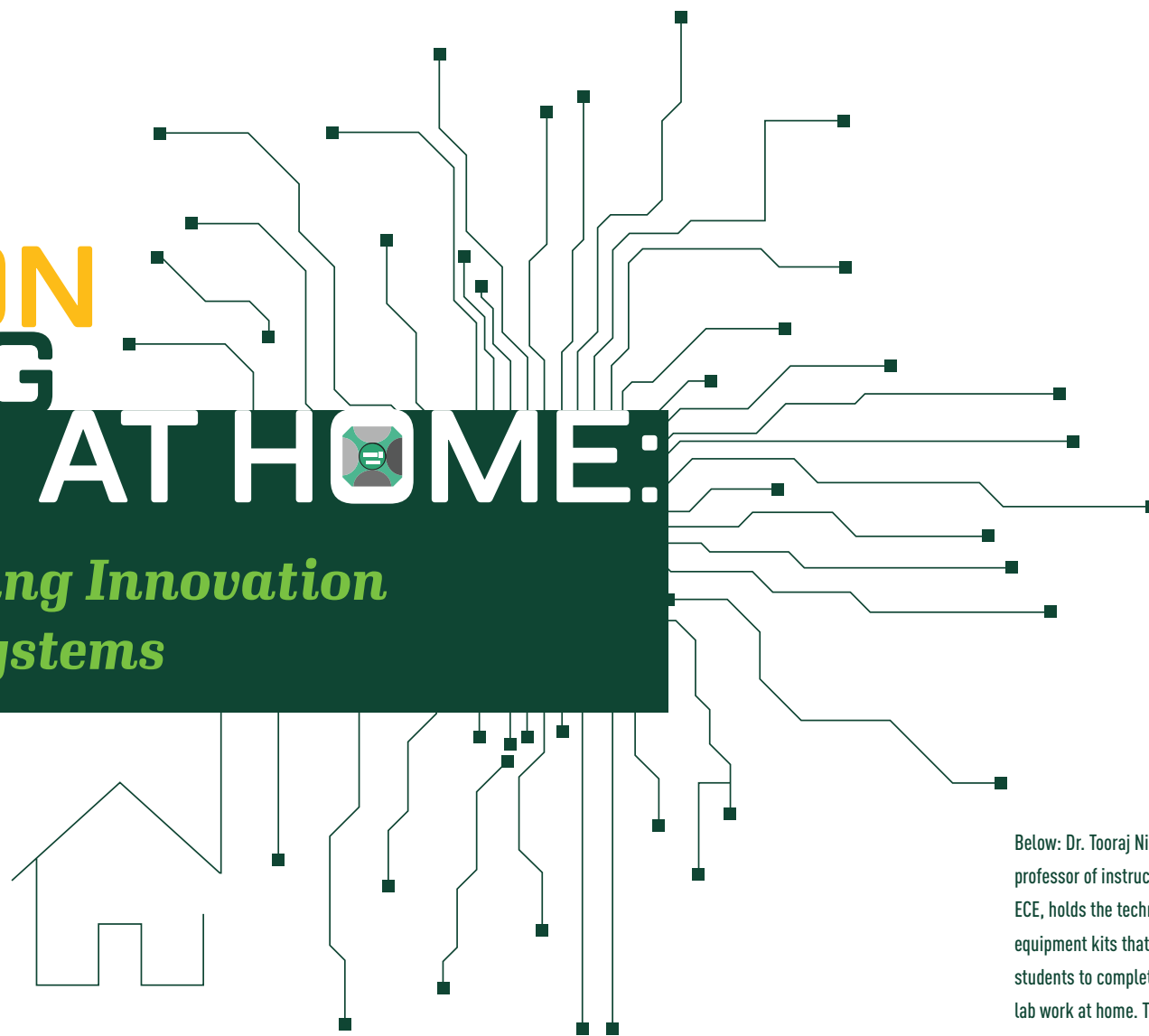


# HANDS-ON LEARNING AT HOME:

*TI Supports Learning Innovation  
With Embedded Systems*



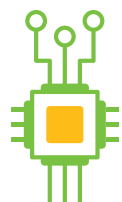
The original laboratory equipment designed for the required class could not be easily used when students began remote instruction.



Below: Dr. Tooraj Nikoubin, professor of instruction in ECE, holds the technical equipment kits that allow students to complete lab work at home. Texas Instruments Inc. provided the pared-down technology.

After teaching students for years in a laboratory using electronics equipment such as an LCR meter, oscilloscope, power supply, signal generators, a breadboard, a microcontroller, a design and test board and an integrated circuit, Dr. Tooraj Nikoubin, professor of instruction in electrical and computer engineering at The University of Texas at Dallas, is still elated that students can now learn from these tools at home.

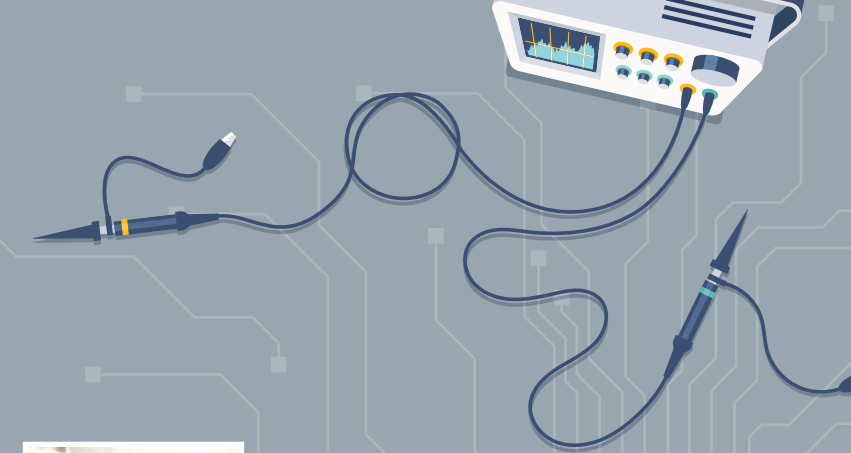
“We pared down this large technical equipment to a package smaller than a shoebox to allow students to take it home and learn,” Nikoubin said. “I am still in shock at how quickly we were able to adapt.”



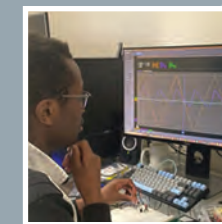
Students are now able to practice hands-on skills at home because of the kits, originally provided by Texas Instruments Inc. (TI) because of the COVID-19 pandemic. Nikoubin and others in the Department of Electrical and Computer Engineering (ECE) in the Erik Jonsson School of Engineering and Computer Science are continuing to teach several courses using the kits. Compared to the traditional laboratory settings, learning at home allowed the experience to better fit students’ needs. For example, when students no longer needed to reserve laboratory time, those who needed to take more time to master skills and content were able to do so. Self-motivated students who practiced homework problems multiple times also performed better on exams.

Additionally, the small-scale technology is more comparable to what graduates will encounter in their careers.

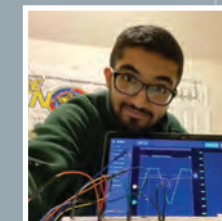
“I am trying to make connections between work and the skills they need for their jobs,” Nikoubin said. “Once they uncover their interests, they will also have the skills they need to move forward.”



“The TI equipment really helped us get hands-on experience with devices and circuits.” – Sangeetha Tatineni BS’21



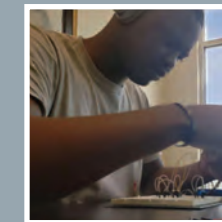
“I had the components needed to practice and hone my skills as an engineer. I expect to run into issues and sometimes fail, but I take those as a learning experience to grow.” – Sean Njenga BS’22



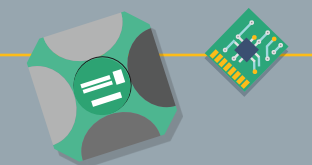
“The kits provided the equipment necessary for me to learn about some of the fundamental electrical components used in the industry.” – Abdullah Abdulhameed BS’22



“Students like me were able to continue learning despite the circumstances due to the pandemic. Without access to these materials, we would have missed out on learning opportunities that are extremely important in our development as competent engineers.” – Sehar Malik BS’22



“Not only have our labs been challenging but fun as well. We couldn’t have done this without this kind donation.” – Nicholas Wagner BS’22



The lab Nikoubin teaches is a multi-subject, junior-level course that is required for all ECE undergraduate students. The subject matter links to several areas of upper-level courses and provides invaluable experience for students who apply for internships.

When classes at UT Dallas and most other universities throughout the country were moved online because of the new coronavirus, Nikoubin and his teaching assistants initially recorded lab experiments using practical lab equipment with as many details as possible. At the same time, the simulation portion of all lab experiments were redesigned for an online meeting platform.

“I used prerecorded lectures along with live lectures,” Nikoubin said. “We modified lab reports to questions and answers on eLearning instead of regular procedures to help students understand when they should use the online platform with its limitations.”

Though recordings provided content for the initial semesters of remote education, Nikoubin knew the hands-on experience was most critical. He was unsatisfied with providing simulations for hundreds of students until the campus could safely reopen.

“For some courses, providing recordings was sufficient,” Nikoubin said. “We knew we needed to push for something else.”

In addition to the standard electronic equipment, the lab course requires the use of several tools and programs including Excel, C programming, LabVIEW, OrCAD for PCB Design, PSpice® and MATLAB.

Students previously worked together in groups of two to share the electronics equipment in a laboratory setting. For months, students could not access the space. While many students packed up computers and other devices, the bulky lab equipment, which costs between \$10,000 and \$20,000, could not be transported to students’ homes, and leaders did not want to ask students to purchase costly equipment kits.

Ultimately, TI came to the rescue and provided kits using the most current technology that would teach and reinforce the same skills as an onsite laboratory experience. Each kit eventually included an integrated circuit as well as testing and measurement tools packed into a container small enough to fit inside a shoebox as a new and advanced embedded system.


“We looked at courses where students would require laboratory instruction,” said Ayesha Mayhugh, a former TI representative. “Hands-on training at this stage is vital to them. They would not have the same marketable skills with only a lecture as they received from practical implementation through the lab component.”

Overall, TI contributed more than \$102,000 in equipment for more than 300 students during each semester of remote instruction.



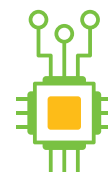
“The partnership with Texas Instruments has been transformative,” said Dr. Lawrence Overzet, professor of electrical and computer engineering who also teaches a course using the kits. “They stepped in so we could teach hands-on electronics labs to our students in their homes. Quality remote learning through COVID seemed like a hurdle too huge to overcome, but Texas Instruments came alongside us and made it possible.”

The kits are now used in as many as six courses.

“With the consideration of available advanced embedded devices, Lab at Home is more than a solution,” Nikoubin said. “It is a new culture.” 



Dr. Lawrence Overzet





**Dr. Stephanie G. Adams**

**\$1 Million**

National Science Foundation (NSF), Adaptation: Adapting Successful Practices to Foster an Inclusive, Respectful and Equitable Environment (ASPIRE<sup>2</sup>)



**Dr. Andrea Fumagalli**

**\$1 Million**

NSF, Collaborative Research: CNS Core: Medium: TeTON: A Testbed and a Toolkit for Expediting Investigation of and Accelerating Advancements in All-Optical Neural Networks



**Dr. Vibhav Gogate**

**\$4.9 Million (For Two Phases)**

Defense Advanced Research Projects Agency, Neuro-Symbolic Dynamic Probabilistic Models: A Unifying Representation and Reasoning Tool for PTG

**AWARDS  
\$1 MILLION  
AND UP**



**Dr. Seth Hays**

**\$3.4 Million**

National Institutes of Health (NIH), Wireless Nerve Stimulation Device to Enhance Recovery After Stroke



**Dr. Kenneth Hoyt**

**\$2.9 Million**

NIH, Multifrequency Ultrasound Imaging for Improved Breast Tissue Characterization



**Dr. Stephen Levene**

**\$1.4 Million**

NIH, Biophysical, Topological and Functional Studies of Endogenous Circular DNAs



**Dr. Zhenpeng Qin**

**\$1 Million**

NIH, Rapid Diagnostic Test for Respiratory Syncytial Virus by Digital Nanobubbles



**Dr. Joshua Summers**

**\$1.5 Million**

NSF, SaTC: CORE: Small: Genetic Circuit Learning from Adaptive Side-Channel Queries

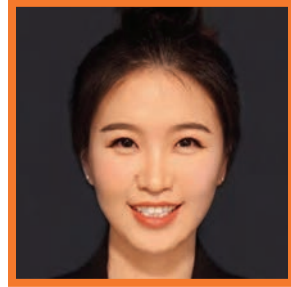


**Dr. Amy Walker**

**\$1.5 Million**

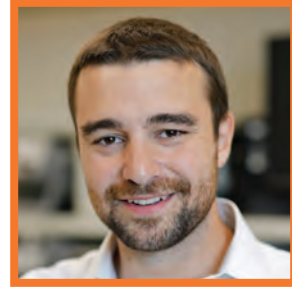
NSF, Improving Transfer Academic, Career and Community Engagement for Student Success (IT ACCESS) in Engineering and Computer Science

ACCOLADES



**Chen Chen**

Solid-State Circuits Society of the IEEE (Institute of Electrical and Electronics Engineers) Predoctoral Achievement Award



**Dr. Joseph Friedman**

NSF (National Science Foundation) CAREER Award, Bottom-Up Localized Online Learning with Spintronic Neuromorphic Networks



**Dr. Zygmunt Haas**

Fellow of ACM (Association for Computing Machinery)



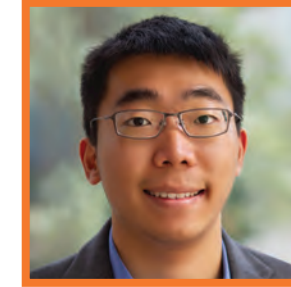
**Dr. John Hansen**

IEEE Signal Processing Society Leo L. Beranek Meritorious Service Award



**Dr. Shuang Hao**

NSF CAREER Award, Empowering White-box Driven Analytics to Detect AI-synthesized Deceptive Content



**Tiancheng Hu BS'20**

Gates Cambridge Scholar toward a PhD in computation, cognition and language



**Dr. Gu Kang**

Recipient of the American Society of Biomechanics Junior Faculty Research Award



**Dr. Murat Kantarcioglu**

Fellow of IEEE



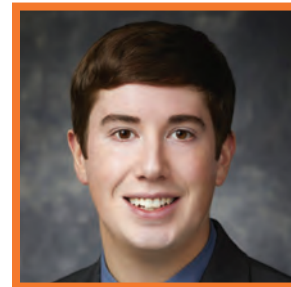
**Dr. Nasser Kehtarnavaz**

Fellow of AAIA (Asia-Pacific Artificial Intelligence Association)



**Dr. Latifur Khan**

Fellow of IEEE



**Dr. Justin Koeln**

Office of Naval Research (ONR) Young Investigator Award, Hierarchical Nonlinear Control of Integrated Propulsion, Power and Thermal Management Systems for Naval Aircraft



**Dr. Reza Moheimani**

Fellow of ASME (American Society of Mechanical Engineers)



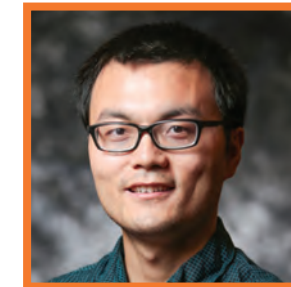
**Dr. Lawrence Overzet**

AVS Plasma Science and Technology Division Plasma Prize



**Dr. Shalini Prasad**

Fellow of AIMBE (American Institute for Medical and Biological Engineering), BMES (Biomedical Engineering Society) and Royal Society of Chemistry; ELATES (Executive Leadership in Academic Technology, Engineering and Science)



**Dr. Zhenpeng Qin**

ASME Y.C. Fung Early Career Award



**Neel Reddy BS'19**

Schwarzman Scholar Toward a Master's Degree in Global Affairs



**Dr. Justin Ruths**

NSF CAREER Award, Going Beyond Linear Models for Attack Detection and Defense in Control Systems



**Dr. Bhavani Thuraisingham**

IEEE Cyber Security Cloud Conference, Special Recognition Award for work in Diversity, Equity and Inclusion in Cyber Security, Cloud and Data Sciences



**Dr. Murat Torlak**

NSF Director's Award for Superior Accomplishment



**Dr. Robert Wallace**

Clarivate's Institute for Scientific Information, Highly Cited Researchers



**Dr. Shiyi Wei**

NSF CAREER Award, Improving the Practicality of Configurable Static Analysis Tools Through Analysis, Testing, Refinement and Adaptation



**Dr. Rym Zalila-Wenkstern**

Dallas Business Journal North Texas INNO, Researchers to Watch



**Dr. Wei Yang**

NSF CAREER Award, Enhancing Deep-Learning-based Code Analyses via Human Intelligence



**Dr. Yue Zhou**

ONR Young Investigator Award, Development of Structural Batteries with Improved Multifunctional Efficiency for Aerospace Applications

ACCOLADES

# LEAVING THE NEST:

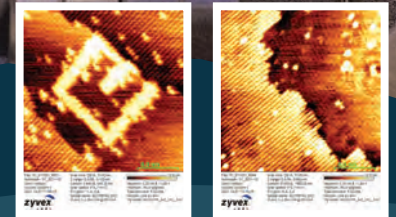
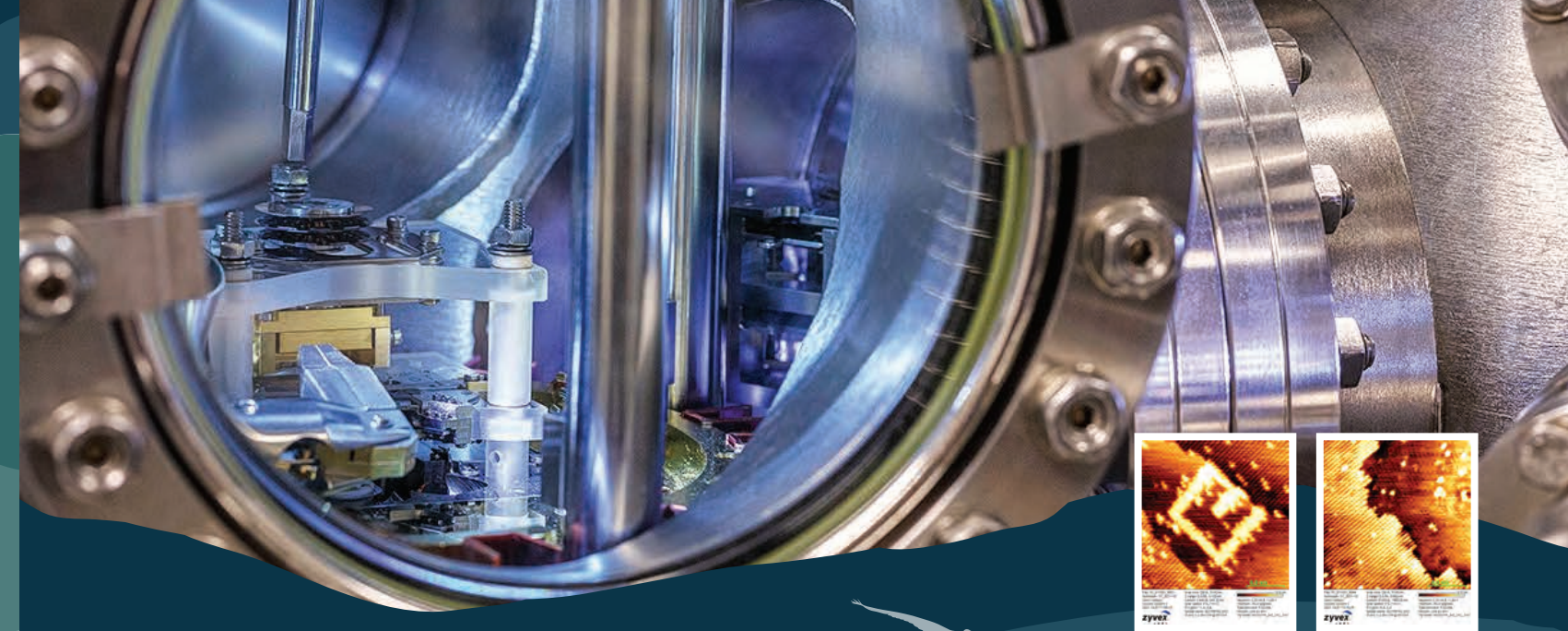
All innovation begins with a question, an idea. Researchers make big theoretical inquiries, examine microscopic problems or simply look out the window at practical issues ready to be tackled.

The laboratory acts as a home — a nest — for these ideas to incubate and hatch.

The journey from nest to flight is never perfect. Ideas grow with iteration. Just as young birds make several attempts to leave the nest, research can face false starts. However, through trial and error, engineers and computer scientists at The University of Texas at Dallas have watched their work propelled far beyond campus.

Recently, discoveries and devices born out of labs in the Jonsson School have successfully soared into new worlds of industry and landed in new branches of exploration.

# IDEAS TAKING FLIGHT



# SOARING AT THE QUANTUM SCALE

Below: This tiny innovation packs grand implications. Dr. Reza Moheimani introduces a nanoscale quantum device. Above: equipment for and images of the advance

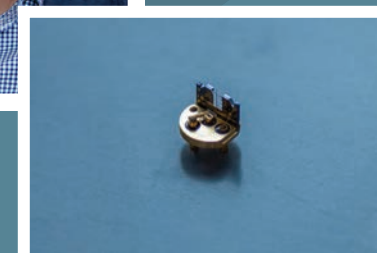
UT Dallas researcher has partnered with a North Texas company to commercialize technology developed in the lab. The new tech makes it possible — for the first time — to manufacture tiny quantum devices on a large scale.

Dr. Reza Moheimani, the James Von Ehr Distinguished Chair in Science and Technology, and Zyvex Labs received funding from the U.S. Department of Energy for their work. A Small Business Technology Transfer award worth \$1.1 million went to Moheimani to support his research over the next two years. Zyvex Labs, which specializes in developing atomically precise manufacturing devices, also received \$1.1 million.

“Quantum computing has the ability to transform fields, but the technology to manufacture these devices on a large scale is still emerging,” said Moheimani, also a professor of systems engineering in the Jonsson School, who detailed how his research team discovered greater control and precision of the fabrication process in the *Journal of Vacuum Science & Technology B*.

Moheimani received a \$2.4 million grant from the U.S. Department of Energy in 2019 to help catalyze his work examining the manufacturing of quantum devices.

“What we are doing is what universities are meant to be doing,” Moheimani said. “You’re not supposed to be working in a vacuum; you’re meant to be interacting with industry, and what we’re doing complements each other’s abilities and skills.”



# HOMEGROWN COMPANY FLOCKS TO SUCCESS

After more than a decade of tireless research and business development, a UT Dallas spinoff company — Adaptive3D — is flying high.

The company, which was founded by Dr. Walter Voit BS'05, MS'06, was acquired by Desktop Metal Inc., an industry leader in additive manufacturing based in Burlington, Massachusetts. Voit, associate professor of materials science and engineering and mechanical engineering in the Jonsson School, will continue to serve as CEO.

Through his research, Voit has developed specialized plastic and rubber materials using 3D printing. The acquisition makes way for large-scale manufacturing of these materials, which can be used for products ranging from shoes to parts for airplanes.

"We are thrilled to partner with Desktop Metal," said Voit. "The university set up the DNA for entrepreneurship at UT Dallas to be successful."

The Venture Development Center provided space to Adaptive3D for years, while the Office of Research and Innovation and the Office of Technology Commercialization helped with intellectual property and licensing.

Making space for growth, the company is naming the Richardson Innovation Quarter as their new home, a move that will quadruple the company's footprint.

With Adaptive 3D's mission aimed at achieving broad impact, students in UTDesign®, a senior capstone program, recently researched COVID-19 pandemic-related problems under Voit's direction.

Dr. Walter Voit is pushing the limits of 3D printing through flexible polymers and mass production of nasal swabs during pandemic shortages.

In efforts to boost the supply of nasal swabs due to shortages at the beginning of the pandemic, students sought to develop a flexible and more accurate 3D-printed nasal swab for infectious disease testing. The swabs are made with a rubber material based on technology developed in a campus lab.

"We will pick up from where the student teams left off with their designs to find a development pathway to scaling their systems to handle high-volume manufacturing of millions of swabs per month," Voit said.



# A BIRD'S-EYE VIEW OF THE PANDEMIC

The pandemic brought a host of urgent issues for UT Dallas researchers to address.

Dr. Ignacio Segovia-Dominguez, a postdoctoral research associate in the Department of Computer Science in the Jonsson School and the Department of Mathematical Sciences in the UT Dallas School of Natural Sciences and Mathematics, teamed up with NASA Jet Propulsion Laboratory to show that air quality and COVID-19 hospitalization rates were uniquely tied together.

By pulling data from several government agency satellites and plugging complex spatiotemporal information into a geometric deep learning computer model, Segovia-Dominguez determined that three factors — temperature, relative humidity and the number of aerosol pollutants in the air — could help predict the severity of COVID-19 outbreaks.

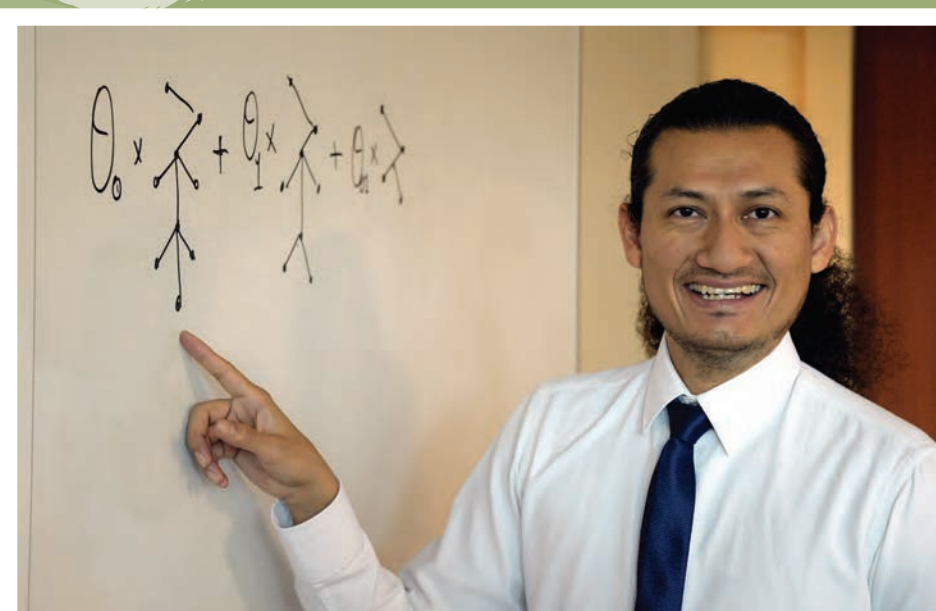
"The seasonal flu is tied to temperature, but COVID-19 did not seem to be heavily related," he said. "We weren't expecting the two — the flu and coronavirus — to behave differently in that regard."

As the lead author on the study, Segovia-Dominguez noted that relative humidity is likely the biggest factor in determining whether the coronavirus will survive in certain environments. While the flu virus thrives in less humid areas, COVID-19 may be more tolerant.

This study highlights the intrinsic relationship between air quality and COVID-19 clinical severity, delivering insights on new ways to predict geographical areas at higher risk of coronavirus infection. As demonstrated by the new findings, NASA's satellite data will play a more prominent role as researchers develop reliable predictive platforms for future epidemiological monitoring.

The Jonsson School researcher added that these findings encourage new branches of inquiry.

"It makes you think; it motivates you," Segovia-Dominguez said. "I want to continue to explore and push forward to make a difference."



Dr. Ignacio Segovia-Dominguez uses a geometric deep learning computer model to solve another pandemic problem — predicting where the next severe outbreak will occur.

# PERCHED TO PROVIDE RAPID DETECTION

In addition to examining the air, scientists are also looking to the tiny molecules hidden in sweat and breath.

A team of bioengineers in collaboration with the company EnLiSense have designed a wearable sensor that can detect markers of viral infection in sweat. This jump in early detection measures passive sweat, so users don't have to actively engage in physical activity. And, monitoring happens in real-time.

"We have built a technology to unlock and explore the latest frontier in sweat diagnostics," said Dr. Shalini Prasad, head of and professor in the Department of Bioengineering in the Jonsson School and the Cecil H. and Ida Green Professor in Systems Biology Science at UT Dallas. "This wearable technology is truly transformational in that it can measure and report human host response messenger molecules associated with inflammation and infection in a continuous manner."

In their study, the researchers collected sweat from 18 healthy people who wore the sensor. They also drew blood from the subjects and compared the results. The next phase of investigation is to evaluate the sensor's effectiveness in clinical studies with patients experiencing respiratory infections such as the flu and COVID-19.

The first author of the study was Badrinath Jagannath PhD'21, who received a first-tier Baxter Young Investigator Award and David Daniel Thesis Award from UT Dallas' Office of Graduate Education for his research on the sensor technology. He recently became a postdoctoral research fellow at the Wyss Institute at Harvard University.

Badrinath Jagannath PhD'21 (left) earned several awards for his PhD work with Dr. Shalini Prasad (right) on sensor technology.



Prasad leads by example as she encourages others to pursue technology commercialization opportunities.



While monitoring the body's sweat seems like an immediate way to measure indications of infection, Prasad helped push the limits of rapid detection when she along with a team of researchers invented the 30-second coronavirus breath test.

Easily used at home, the portable, reusable breath test device was designed by Dallas biotech company SOTECH Health, which licensed the platform technology that Prasad developed and further optimized through the University's Intellectual Property Assignment/Sponsored Research Agreement (IPA/SRA). The company has submitted the device to the U.S. Food and Drug Administration for emergency use authorization.

"The pandemic presented a myriad of research questions, and we worked to find some answers quickly," Prasad said. "The idea is to screen people rapidly to help prevent any further transmission."

The device works by identifying molecules that show the presence of an infection in an individual's breath. If the sensor presents a positive result, then the patient would need a COVID-19 polymerase chain reaction (PCR) test.

"This way of screening patients helps to sort who needs further testing or care immediately," Prasad added.

Wearable sensors and point-of-care diagnostics are a new frontier in biomedical engineering.



# SCIENTIST IN THE A.M., ‘SNACK’ IN THE P.M.



**B**ioengineering PhD student Leroy Arthur was at a Dallas restaurant with friends when he received what seemed like a random message through his Instagram account, which shows a video of him skydiving as well as photos of him fashion modeling and spending time with friends and family.

The message was, in fact, a legitimate invitation to join the “Bachelor” franchise. The long-running dating reality TV series that airs on ABC is watched by millions of people around the world and has expanded to include podcasts, a website, live tours and more. Contestants receive a rose each week as a sign they still have a chance to get engaged after a few of weeks of knowing a stranger.

“I’m big on ‘why not?’” said Arthur, whose Twitter bio includes the moniker “snack,” slang for an attractive person. “I have an adventurous side to me, and I wasn’t prepared to wonder what would have been.”

So after a year in the Jonsson School lab of Dr. Kenneth Hoyt, associate professor of bioengineering who also has a faculty appointment at UT Southwestern Medical Center in Dallas, Arthur packed a suitcase for California, where he entered quarantine, was sequestered and

then competed for up to two months to get engaged to Michelle Young, runner-up on season 25 of “The Bachelor” and lead of season 18 of “The Bachelorette.”

Competing included writing and publicly reciting poetry to Young, clobbering a fellow suitor with a giant teddy bear while wearing a silk pajama short set, then traveling to Young’s home state of Minnesota. Arthur donned gear of the Vikings — the historical Scandinavians, not the football team — and participated in activities such as yell war cries; throw tree stumps; eat fermented fish and a blend of cow brains, tongue and cheek; and arm wrestle.

His connection with Young was strong enough to make it to the final 10 guys before he did not receive a rose.

In a franchise known almost as much for its villain edit — those who cause the most drama tend to get more airtime — as for its love story, Arthur earned a reputation among contestants and viewers as a good person and a fashionable dresser.

“I will always feel like I have a lot to bring to the table; however, the storytelling is not about me — it’s about Michelle,” said Arthur, who as an undergraduate

student at the University of North Carolina at Chapel Hill earned a regional National Society of Black Engineering award for top poster presentation.

Arthur said that one of the toughest parts of filming was being disconnected from his family, but that his relationship with God allowed him to be himself on TV and helped with the transition back to his normal life.

“It was tough for my family to not know where in the world I was,” Arthur said. “But my mom, dad and older sister, now that things have transitioned, we laugh about it.”

Aside from finding a spouse, some previous contestants have used the



fame they gained from the show to build careers as social media influencers, models or actors. Arthur said that his career is in the lab. He is researching how to add ultrasound to existing techniques and tools to enable earlier diagnosis of nonalcoholic fatty liver disease (NAFLD).

Is he still looking for love?

“I am still single. I love love and the idea of it,” he said. “School is a priority, so building a connection while maintaining a successful work/life balance is essential for my next relationship.”

And with enough time, Arthur will have earned his PhD, meaning if he decides to compete in a future “Bachelor Nation” show, he would have the much-coveted title of “Dr.,” arguably making him even more of a “snack.”

Arthur can be seen on season 18 of “The Bachelorette,” episodes one through five. ↗

On Arthur’s Twitter account, he refers to himself as a “snack,” which means an attractive person.





By Jeffrey Hackett

# PARALLEL CIRCUITS



Four of five Fasolino brothers earned electrical engineering degrees from the Jonsson School, and three of them now work at Raytheon. From left to right, Kevin, a brain-based chiropractor; Mark, now a radio frequency and microwave engineer at the defense company; James, now a graduate intern at the defense company; Stephen, a senior failure analysis engineer; and Michael, a senior software engineer at Raytheon from 2005-17 and now a senior safety engineer at a different company.

The Fasolino family garage in Allen, Texas, was the center of many hands-on learning sessions for John and Stephanie Fasolino's children.

"My dad always had us out in the garage helping him; he can fix pretty much anything, electrical or mechanical," said Mark Fasolino BS'18, MS'19 who is now a radio frequency (RF) and microwave engineer at Raytheon. "We'd be helping him and engineering principles and techniques would naturally emerge."

Six of the seven Fasolino children went on to earn degrees from The University of Texas at Dallas, and four of five brothers graduated from the Erik Jonsson School of Engineering and Computer Science. Motivated by their passions for faith, family and engineering, the Jonsson School alumni are professional engineers, with three of them currently working at Raytheon Technologies Corp.

## PROFESSOR CONNECTIONS

Among the common connections is a favorite professor. Dr. Randall Lehmann, professor of instruction in electrical and computer engineering (ECE), taught three of the brothers as undergraduate and graduate students. Known by them as a tough grader who enhanced their technical competence through rigorous classwork, Lehmann also inspired them with lessons not found in textbooks.

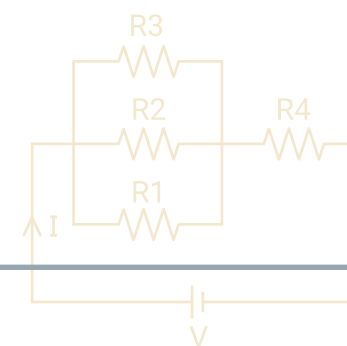
"He is the reason I pursued RF engineering in the workplace," said Mark, referring to radio frequency engineering. "Dr. Lehmann's undergraduate RF circuits course opened my eyes to the field and caused me to work toward a master's degree in the subject."

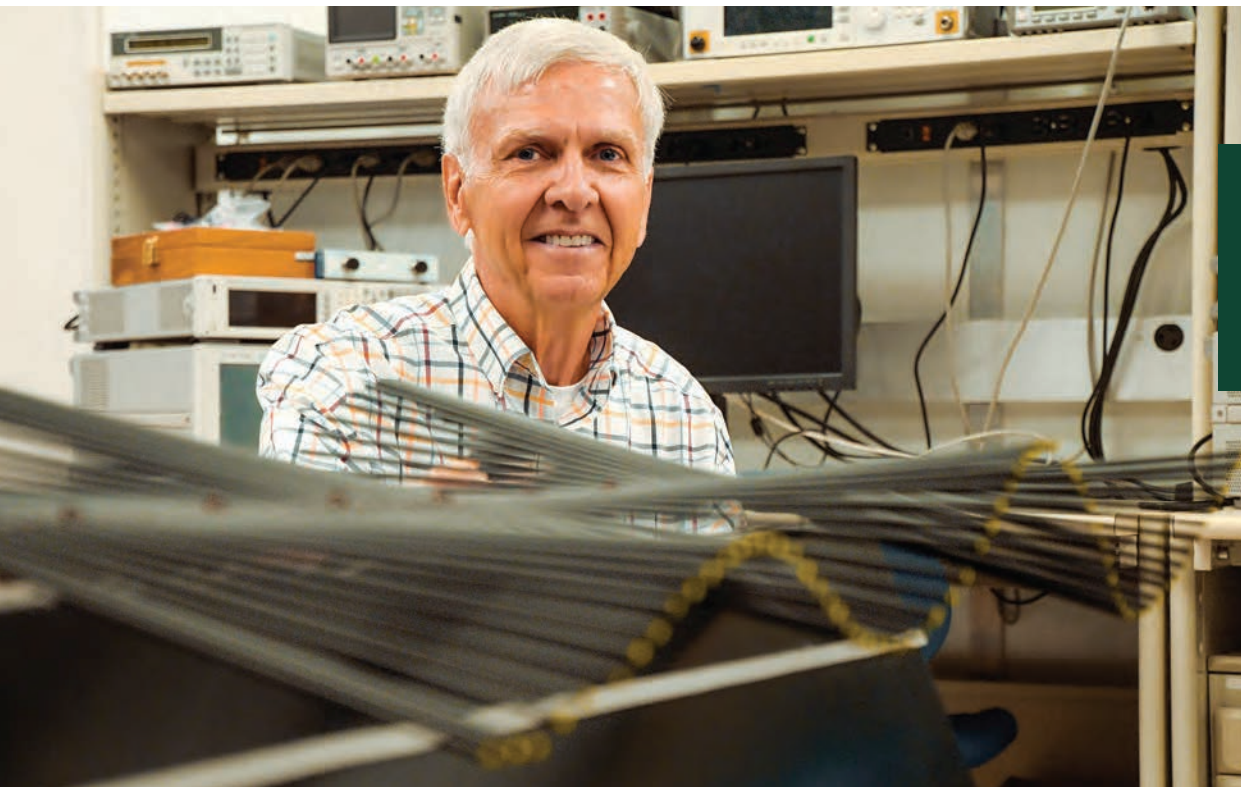
"I always heard good things about Dr. Lehmann, but after seeing him in action, I know he is one of the best professors I had in all of my years of school. He is inspiring."

Stephen BS'09, now a senior failure analysis engineer at Raytheon, appreciated the intangibles Lehmann incorporated into his lectures and his diligence in presenting complex material.

"He always had a character lesson of the week, that if you want to be a good

Six of seven children in the Fasolino family graduated from UT Dallas. From left to right: Christine BA'06; Michael BS'03; Mark BS'18, MS'19; father John and mother Stephanie; Stephen BS'09; James BS'20, MS'21 and Renee BA'05.





Dr. Randall Lehmann, professor of instruction in electrical and computer engineering (ECE), was a favorite teacher of the Fasolino brothers who incorporates character lessons into his instruction on electromagnetic wave propagation.

worker, this is the character you'll need to have," Stephen said about the Lehmann lectures. "You were his student, he cared about you and that came across in how much you learned."

Over the years, the Fasolino family has seen the relatively young university change and grow. UT Dallas is just 53 years old, and the Jonsson School is less than 40. From the time that eldest brother Michael BS'03, a senior safety engineer at Reynolds and Moore LLC, attended UT Dallas, the physical campus and the school's academic reputation have grown closer to achieving the founders' aspirations of becoming the "MIT of the Southwest." In 2015, the Carnegie Classification of Institutions of Higher Education designated UT Dallas an R1 research university, its highest level of research activity for doctoral

institutions. In 2018, UT Dallas achieved the benchmark criteria to qualify for funding from the National Research University Fund (NRUF), an exclusive source of research support in Texas. The research support increase occurred while the University was also one of the fastest-growing public universities over the past 10 years, according to *The Chronicle of Higher Education*. UT Dallas' electrical and computer engineering programs rank 3rd among public schools in Texas, according to *U.S. News & World Report* rankings, trailing only The University of Texas at Austin and Texas A&M University.

Dr. Rashaunda Henderson, interim co-head of the ECE Department and Fellow, Eugene McDermott Professor at UT Dallas, taught brothers Mark and James BS'20, MS'21. During James' graduation last

December, she reunited with the brothers and other family members.

Henderson, also founder of the High Frequency Circuits and Systems Laboratory at UT Dallas, said it is a short distance between the classroom and the workplace. Additionally, one hallmark of the university is that faculty are accessible to students and intentionally build relationships.

"What they learned on our campus is directly applicable to what they do in their jobs," she said. "We believe in being available to our students."

#### CAREER CONNECTIONS

Three of the brothers work in the defense industry at Raytheon in McKinney, Texas. Although their respective roles limit collaboration, the spirit of brotherly competition is ever-present.

"I have one of the coolest jobs, compared to my brothers," Stephen said. "I work in the Failure Analysis Lab. At times, it can be a combination of CSI, or crime scene investigation, and an emergency room for electronics. There are always new problems that walk in the door, and I get to tear stuff apart and find the root cause of failures."

"It's fun figuring out why things broke. I've been doing that since I was 10 in the garage, fixing my mom's vacuum cleaner."

Stephen's natural curiosity and desire to understand how things work doesn't stop at the end of a workday. After hours, he shares his hands-on skills through a YouTube channel called "Stephen of All Trades."

"People would call me up, and say my X, Y, Z is broken, and I'd talk them through it," he said. "You'd be very surprised how many times a week something breaks in the house, and I get to use my knowledge from work and school to fix something. It's a blast to be able to do that."

His penchant for problem-solving includes filings with the U.S. Patent and Trademark Office, with five patents awarded and several pending.

"I really enjoy innovating," Stephen said.

Stephen's younger brother Mark encouraged the creation of the YouTube channel, even buying his brother a camera known for action filming and surviving water and rugged encounters for Christmas.



Michael gives hands-on help to his father John, an electrical engineer.

Yet, Mark could not resist taking a competitive job at his older siblings.

"I attained a master's degree at UT Dallas for two reasons," he said. "One, because I knew it would be helpful in the workplace, and two, because my older brothers who went there didn't get their master's degrees."

There is general agreement among the brothers that James, now a graduate intern at Raytheon, probably earned the best grades and a special title.

"If you throw around the word 'nerd,' it's usually referred to as a compliment, not an insult, at least at UTD," James said.

James said he aspired to be a nerd: "There's a lot of complicated stuff in engineering. It takes dedication, time and persistence to get all of the details right."

At Raytheon, both James and Mark work in the RF radar design areas, building and testing electronics for military applications.

"I really enjoy my job," Mark said. "I use daily much of what I learned in my graduate studies at UTD."

James added: "It's cool to design a product and be able to test the product you designed on the computer."

Dr. Rashaunda Henderson, interim co-head of ECE, taught Mark and James and said that a hallmark of the program is faculty accessibility to students.



### FAMILY CONNECTIONS

There is a point in time somewhere between fixing vacuums in the garage and working for a Fortune 100 company that each of the brothers worked at Fasolino Lawn Care, a business started by eldest brother Michael, who was a senior software engineer at Raytheon from 2005-17.

Fasolino Lawn Care was a rite of passage. The brothers, including Kevin, spent summers working the business, and each of them consecutively owned it until heading off to college.

“We all paid college off with that business,” Mark said. “If I weren’t an electrical engineer, I’d be growing the lawn care business.”

In addition to covering college tuition, the business taught essential lessons in managing money and taking care of customers. Their father John built

a custom handle on a lawnmower for his then 10-year-old son Michael, then purposely stayed out of the way, allowing the brothers to run the business.

John remembers, “Michael was plodding along in the lawn care business, then Stephen came along and decided to up the game, getting chain saws and commercial tools. But Kevin was the businessman — he’d tell somebody how much he would charge them while the other guys just took whatever someone was willing to pay.”

Kevin studied another STEM discipline. His entrepreneurial acumen and attraction to biology and how the human body works led him to become a brain-based chiropractor.

One of their sisters, Christine BA’06 is involved with faith-based work, while the other sister, Renee BA’05 has used her University education to teach at a local public elementary school, in a private education system, in church children’s programming and at home with her own children.

### FAITH CONNECTIONS

It is a law of nature that electrons flow from negative to positive poles in a direct current. An immutable law of the Fasolino family is that their faith in God is the consistent energy in their circuit — from homeschooling at the

kitchen table, to the workbench in the garage, to the pews of their local church.

“Faith in Jesus Christ is paramount to everything we do,” said John, an electrical engineer. “The Bible declares that Jesus is the creator and as such He is the giver of true knowledge, wisdom and knows how everything works — electrically, mechanically and socially.”

Stephen said he and his siblings got to watch their parents live out their faith.

“Everything we do is shaped by our faith,” Stephen said. “That comes out in the way we study, school, the way we work and our life at home.”

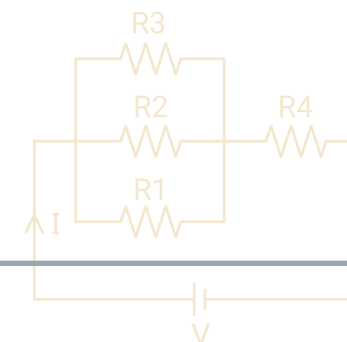
### CHARACTER CONNECTIONS

Lehmann, the Jonsson School ECE professor who helped inspire the Fasolino brothers in electrical engineering, said that it was an honor teaching the brothers.

“I expect graduating engineers to have good technical competence, but I always look for students with good character,” said Lehmann, who joined UT Dallas in 2004, a year after Michael graduated. “Stephen, Mark and James demonstrate those character qualities, which I believe will ultimately be responsible for their overall long-term success in their careers and lives.”



Dr. Lehmann and Mark at commencement



## FASOLINO GRADUATES OF UT DALLAS

**MICHAEL FASOLINO**  
Brother  
BS in Electrical Engineering, 2003

**CALEB NELSON**  
Brother-in-Law (Husband of Renee)  
PhD in Electrical Engineering, 2010  
MS in Electrical Engineering, 2007  
BS in Electrical Engineering, 2006

**RENEE NELSON**  
Sister  
BA in Interdisciplinary Studies/  
Certificate in Teaching, 2005

**CHRISTINE PILLETTE**  
Sister  
BA in Interdisciplinary Studies, 2006

**STEPHEN FASOLINO**  
Brother  
BS in Electrical Engineering, 2009

**MARK FASOLINO**  
Brother  
MS in Electrical Engineering, 2019  
BS in Electrical Engineering, 2018

**JAMES FASOLINO**  
Brother  
MS in Electrical Engineering, 2021  
BS in Electrical Engineering, 2020

# AHEAD IN THE COUNT

Devyn Yanello, Conference Softball Player to Watch  
By Jeffrey Hackett

**M**uch can happen in the 43 feet between the pitcher's mound and home plate. Standing on the rise, Devyn Yanello reads the sign from the catcher. Her unspoken intention — send the batter back to the dugout.

Earlier this year, Yanello, a mechanical engineering senior in the Erik Jonsson School of Engineering and Computer Science at The University of Texas at Dallas, was named a preseason "Player to Watch" in the American Southwest Conference. Yanello is a former high school state champion from Houston.

"When a batter comes to the plate, I need to connect with the catcher on what pitch I'll throw. We have a mental connection being able to talk to one another without saying anything," Yanello said.

Her college teammates, the UT Dallas Comets, are a young group lacking senior leadership, but they showed improvement this past season under new women's softball head coach Kelly Archer.

Softball is a statistic-heavy sport where every action is assigned a numerical value. Whether on the mound or in the batter's box, staying ahead in the count requires athletic and mental abilities. Having spent

hundreds of hours in math and science classrooms with equal time in the bullpen, Yanello's knowledge of the ball's speed, rotation and trajectory are attributes she applies automatically from the mound.

"It's a lot about physics and how the ball spins in line with the plate," she said. "If one little thing is off, the ball shifts its movement. I'll think about how to fix it, like in math where one little number can drastically shift the solution."

Those changes in ball and bat movements are governed by Sir Isaac Newton's second law of motion, where the force of an object is equal to its mass times acceleration. What happens on softball fields and in the classroom are not that far apart. Classroom test scores and wins and losses on the diamond measure her academic and athletic successes.

"As a pitcher, I strive for perfection," Yanello said. "A perfect game is no hits, no runs. But it's hard, and the margin of failure is high. So, if they get a hit, it's okay, we're fine. You have to keep going."

Yanello transferred to UT Dallas primarily because of the Jonsson School's reputation. The University's close ties with North Texas companies

helped her decision. But the chance to play a sport she loves sealed the deal.

The University helps student-athletes succeed by offering tutoring and early class registration. Even demanding professors provide a touch of empathy. Nevertheless, the rigor of college-level academics is challenging. Add in team practices, travel and games, and the commitment becomes a handful. Then consider that women engineers are breaking barriers in a field with very little gender balance.

"I'm in a class with two women and 60 men. I feel it shouldn't be like that — women should want to do STEM and be a part of it," Yanello said. "I want women to know that you can do anything you want. Even for young girls, if you want to be a mechanical engineer, yes! If you want to work in STEM, yes!"

She continued, "Anything is possible, and just because right now the field is dominated by males, it could later be dominated by females. That would be an amazing shift."

*The 2022 season ended 23-18. Yanello pitched in 22 games with team-high 15 starts, striking out 24 batters in 86.0 innings pitched, with season-high three strikeouts. T*

# FABRICATING THE FUTURE

BY SALLY PARKER

Before he became president of The University of Texas at Dallas in 2016, Dr. Richard C. Benson was an engineering professor, department chair and school dean at prestigious institutions on the East Coast. As a leader, he soon realized a critical part of his job was to show the wider university community that engineers were more than the left-brain nerds stereotypes suggest.

From his days as an assistant professor, he raised his hand for university-level committee assignments. He enjoyed collaborating with colleagues in the arts and humanities so much, in fact, that leading the whole ship became the next logical step.

“There’s just something very satisfying about working across the whole university,” said Benson, the Eugene McDermott Distinguished University Chair of Leadership, about UT Dallas. “You’re surrounded by really bright people, and in many cases, you really don’t have boundaries. You can explore and work in partnership with others, sometimes in ways that might surprise others.”

How  
ENGINEERING LEADERS ARE  
Constructing a  
BETTER UT DALLAS

Universitywide leaders from the engineering and computer science community (from left to right) Frank Feagans, vice president (VP) for information technology and chief information officer; (seated) Dr. Yvette E. Pearson, VP for diversity, equity and inclusion; Dr. Ravi Prakash, speaker of the Academic Senate; Dr. Richard C. Benson, president of UT Dallas; Jennifer Klunk, Staff Council president; Kara Peak, inaugural Graduate Student Assembly president; Dr. Stephanie G. Adams, dean of the Erik Jonsson School of Engineering and Computer Science; and Dr. Joseph Pancrazio, VP for research and innovation.

President Benson and other engineers and computer scientists in universitywide roles with responsibility across schools and units at UT Dallas say that the university offers the perfect environment to apply the tools of their disciplines to the overall mission. From the University's role in the region's economy to employee rights, engineering leaders are making a difference.

“Maybe it's the engineer in me. I like to set a goal that you can picture reaching, but you also know that you're going to have to work together to get there.”

*Dr. Richard C. Benson*

Created in 1961 as a corporate research wing by the founders of Texas Instruments Inc. and then formally established as a state university in 1969, UT Dallas is younger by a century or more than most of its peers. Its first focus was on graduate education; four-year undergraduate programs were not added until 1990.

Against this nontraditional backdrop in an environment of explosive growth, UT Dallas leaders who come from an engineering or computer science background bring their own mix of skills: logic and analysis, organization, pragmatism, problem-solving, yes — but also innovation, creativity and collaboration.

The University's strategic plan for 2018 to 2025 sets out aggressive goals rooted in metrics that quantify UT Dallas' standards, especially relative to benchmark

institutions. While not all targets can be quantitatively measured, the plan has a decidedly analytical approach to tracking progress — from student enrollment numbers to the size of the endowment.

“I like to have goals that are uncomfortable,” Benson said. “Maybe it's the engineer in me. I like to set a goal that you can picture reaching, but you also know that you're going to have to work together to get there.”

Inspiring the next generation and developing a workforce are central to the University's mission. But institutions are now expected to do even more. One theme of the plan is to become an economic engine for the region through research and development.

“There's an expectation that the things that we do impact the world, from research to the marketplace, and that we are part of the innovation machinery that happens, especially across here in North Texas,” said Dr. Joseph Pancrazio, vice president for research and innovation who also is a professor of bioengineering in the Erik Jonsson School of Engineering and Computer Science.

That means leading from behind, relying on scholarly and scientific training to create a fertile environment for the research pursuits of faculty and graduate students.

“Part of leadership in academia is trusting and building trust, and allowing excellent people to do the excellent work that they can do,” Pancrazio said.

Another part of leadership that engineers may be more likely to embrace is pragmatism, he added.

“Sometimes, you're not going to get a perfect solution,” Pancrazio said. “Engineers understand that when you have a lot of different considerations, you have to make very principled, thoughtful, logical decisions — and you don't have the time nor the luxury of being perfect. That's just reality.”

Dr. Ravi Prakash, speaker of the Academic Senate and professor of computer science, said his background “imposes a certain discipline in how I approach any problem — whether with research, or teaching or administrative issues. For example, if I were writing a program, how would I ascertain its correctness? It's like debugging a piece of code. A system made of people is way more complex than any code I will write, so I'm always conscious of that.”

As speaker, Prakash does a lot of listening and bridge-building as faculty debate often hot-button issues, such as curriculum decisions or safety during the pandemic. To bring them to agreement, he gives them space to air their views, then with a full lay of the land — and crystal clear communication with forthright administrators, he added — he can set a path forward.

“If you keep the communication lines open in the culture that is UT Dallas that is far more productive,” said Prakash, also a professor in the Hobson Wildenthal Honors College. “It's productive for the issue immediately at hand and in the long term, because it means you can continue to work together.”

Dr. Yvette E. Pearson, vice president for diversity, equity and inclusion who has a civil and environmental engineering background,

**Name:** DR. RICHARD C. BENSON  
**Title:** University President  
 Eugene McDermott Distinguished University Chair of Leadership  
**How, When:** Selected by the University of Texas System Board of Regents in 2016  
**Priorities:** Attract talent; enrich the student experience; engage globally; enrich the arts; advance research; become an economic engine for the region; develop financial and administrative systems that sustain excellence; create a culture of philanthropy; ensure a sustainable, rewarding campus environment; foster diversity, equity and inclusion



Benson holds a construction hat that reads “PRESIDENT.” He has established a reputation for new construction during his tenure, including the Engineering and Computer Science West Building and the Texas Instruments Biomedical Engineering and Sciences Building.

Pancrazio displays a photo of an implantable microelectronic array capable of recording brain signals. The complex device requires interdisciplinary collaboration and has been his main area of focus throughout his career.



**Name:** DR. JOSEPH PANCRAZIO  
**Titles:** Vice President for Research and Innovation  
 Professor of Bioengineering  
**How, When:** Appointed by UT Dallas President in 2018  
**Priorities:** Reducing the burden for faculty in conducting world-class research; promoting team science that brings diversity; impacting the local community through the research enterprise

**Name:** DR. RAVI PRAKASH  
**Titles:** Speaker of the Academic Senate  
 Professor of Computer Science and in the Hobson Wildenthal Honors College  
**How, When:** Elected by senate members in 2018, 2020 and 2022  
**Priorities:** Keeping faculty informed, working together, healing and recovering from the pandemic; establishing new model of work



Prakash holds a virtual reality headset. His current research is on reducing bandwidth consumed in streaming 360-degree immersive videos for virtual reality and augmented reality scenarios.

Pearson displays the United Nations' sustainable development goals logo. The goals demonstrate the need for convergent approaches that bring together different ways of doing, thinking and knowing from engineers, scientists, policymakers, health professionals, local communities and other stakeholders to solve societal challenges in a way that advances justice, equity, diversity and inclusion for all.



**Name:** DR. YVETTE E. PEARSON  
**Title:** Vice President for Diversity, Equity and Inclusion  
**How, When:** Appointed by UT Dallas President in 2021  
**Priorities:** Advancing justice, equity, diversity and inclusion (JEDI) as a universal standard of practice, inextricably linked to organizational excellence at every level

joined UT Dallas in fall of 2021 with 26 years as a leader in engineering academia. She was drawn in large part by the innovative atmosphere, particularly by campus leaders who were open to pursuing new and better

ways to ensure justice, equity, diversity and inclusion (JEDI) for community members.

“In the grand scheme of things, UTD is such a young institution,” she said. “Many

institutions have centuries of historical inequities in the fabric of who they are. Being such a young institution presented more of an opportunity to model and shape how we see ourselves.”

In a staff retreat this past year, Pearson and her team re-envisioned their role in unifying promising-but-siloed efforts to ensure equity across campus. At her recommendation, UT Dallas became a charter member of STEMM Equity Achievement (SEA) Change, an initiative led by the American Association for the Advancement of Science (AAAS) to make sure equity is at the center of efforts to advance diversity and inclusion in STEMM (science, technology, engineering, mathematics and medicine).

she said. “I’m not an executive; I’m in the trenches. I’m seeing things from the point of view of somebody who has to do a lot of the legwork. Being able to convey that to leadership is important.”

Innovation starts with collaboration. When bioengineering doctoral candidate Kara Peak visited UT Dallas for the first time, she was struck by the collaborative vibe of the department. Not only were principal investigators and graduate students welcoming and eager to answer her questions, they were curious about one another’s research.

“That trip sold me,” she said. “It showed me they had a genuine interest in what their colleagues were up to — even if they weren’t involved in the research. That’s not always the case in academia.”

Peak was the inaugural president of the Graduate Student Assembly (GSA) founded in 2018 to represent the interests of 9,000 students in all disciplines. Her goal last year was to have GSA officially recognized as a governing body to give graduate students a permanent voice in University matters. That occurred in spring 2021.

Of key concern during the pandemic was the safety of teaching and research assistants, whose tuition benefits and stipends required them to be on campus. GSA’s efforts ensured graduate students were afforded the same exemptions as faculty members. Other priorities included increasing stipend amounts and reducing health plan costs.

“Some of the things we’ve been able to effect have real impact for people at UTD in their daily lives and for future policy

“There’s an expectation that the things that we do impact the world, from research to the marketplace, and that we are part of the innovation machinery that happens.”  
*Dr. Joseph Pancrazio*

changes. Those will have lasting influence,” Peak said. “Don’t brush off getting involved with ‘smaller’ or local things. That’s how change begins.”

Frank Feagans, vice president for information technology and CIO, said his office’s supportive role brings him great satisfaction.

In the beginning of his career, Feagans, who holds a bachelor’s degree in computer engineering and a master’s degree in computer science, was about to start a PhD program in computer science when his advisor had a massive stroke. With a young family to support, he switched to corporate work, landing on the leadership track. Returning to the business side of academia in 2011 and joining UTD four years later felt like coming home, he said.

“In corporate America, it wasn’t about making a difference for the greater good,” he said. “It was about the stock price. I felt like doing something that would feel more rewarding.”

Supporting the UT Dallas Strategic Plan is the most satisfying aspect of his job, Feagans said. This includes various student success initiatives, providing productivity tools and training for all UT Dallas employees and helping faculty in any way, including optimally leveraging high-performance computing and other cyber-infrastructure services for faculty research.

**Name:** JENNIFER KLUNK

**Titles:** UT Dallas Staff Council President  
 Program Coordinator in the Department of Mechanical Engineering

**How, When:** Elected by Staff Council representatives in September 2021

**Priorities:** Remote work, employment equity and staff ombudsperson



Klunk chose a gavel from a high school mock trial for an item that is meaningful to her. High school mock trial is where she said she understood that she could work within an institutional structure for the greatest possible good.

**Name:** KARA PEAK

**Titles:** Graduate Student Assembly President  
 Doctoral Candidate and Research Assistant in Bioengineering

**How, When:** Elected by assembly members (UT Dallas graduate students) in 2020 and 2021

**Priorities:** Official recognition of the organization; increased stipends for and coverage by the Student Health Insurance Plan (SHIP) for teaching assistants, research assistants and graduate assistants; reduced cost of SHIP for other students



An item of significance for Peak is a pair of fine-tipped forceps. The bioengineering doctoral candidate said she uses these simple tools in almost every experiment for varying purposes, and that without them, she would not be able to start.

**Name:** FRANK FEAGANS

**Title:** Vice President for Information Technology and Chief Information Officer

**How, When:** Selected by UT Dallas President in 2017

**Priorities:** Accelerate research advancements by helping UT Dallas researchers best leverage cyberinfrastructure services; enhance eLearning services; enrich the total student experience; improve productivity for faculty, students and staff no matter where they physically reside; provide efficient, effective, resilient and secure IT commodity services; grow and nurture a caring, collaborative and inclusive culture across a diverse office



This quote that reads, “I skate to where the puck is going to be, not where it has been,” from Wayne Gretzky, a famed Canadian former professional ice hockey player and coach, reminds Feagans to always anticipate what is ahead.

“I’m always wanting to hear different voices and different views,” said Klunk, who grew up “speaking my mind.”

“One of the things I love about it is getting to see the world through other people’s eyes. To be able to advocate for staff to be appreciated in tangible ways — salary, benefits, work circumstances — is something that I feel is very important,”

“We tell them, ‘Explain your science to us, and we’ll walk you through what cyberinfrastructure services can help you do the research in the fastest, most cost-effective way,” Feagans said.

His team also offers guidance on information security and IT purchasing to 23 units across campus. And each year, more than 100 IT student workers are mentored in roles that give them real world experience.

“My favorite thing is when the people who work for me and the customers they serve are happy,” he said.

A college campus is a great place to make a difference, Benson agreed.

“A lot of people in the working world seek to emulate a campus environment because of the creativity and the ability to interact with seemingly disparate people,” he said. “We can continue to really define the future of UTD. In my inauguration address, I finished by saying that we’re all benefactors, because you have this incredible opportunity to define the future traditions and the areas of strength. Not everyone gets to do that. It’s pretty extraordinary.”

Adams poses with a T-square, emphasizing that she seeks precision as a leader and developed a structured approach to solving problems during her undergraduate engineering courses.



## SERVICE LEADERSHIP IN *an Evolving World*

Jonsson School faculty members have served as leaders in national and international professional organizations for many years. Their work helps keep Jonsson School research and education at the forefront of the engineering field and among peer institutions, further cementing its reputation as a leader in engineering and computer science education.

### DR. STEPHANIE G. ADAMS

American Society for Engineering Education  
President, 2019-2020

#### *Pedaling Through a Pandemic*

ASEE’s annual conference was less than three months away when the pandemic struck. Full-time staffers shifted into high gear, learning tech tools on the fly to create a virtual conference in a matter of weeks.

“We just dealt with a really wicked problem,” said Dr. Stephanie G. Adams, dean of the Jonsson School, holder of the Lars Magnus Ericsson Chair and professor of systems engineering, who was president at the time. “It’s so apropos when you talk about engineering as a profession. It was engineering in action.”

More than 12,000 engineering and computer science educators around the world are members of ASEE. Adams counts lifelong friends among them. She has attended all but one conference since her first in 1998 as a graduate student. Her first of many volunteer roles was to edit the newsletter for ASEE’s engineering management division.

“I consider myself to be a joiner, and I encourage it here,” said University President Dr. Richard C. Benson, a fellow and former board member of the American Society of Mechanical Engineers. “We’re showing leadership at the national and international levels. It’s just part of our growing maturity as a university.”

In recent years, faculty have given this commitment new meaning: The COVID-19 pandemic shut down conferences, scuttled professional education and threatened financial coffers. Read on to learn how four faculty members have tapped skills in creativity and problem-solving to meet those challenges and to further their organizations’ impact.

Adams’ turn as president (book-ended by terms as president-elect and past president) demanded fresh ideas and a knack for creating teams that solve problems. She also used her role as a leader to inspire and to practice being transparent in uncertain times. When Adams found herself binging on snacks and TV shows during the pandemic, she revealed in her monthly president’s column her decision to take up cycling to get off the couch. On social media, friends and colleagues watched as ASEE’s president worked her way up to 40 miles a week and a level of fitness she hadn’t felt in years. Thanks for the motivation poured in.

“Service is the rent you pay for your time here,” she said. “And ASEE is a great organization to serve.”

### DR. JOHN HANSEN

International Speech  
Communication Association (ISCA)  
President, 2018-2021 (two terms);  
current board member

#### *Increasing Inclusion*

ISCA, with 10,000 historical members, works in a wide range of fields that have speech communication at their heart, from engineering technology to linguistics and speech science.

Before the pandemic, Dr. John Hansen, Distinguished Chair in Telecommunications at UT Dallas, professor of electrical and computer engineering and associate dean for research in the Jonsson School, lobbied fellow ISCA leaders for remote participation in education and conferences. He knew it would enable attendance by members who couldn’t be there in person because of health or mobility barriers, visa constraints, lack of funding or religious or cultural reasons. He was met with resistance — until the pandemic forced the switch.

ISCA members live all over the world. In some areas, such as the Middle East, Africa and South America, funding for conference travel is tight or nonexistent. Going virtual made attendance possible for people who had never been able to come and allowed a whole new diverse population interested in speech communication to be part of the community.

“All conferences going forward, we will ensure some kind of remote or hybrid mode,” said Hansen, who was in his second term as president when the switch was



“The speech communications community has been and continues to be committed to supporting diversity in all forms, regions and people worldwide.”  
*Dr. John Hansen*



made. “It helps enormously to bring in more people from underrepresented regions. It gives great opportunities for low-resource languages for speech science and technology to become more visible and of interest to educators and engineers/scientists at companies. This allows them to present papers and be part of the discussion.”

Hansen also oversaw the establishment and support of a diversity committee that explored, among other things, how many female members were ISCA fellows (3%, though they represent about a quarter of the members) and how to encourage more women to be nominated and recognized. An LGBTQ committee was also formed to offer a place of inclusion, especially for members in regions of the world where it’s high risk to identify as such. The speech communications community has and continues to be committed to supporting diversity in all forms, regions and people worldwide, Hansen said. He attributes these commitments to contributing to student membership doubling over the past five years.



“I think sometimes students get forgotten. I felt if they wanted to be part of a community, they really needed to have a voice.”  
*Dr. Amy Walker*

University leaders in other disciplines benefit from engineering and computer science education. These include:

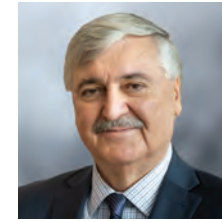
**DR. INGA MUSSELMAN**

Provost and Vice President For Academic Affairs  
Cecil H. Green Distinguished Chair of Academic Leadership  
Postdoctoral Research Associate in the Department of Materials Science and Engineering and Precision Engineering Center, North Carolina State University



**DR. HASAN PIRKUL**

Dean of the Naveen Jindal School of Management  
Caruth Chair  
Bachelor’s degree in Industrial Engineering from Bogazici University in Turkey. His PhD is in Computers and Information Systems, from the Simon Business School at the University of Rochester.



**DR. STEVEN SMALL**

Dean of the School of Behavioral and Brain Sciences  
Aage and Margareta Møller Distinguished Professor in Behavioral and Brain Sciences  
PhD in Computer Science from the University of Maryland



**DR. AMY WALKER**

AVS  
President, 2020

*Nothing Happens in a Vacuum*

Dr. Amy Walker, professor of materials science and engineering in the Jonsson School, joined AVS right after 9/11. The camaraderie she felt in the group, headquartered in New York City, was almost instant, she recalls.

“The support I got from them was and is incredible,” she said.

The 4,500 members of AVS are scientists and engineers who work in the materials sciences — from biological systems (like implants in the body) to new applications of its original focus, vacuum technology.

Through AVS, she met more experienced professionals who became beloved mentors. In turn, Walker, who is associate dean for undergraduate education in the Jonsson School, looks for opportunities to support educators and engineers following her.

Walker came up through the ranks before being elected president-elect in 2019. When she stepped up as president in 2020, her plan was to improve diversity and inclusion, and she created a standing committee to ensure ongoing efforts.

She also started an early professionals committee to bridge the gap between student members and more established professionals. Since AVS began in the 1950s, students have voted only in their local chapter elections. Walker pressed to extend their involvement to the division and group levels, leading to a bylaw change allowing it.

“I think sometimes students get forgotten,” Walker said. “I felt if they wanted to be part of a community, they really needed to have a voice. I was able to explain how this would make it their professional home for much longer.”

**DR. RASHAUNDA HENDERSON**

Microwave Theory and Technology Society of Institute of Electrical and Electronics Engineers (IEEE)  
Current president

*Bridge Leadership*

Dr. Rashaunda Henderson, co-interim head and professor of electrical and computer engineering, was an undergraduate student when she joined IEEE, the largest professional technical organization in the world. She didn’t imagine that someday she would be president of one of IEEE’s largest divisions, the 11,000-member Microwave Theory and Technology Society, or MTT-S, overseeing more than a dozen standing committees and serving as a go-between for the society and IEEE.

Henderson, also a Eugene McDermott Professor at UT Dallas, is taking up where her predecessor left off, with an ad hoc committee pushing to attract more young members for the fresh ideas they can bring. As part of that, she’s also pressing for diversity, mentoring and inclusion; while she’s never felt excluded, only 8% of MTT-S members are women. Of the 1,500 graduate student members, however, women make up roughly a third.

“My role as president is to be a voice as well as a set of ears regarding the present and future directions of our society,” she said. “What do we need to be doing in the future, and are we addressing the needs of our entire community? Are students being cared for? Do women have what they need, or are they being ostracized?”

Henderson says the society has been like a family to her. Growing ranks of satisfied members will be an important part of its future success.

“If people get involved, you want to figure out what it is that gets them to stay for 20-plus years. What is it we need to do to accommodate that?” she said. “I just hope to connect people so they can establish those long-term relationships and have a positive experience.”



“What do we need to be doing in the future, and are we addressing the needs of our entire community?”  
*Dr. Rashaunda Henderson*

# UT DALLAS HOSTS NATIONAL CAPSTONE DESIGN CONFERENCE ...

UT Dallas hosted the national Capstone Design Conference in June. The event, organized by members of UTDesign®, the Jonsson School's signature senior design capstone program, drew more than 200 attendees, representing more than 65 institutions from throughout the country.

Following are a few highlights of the three-day event.



The event kicked off with a panel discussion moderated by Dr. Stephanie G. Adams, dean of the Jonsson School, holder of the Lars Magnus Ericsson Chair and professor of systems engineering, about why design teams should focus on inclusion throughout the design process to create the best, most functional products designed to serve the greatest number

of people. The panel (pictured starting third from the left to right) included Dr. Brooke Coley, assistant professor of engineering at Arizona State University; Ronnie Spellman, chief operating officer at Mbroh Engineering and member of the Jonsson School's Executive Council; Dr. Sindia Rivera-Jiménez, assistant professor of engineering education from the University of Florida; and

Roslyn Barker, executive chief of staff at Toyota Motor North America. Event co-chairs Dr. Keith Stanfill, Edwards assistant dean and director of integrated engineering design at the University of Tennessee, is far left and Dr. Shraddha Sangelkar, assistant professor of mechanical engineering at Rose-Hulman Institute of Technology, is far right.

College student teams from across the nation whose work had been selected through a rigorous process attended the event with their professors and presented their work during the poster competition. Participating team members volunteered to meet with high school students from the Plano and Dallas Independent School Districts through a panel discussion and breakout groups that focused on opportunities in the engineering profession.



Keynote speaker Douglas Moore, general manager fuel cell solutions and business development, from Toyota Motor North America described his focus on the customer experience and model of continuous improvement.



# ...and WINS 10<sup>TH</sup> NATIONAL TITLE

A UT Dallas UTDesign student team won a first-place award at the conference for developing a system that helps a corporate sponsor test its device to prevent blood clots.

The win marks the 10th first-place capstone design win since 2014 for UTDesign teams in the American Society of Mechanical Engineering (ASME) Manufacturing Science and Engineering Conference and the biannual Capstone Design Conference. The team's 2022 Capstone Design Conference win was a three-way tie.

This year's winning team developed a pressure-sensing system for Precision Medical Products, a Texas-based company that makes postsurgical devices to prevent deep vein thrombosis, which occurs when a blood clot (thrombus) forms, usually in a leg. The

UTDesign team's device, shaped like a human calf, serves as a surrogate leg for testing. Rows of intersecting copper tape on the device create more than 225 sensing points to make it possible to visualize the applied pressure, providing more than 400,000 unique data points per minute.

"The students' ability to work as a team led to an exceptional outcome that absolutely exceeded our expectations," said Tony Spyropoulos, Precision Medical Products' executive vice president of product development.

He said the UTDesign team's device will help the company avoid the expense and delays of outsourcing its testing.

Biomedical engineering senior Edgar Acevedo accepted the award with Roger Decker III BS'22, the team's leader. 7



# NEW RANKING HIGHLIGHTS EXCELLENCE IN SOFTWARE ENGINEERING

**U**.S. News & World Report recently ranked The University of Texas at Dallas' software engineering program within the top programs nationwide in its 2023 undergraduate rankings. This category includes academic programs where “students learn to create and maintain computer programs and applications.” UT Dallas is ranked 18th nationwide, 14th among public schools nationwide and No. 2 within Texas.

In Texas, the Jonsson School software engineering specialty ranking trails only The University of Texas at Austin among all ranked schools, including private schools, for the second year in a row. *U.S. News* first ranked this specialty in its 2022 listing. For undergraduate computer science, the program is No. 3 among public schools in Texas.

Dr. Ovidiu Daescu, head of the Department of Computer Science, said the new software engineering ranking is significant, particularly because of the substantial growth of the computer science department. The student enrollment for the graduate program in software engineering has also grown by more than 240% over the past five years.

“Since the inception of the software engineering program, the Department of

Computer Science has focused on making it one of the best in the nation,” Daescu said. “In the last 10 years, the department has hired outstanding tenure-track faculty in software engineering who publish in top-ranked conferences and journals and attract significant external funding. Coupled with the research strength of our faculty and rising standards for graduate admission, both our undergraduate and graduate degrees have increased in value.”

The ranking is considered a specialty category of computer science, and the top-ranked schools include both public and private institutions. At just over 50 years old, UT Dallas is one of the youngest institutions to be included on the list.

Daescu continued, “Today, our department is a sought-after place for getting a degree in software engineering. Notably, a few rankings place our programs among the best in the nation. For example, *csrankings.org*, a website that ranks institutions based on publications in top academic venues, places our software engineering program at seven for 2012-2022. Both our undergraduate and graduate degrees are complemented by an

Executive Master of Science in Software Engineering degree that is designed for mid-career professionals and has received excellent reviews from our alumni.”

Full rankings are on page 13. ↗

## #2

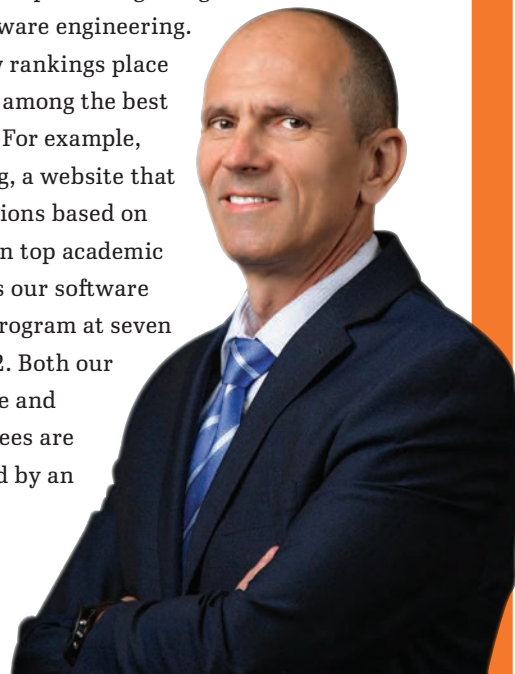
undergraduate software engineering program in Texas (*U.S. News & World Report*)

## #3

undergraduate computer science program among public schools in Texas (*U.S. News*)

## #7

software engineering program (*csrankings.org* 2012-2022)

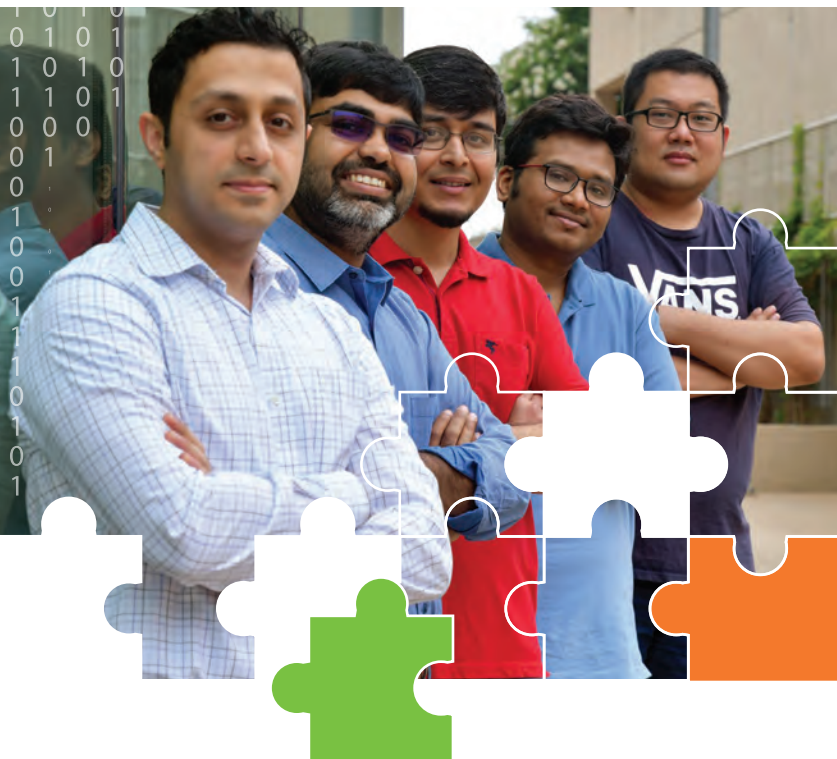


Dr. Ovidiu Daescu

# UNLOCKING

## INTEGRATED CIRCUIT SECURITY

UT Dallas' logic locking team in the cybersecurity competition included (from left to right) Dr. Kaveh Shamsi, assistant professor of electrical and computer engineering; Dr. Kanad Basu, assistant professor of electrical and computer engineering; and graduate students Shamik Kundu, Rajesh Kumar Datta and Guangwei Zhao.



Some of the most destructive computer hacks occur before computers are even assembled. A student team from the Erik Jonsson School of Engineering and Computer Science aimed to thwart would-be hardware hackers through logic locking, a technique designed to prevent hardware attacks, and earned international acclaim with their creative solution.

"The circuit is like a room," said Guangwei Zhao, a PhD student and research assistant in electrical and computer engineering. "When you want to go into the room, you need to go through the door. Logic locking is like a key into the circuit, and the only people who understand how to get in are ourselves."

"I never thought previously that logic locking was sophisticated," said Guangwei Zhao, a student on the Jonsson School team that won second place in the worldwide cybersecurity competition. "The advantage is that the experience broadened my eyes, so I thought of how it could be applied elsewhere."





The Cybersecurity Awareness Worldwide (CSAW) competition hosted by students at the New York University Tandon School of Engineering included more than 6,000 competitors across five global regions. The Trustworthy and Intelligent Embedded System (TIES) team from The University of Texas at Dallas placed second at the CSAW Logic Locking challenge in November 2021 and was named a global finalist.

“CSAW is one the biggest global competitions,” said Dr. Kanad Basu, assistant professor of electrical and computer engineering and founder of the TIES Research Group. “It has expanded to India, Latin America and Europe. When I first joined UT Dallas, I led a team to third place.”

This year, Dr. Kaveh Shamsi, an assistant professor of electrical and computer engineering and an expert in circuit-based logic approaches, joined the team as a faculty advisor.

“As a PhD student, I took second place in an embedded security competition,” Shamsi said. “This logic locking competition focused on software I have been researching and working on for six years. The students began by using our software, but then developed and adapted it together.”

Shamsi’s leadership made an immediate impact.

“With Dr. Shamsi’s added expertise, we took second at the finals,” said Basu, who is also affiliated with the Cyber Security Research and Education Institute at UT Dallas.

In addition to Zhao, the team included Rajesh Kumar Datta, a doctoral student and teaching assistant in electrical engineering, and Shamik Kundu, a doctoral student and research assistant in computer engineering.

### THE KEY TO HARDWARE PROTECTION

Logic locking is a complex process designed to protect integrated circuits from security threats including Trojan attacks, piracy and reverse engineering.

“The technique of logic locking started around 2005-2008 when the concept was first proposed,” Shamsi said. “Since then, people have been going back and forth to develop it, then trying to secure it as attacks have become more sophisticated.”

This year, the TIES participants focused on Embedded Field Programmable Gate Array (eFPGA) redaction.

The team attempted a cost-effective method of embedding the key within the design itself. They were able to activate parts of the eFPGA that would have been unintelligible to potential hackers after the manufacture was complete, thus providing a reliable method for preventing reverse engineering attacks.

“The key to logic locking is that you try to obfuscate your design,” Shamsi said. “However, it’s very difficult to secure. For the competition, they picked the most secure logic locking and set it up against the toughest attack.”



Shamik Kundu, a doctoral student and research assistant in computer engineering

### EMBEDDING A NEW SOLUTION

The up-to-date, evolving nature of the challenge was particularly interesting for the team.

“We mostly use benchmark circuits for fabrication, but here we used eFPGA circuits currently in industry,” said Kundu. “It’s interesting to see how everyone solved this problem.”

The team met remotely due to the COVID-19 pandemic prior to the virtual competition. Debugging and working together on physical hardware intensified the challenge.

“It would have been a lot easier to work in person,” Kundu said. “When working with circuits, it’s not always possible to use the whiteboard.”

Ultimately, however, the team developed a unique solution, which gave them a competitive edge.


“The creative part is that we reversed the functionality of the eFPGA,” Zhao said. “Our method focused on recovery of the functionality.”

### UNCOVERING CAREER POTENTIAL

Companies across the globe face cybersecurity threats, so student competitors are well-positioned to land interviews or invitations for research presentations.

“Companies specializing in everything from software security to AI to CAD will notice,” Basu said.

That’s an added benefit for Kundu, “If your approach is promising, that increases your chances of getting a call. There are representatives paying attention from government and major companies like IBM, Intel, Amazon and Facebook.”



Additionally, the competition motivates students to enter the most advanced areas of research while questioning their assumptions.

“I never thought previously that logic locking was sophisticated,” Zhao said. “The advantage is that the experience broadened my eyes, so I thought of how it could be applied elsewhere. Do we need this key or the functionality?”

The team is already planning for future opportunities to collaborate.

“The competition topics change each year, so I’m looking forward to next year’s focus,” Zhao said. “This experience produced real innovation.”



# COMPETITIVE PROGRAMMING TEAM RAISES STANDING, QUALIFIES FOR WORLD FINALS

A team from the Erik Jonsson School of Engineering and Computer Science returned to the International Collegiate Programming Contest (ICPC) North America Championship (NAC) where they qualified for a second straight year for the ICPC World Finals, the world championship event held this fall. The powerhouse team was recruited through Codeburners, a student coding club at The University of Texas at Dallas.

"I think I was lucky," said Duy Vu, computer science senior. "We knew about each other, but we didn't know for sure how our team would work together until the regional competition."

Vu's team members included An Q. Nguyen BS'21, Peter Kwak, computer science senior and coaches Bhadrachalam Chitturi PhD'07, the team's coach and associate professor of instruction, Mohammadreza (Reza) Haghpanah, a PhD student and assistant coach, and Darrin Wiley BS'19, also a current PhD student and assistant coach. Wiley was previously a contestant on the UT Dallas team that qualified for the 2021 world event.

"This competition serves to find the best of the best in computer programming," said Dr. Ovidiu Daescu, head of the Department of Computer Science. "They qualified twice in a row out of tens of thousands."

The competition that began in the 1970s is considered the world's premiere programming competition. More than 60,000 students participate from more than 3,000 universities representing as many as 115 countries.



"If you think about the hundreds of thousands of students studying computer science, then take high-performing teams, you can see why it's a challenge even to make it past regionals," Daescu said. "UT Dallas teams qualified not only for nationals but also for the world competition two years in a row, which shows that this is not a fluke."

## FORMING A COMPETITIVE TEAM

In the competition, teams of three students have up to five hours to solve a set of new problems that require skills in advanced algorithms, data structure and mathematics, as well as programming languages. One problem at nationals in 2021 included planning the largest possible robot that could strategically clean a rectangular room and not be hindered by obstructions. Another required students to compute the longest subarray that is both mountainous, or strictly increasing then strictly decreasing, and a palindrome, or the same sequence forward and backward, from a series of integers.

Above: The 2020 team qualified for the world finals after finishing 15th out of 65 teams in the ICPC North America Championship in February 2021. (Left to right) Dr. Bill Poucher, ICPC executive director; Mohammadreza (Reza) Haghpanah, the team's assistant coach; An Q. Nguyen; Duy Vu; Darrin Wiley BS'19; Bhadrachalam Chitturi PhD'07, the team's coach and associate professor of instruction; and Dr. Jeff Donahoo, ICPC deputy executive director.



During the next season, Vu (left) returned as a teammate for a second year of competition, Chitturi (center) returned as the team coach and Wiley (right) served as assistant coach.

“You can enter five competitions, maximum,” Wiley said. “Fortunately, in my last possible competition, we qualified for the world competition. But I still wanted to stay involved with the team.”

The UT Dallas team participated in a virtual-only competition, including recruiting new team member Kwak and practicing remotely. Wiley also stayed on as a coach.

Vu said that the remote competition provided a very different experience.

“We could not meet in person, so we had to meet online once a week,” he said. “We were in three different time zones.

“Also, Peter’s strengths were different from Darrin’s, so we needed to adapt.”

Wiley observed that coaching as a former team member helped to build continuity, which he believes led to the team’s success.

“Coaching has been a great experience,” Wiley said. “My coaching style was as a fourth participant, which has allowed me to stay sharp. I also had

to consider the strengths that a new team member contributed. Peter had not participated in competitive programming previously, but he’s easily one of the best at UT Dallas now.”

Both Wiley and Vu had been competitive programmers in high school. They formed a team through Codeburners. They discovered their next team member through a chance encounter at their academic advisor’s office.

Vu continued, “An and I randomly visited our advisor at the same time, and he knew of me from an online coding group called Codeforces. He asked if I wanted to join Codeburners. If he and I had not visited the advisor at the same time, we wouldn’t have known each other.

“I have been a competitive programmer since high school,” Vu said. “The first time was in seventh grade, and I tried competitions in Da Nang, Vietnam. I won first in a Vietnamese national youth contest. I didn’t know about UT Dallas for computer programming competitions — I decided to go here for the computer science program. I think I was lucky. We

didn’t know for sure how we would come together until the regional competition.”

#### HIGHLY COMPETITIVE QUALIFIERS

In 2021, students faced an additional competition in order to qualify for the national championship. The North American Division Championship (NADC) was added following the regional competition, so students had to be well placed at regionals, then NADC, then NAC in order to qualify for the world finals.

“The structure at nationals has changed,” Chitturi said. “Previously, they hosted a regional competition as a qualifier for the national competition. Now, students also need to compete in the North American Division Championship in order to qualify for the nationals.”

While the team competed in a virtual format at regionals, they were able to improve their standing by placing first, outranking regional teams from major private and public institutions.

“My favorite part is the regional competition,” Wiley said. “Participants just have a really fun weekend. You

get to play cards and make a lot of friends. I was also really excited that we won regionals this past year and beat some very strong teams — that’s a testament to how hard the team works.”

At the NADC, a second regional qualifier, the team placed 8 out of 43 regional teams and qualified for nationals a second year in a row.

Finally, the ICPC North America Championship was held in early August 2021. UT Dallas placed 8th out of 48 teams. Teams within the top 10 included Massachusetts Institute of Technology, Georgia Institute of Technology and University of California, San Diego.

#### WORLD COMPETITION AND BEYOND

The UT Dallas team first qualified for the world competition in Moscow in October 2021, then returned for a second national championship where they qualified for world again. The 2022 world competition was held in November in Dhaka, Bangladesh.



Peter Kwak joined the team in 2021.

“This is the most prestigious team competition in computer science,” Chitturi said. “Getting there is not a small accomplishment.”

After gaining world recognition, competitors often go on to high profile careers in the tech industry.

“I really encourage students to go for higher education,” Chitturi said. “An is now a master’s student at Brown University, and

Darrin is a PhD student at UT Dallas. I am encouraging Peter and Duy to earn their advanced degrees as well.”

Competitors say they most value the lessons in teamwork.

“This was the first time I competed on a team,” Vu said. “We had to communicate, correct each others’ code, focus on the strengths of our team, work remotely and become more efficient. I definitely think this experience will help my future work in industry.”

During the COVID-19 pandemic, both practices and competitions were hosted remotely, providing unique communication and collaboration challenges.



# A CIRCLE OF MENTORSHIP: UT DALLAS SOCIETY OF WOMEN ENGINEERS HONORED FOR EXCELLENCE



Award, the 2021 Gold Collegiate Mission Award, Strategic Goal #1 Leadership Development with the Group and Strategic Goal #4 Mentorship.

In December 2021, the group was also recognized with the Million Women Mentors — Texas 2021 Collegiate Stand Up for STEM Award. The statewide event presented by the Texas Girls Collaborative Project recognized the group for their passion for STEM, their encouragement of others and their “willingness to share skills and knowledge through role modeling and mentoring others.”

“We really honed our focus on mentorship,” said Maaha Sakhia, president of SWE during the 2021-2022 academic year who is majoring in electrical engineering. “We have Ladies in Tech Mentorship and a competition within SWE match. They can all learn from each other. Outside of SWE, we have an education program.”

Areeba Qazi who currently serves as vice president of internal affairs and is majoring in biomedical engineering, added, “It was my first time in person. I was surrounded by so many hard-working women who have helped us accomplish so much.”

## CENTERING INCLUSION

The Boeing Company Collegiate Multicultural Award in particular focuses on programs that have prioritized diversity, equity and inclusion, and SWE’s programs stood out for their commitment to high-quality programming.

Many engineering programs nationwide are working to achieve greater equity for students from underrepresented groups. The UT Dallas SWE section has aimed to provide a warm, welcoming

**M**edha Aiyah BS’21, graduate student in computer science, met engineer Lisa Depew as a high school student in El Dorado Hills, California, when she worked on her Girl Scout Gold Award project to create a solar cars curriculum. She observed how Depew balanced motherhood with an engaging career at Intel and McAfee, and she also learned about Depew’s involvement in the Society of Women Engineers (SWE), an international organization that focuses on mentorship and career preparation for women in engineering.

In December 2021, Depew reunited with Aiyah, who had served as the president of The University of Texas at Dallas’ SWE section. The section was recognized for achieving multiple strategic goals at the organization’s international conference last year in Indiana.

“It was a real honor,” Aiyah said.

The UT Dallas SWE section received four major awards in support of the organization’s mission. The areas they were recognized for include the Boeing Company Collegiate Multicultural



Shreya Chauk, Maaha Sakhia BS’22 and Areeba Qazi served on the SWE leadership team during the 2021-2022 academic year. During their tenure, they focused on streamlining in-person and virtual events.





Qazi, Chauk, Sakhia, Medha Aiyah BS'21 and Alisa Thomas BS'21 MS'22 (from left to right) brought national recognition to The University of Texas at Dallas section of the Society of Women Engineers for exceptional programming aimed at inspiring and supporting women and nonbinary students as they pursue careers in engineering.



place for students over the past several years, including sponsoring the University's first hackathon for women and nonbinary students.

"Alisa Thomas was so inclusive, and I wanted to maintain that environment," said Aiyah about the former president.

Dr. Stephanie G. Adams, dean of the Erik Jonsson School of Engineering and Computer Science and holder of the Lars Magnus Ericsson Chair, is nationally recognized for her efforts toward diversity, inclusion and belonging in engineering education, and she provided advising and financial support to the group. Adams herself served as SWE president as an undergraduate student in 1987.

"SWE provided a critical leadership opportunity during my formative years," said Adams, also a professor of systems engineering. "Inclusion extends to leadership and mentorship opportunities, particularly those

that are extended to women and others who are underrepresented in engineering. I am pleased to support SWE's offerings at UT Dallas."

#### MENTOR MATCHING

Sakhia and Aiyah have both faced challenges with running a student organization through the COVID-19 pandemic. With expanded programming and enhanced communications, they have created more mentorship programs even as they have had far fewer opportunities to plan in-person gatherings.

SWE Match is an initiative focused on pairing students with beginning and intermediate skills. Ladies in Tech Mentoring provides mentor matches between freshmen and sophomores with upperclassmen and graduate students, and the SWE Resources Education Virtual Program (SWERV) partners with the Plano Independent School District to provide an engineering fundamentals workshop for students in grades K-12.

Their website provides study guides and a portal with resources so students have multiple ways to engage. SWE has also expanded corporate sponsorship, which has helped to enhance the University's section's offerings to students.

#### CULTIVATING EXCELLENCE

Sakhia and Aiyah have embraced the mission goal of professional excellence using their own skill sets as leaders. Aiyah initiated many of the new programs, while Sakhia has streamlined processes as the University has transitioned back to campus.

"It's crazy to see what we accomplished within a virtual environment," Aiyah said. "It's been a great ride, and it's also been great to see Maaha stabilize some of these programs."

Sakhia continued, "We worked to solidify some of the programs, especially due to the shift from virtual to in-person events. I think the structure we're developing also facilitates becoming better leaders.

One aspect of leadership is passing the baton and ensuring that you're enabling others to lead after your time is through."

As the leaders aim to connect women to their future careers, they consider what women will need to know about success in STEM fields, including work-life balance and long-term career management.

"We host several different industry events," said Shreya Chauk, vice president of external affairs who is a double major in computer science and cognitive science. "I particularly enjoyed hosting socials. There is constant communication and a level of contact. It really empowered me personally — we're going to focus on that aspect in the upcoming semester."

As Sakhia has recently finished her year as SWE president, she has also benefited from mentorship. She identifies as a Muslim and has connected with another Muslim woman engineer who has integrated her faith and personal life with her career. Qazi said that Sakhia has also mentored her and inspired her to take on leadership roles.

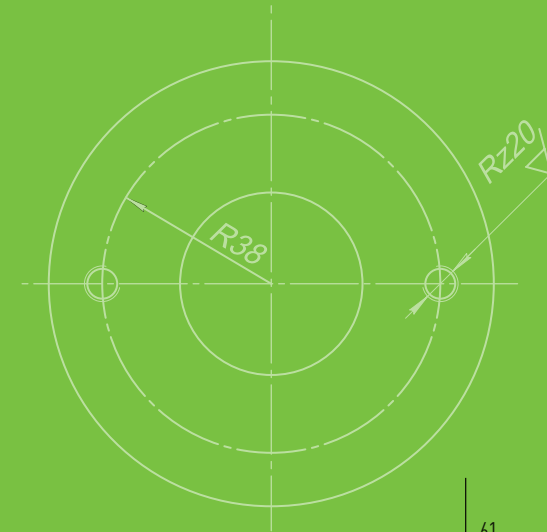
The team aims to continue the example of mentorship and professional excellence that has garnered both local and international recognition.

"It was very gratifying," Chauk said. "Getting that recognition just showed the fruit of our efforts and how we have grown." 

Below: One, two, three! SWE presidents (from top to bottom) Thomas, Aiyah and Sakhia focused on creating inclusive mentorship programs and career preparation offerings over three years as they built upon each other's leadership strengths.



Above: Medha Aiyah BS'21 (left) reunited with mentor Lisa Depew at the SWE international conference held in Indiana in December 2021.





A NEW TAKE ON ROYALTY:

**JONSSON  
SCHOOL  
STUDENT  
ELECTED  
HOMECOMING  
KING**



**H**omecoming at The University of Texas at Dallas is designed to celebrate students and their unique experiences at a university with an internationally ranked chess team, nationally ranked esports team and no football team. In February 2022, University students elected Natasha Rahman (she/they), a mechanical engineering senior in the Erik Jonsson School of Engineering and Computer Science, to reign. Rahman, the first queer woman elected Homecoming King, shares their experiences as a Comet.

You were elected the University's Homecoming King in 2022.

Congratulations! How did you feel to be part of the Homecoming court?

*It felt euphoric to be named Homecoming King and shows that UT Dallas is a safe space. It was really an accumulation of so many things, especially since this happened during my senior year. I had a rocky start to college, then once I began to find my core groups on campus, we went virtual due to the COVID-19 pandemic. Doing everything remotely showed that so many activities on campus are designed to build you up. Even though it was a challenge, I saw a lot of personal growth during the pandemic.*

What activities did you participate in as Homecoming King?

*We did so many things! We had a door-decorating competition, we decorated golf carts, and we got everyone to submit their videos. We worked hard to promote the Homecoming events. After we had been remote for so many months and then hosted an in-person Homecoming in the spring, we really wanted to show that spirit and pride. With the door-decorating and individual campaigns, I was able to express my defining personality traits and activities in college.*

I understand you are active in several student organizations including the University chapters of the Society of Women Engineers (SWE), Engineering World Health, American Society of Mechanical Engineers (ASME) and Chi Alpha Iota Diaternity. Can you tell me more about your involvement?

*Chi Alpha Iota provides a home for queer Greek life on campus. I have served as the president, and it's one area where I don't have to just focus on academics. We hosted a drag show last fall, and this spring,*



Above: Temoc, the UT Dallas mascot, (bottom row) with 2022 Homecoming Court members and University staff members (left to right) Tineil Lewis-Moore, assistant director of student organizations; Natasha Rahman; Sarah Romanko; Paolaenid Rodney-Hernandez; Brandon Borick; Troy Murray; and Alexis Yi, student program coordinator.

*we hosted ReProm, which is for LGBTQ students who didn't get the prom experience in high school. SWE has helped me a lot with professionalism. I am also a secretary for Engineering World Health, which is a smaller organization. I am able to take some of what I have learned from SWE, which is a very large and successful organization on campus, and bring some of those leadership insights to help this organization to grow. ASME is also helping to prepare me more academically and professionally.*

Chi Alpha Iota is a gender neutral Greek organization at UT Dallas. I understand SWE also promotes inclusion of LGBTQ students. How can student organizations promote inclusivity and safe spaces for all students?

*The biggest thing I can say is that we cannot force change or inclusion to happen. We shouldn't just tell people what to do or police pronoun usage. Allyship should be more like opening up. Like any good teacher or leader will say, 'We encourage*

*you to take this opportunity.'* Sigma Lambda Gamma is a Greek sorority that focuses on advocacy, and the UT Dallas chapter has been very interested in promoting allyship. We need to give all of our organizations room to be an ally.

Mentorship is a critical part of leadership. How have you served as a mentor and advisor to students?

*My mentorship style has focused on shaping up and coming leaders. College life is transitory, and students have a lot of potential. I lead by teaching incoming freshmen as an openly queer person of color, and parents seem to warm up to me. Through Road Warriors, which is for commuter students, there is more one-on-one interaction. Now, as a resident advisor, I try to help students feel connected to the UT Dallas community. One of my main roles now is connecting students to the resources already available on campus, whether it's therapy or the Student Success Center. You don't have to handle everything alone.*

You described your own freshman year as rocky. Can you tell me more about that? Many students struggle with the transition to college. I wasn't used to the study skills I needed to have in order to be successful in engineering. Your GPA can be a really frustrating metric — it's a huge roadblock when you need to get an internship. A friend of mine recommended the Student Success Center, and it was so helpful. Also, when we went remote, the classes became substantially more accessible. I think that is one of the side benefits of remote learning, because I had time to think through my learning strategies.

I understand you are majoring in mechanical engineering with a minor in

marketing. How have your experiences at UT Dallas prepared you for your future career?

*I switched majors to mechanical engineering, and it was miraculous how much more I enjoyed attending class. I found my niche faster. I've found that it's one of the most creative engineering degree plans, which I didn't think was the case initially. I am looking at careers in product management or product design. When I used CAD during my internship last summer, that took away the grade pressure. I was doing something purely to learn, so I think that revolutionized my thought process about my future career and has helped me to find my passion in mechanical engineering. This summer, I had an internship at General Motors. I want*

Below: Rahman at a diaternity drag show.

Rahman stated, "The biggest factor that unites Comets is our sense of individuality."



*to look at different company dynamics. I have learned how to utilize my network, so it's looking like getting a job after graduation will be the least of my worries.*

What advice would you give to incoming freshmen about getting the most out of their time at the Jonsson School?

*I think students should attend career panels. Hearing professionals talk about their jobs is extremely beneficial. I didn't recognize the creativity involved in engineering until I heard about what people do day-to-day, beyond the academic structure of college. Keep your options open, and don't be afraid to reach out to people on LinkedIn.*

Whatever your niche is, the personal growth journey in college is massive. It's not all about the books. Seniors may understand, but I think freshmen don't just yet. Chi Alpha Iota is a passion for me. There's a lot of learning to do in college — you learn what defines you as a person.

What does it mean to be a Comet? What does school spirit at UT Dallas look like?

*The biggest factor that unites Comets is our sense of individuality. We have so much diversity on campus that there's a home for everyone. There are a million ways to be a Comet. Each student who walks onto campus finds their niche organization, program or community, and it becomes their family and their support system. With the variety of activities on campus, we make campus feel like a home for everyone. School spirit on campus is also a product of the diversity that exists here at UTD. It's taking pride in everyone around us and celebrating the wins in the communities we have created. School spirit is investing in everyone around us to help build the confidence of all Comets. ↑*

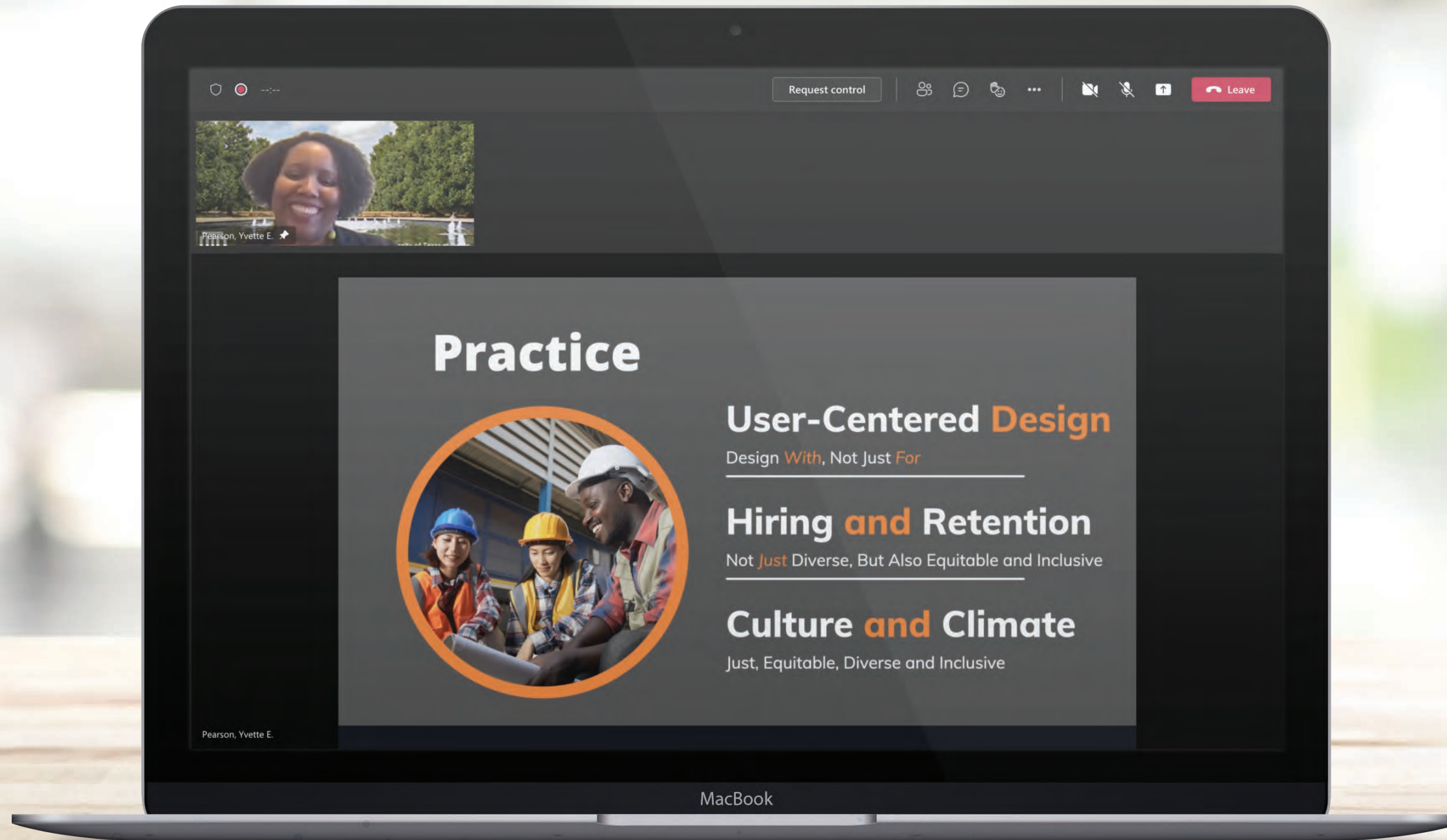
Dr. Yvette E. Pearson, vice president for diversity, equity and inclusion at UT Dallas, tells audience members that user-centered design integrates the entire user experience throughout the iterative process.

## DISTINGUISHED LECTURER CONNECTS ENGINEERING, EQUITY AND INCLUSION

In the wake of George Floyd's murder in 2020, corporations and organizations rushed to issue statements emphasizing their commitments to diversity and social justice. Dr. Yvette E. Pearson, vice president for diversity, equity and inclusion at The University of Texas at Dallas, worked with the American Society of Civil Engineers (ASCE) leadership at that time to issue a similar statement in her role as inaugural chair of Members of Society Advancing an Inclusive Culture (MOSAIC), a board-level ASCE committee.

What disheartened Pearson afterwards was that an engineer asked the question, "What does social justice have to do with engineering?"

Pearson attempted to answer that question when she delivered the Dean's Distinguished Lecture at the Erik Jonsson School of Engineering and Computer Science via Microsoft Teams earlier this year. The invited lecture marked an introduction to Pearson's vision for a focus on justice, equity, diversity and inclusion (JEDI) principles to be incorporated at school, university and



societal levels. Dr. Stephanie G. Adams, Jonsson School dean and Lars Magnus Ericsson Chair, invited Pearson to deliver the lecture a few months after she joined UT Dallas. Pearson titled her lecture “Connecting the Dots: Engineering, Ethics and Equity.”

“I am pleased to call Yvette my colleague and friend,” said Adams, also professor of systems engineering. “Engineering design and inclusion are inextricably connected, and I knew that members from across the Jonsson School could benefit from hearing how they can participate in more equitable, effective engineering practices. We are so fortunate to have someone with Yvette’s caliber of expertise at UT Dallas.”

Pearson is a civil engineer who previously served as associate dean for accreditation, assessment and strategic initiatives in the George R. Brown School of Engineering at Rice University. She was recently awarded the 2021 President’s Medal from ASCE, the 2021 Distinguished Engineering Educator Award from the Society of Women Engineers and the 2019 Claire L. Felbinger Award for Diversity and Inclusion from the Accreditation Board for Engineering and Technology (ABET). She earned bachelor’s and master’s degrees at Southern University and her PhD in engineering and applied science from the University of New Orleans.

### CHANGING PERCEPTIONS

Pearson introduced several problems that demonstrate disparate outcomes for specific populations stemming from bias and systemic inequity. She cited a statistic from the Centers for Disease Control and Prevention indicating that Black women are three times more likely to die from a pregnancy-related cause than white women but that the gap closes when Black women are under the care of Black physicians. She cited a Georgetown University study showing a 36% higher mortality among pedestrians using wheelchairs and discussed National Institute of Standards and Technology findings on how Asian and African American people are up to 100 times more likely to be misidentified by facial recognition technology, with Native Americans having the highest rate of being falsely identified. Finally, she explained a *Fort Worth Star-Telegram* report on how people in that Texas city in a predominantly African American, lower-income community on average will not live to the age of 67, despite living in close proximity to high-quality hospitals.

“What’s the common thread that connects all of these problems?” Pearson asked.

“The answer is that they are very strongly rooted in inequities that we see in Science, Technology, Engineering, Mathematics and Medicine (STEMM). It’s not only in the practice of those areas, but it ties back to what we are doing in terms of education and research in those spaces as well.”



Pearson’s lecture addressed the question, “What does social justice have to do with engineering?”

### INVITING PARTICIPATION

One key concept that Pearson discussed is that a diverse group of stakeholders should be engaged throughout research and problem-solving processes. Rather than manipulating a group of people from the outside, researchers should use asset-based approaches that acknowledge the unique insights people bring from their experiences.

“When we see deficits, it’s not in the people but in the systems that have been marginalizing and disadvantaging populations,” Pearson emphasized.

In the classroom, Pearson said, faculty can apply Universal Design for Learning (UDL) principles. She cited Process-Driven Math (PDM) as one means of doing this. Mathematics is required in all majors; mastery of mathematics is critical for students who are interested in pursuing STEMM professions. With funding from the National Science Foundation (NSF), Pearson and her team at Auburn University at Montgomery, Auburn University and Rice have been studying the efficacy of PDM, a novel UDL-based method of teaching and assessing mathematics for all learners, in particular those with vision and/or print-related disabilities.

Researchers and practitioners can apply User Centered Design (UCD) in their work, seeking input from participants through an iterative process from problematization through solution as they seek to understand users’ needs and experiences while incorporating their feedback. Overall, the UCD framework is constructed to consider the entire user experience, not pulling together fragments of data but integrating input throughout the process and drawing from experts in multiple domains, including lived experience.

### APPLYING INSIGHTS THROUGH FUNDING AND SUPPORT

Researchers can start by initiating their projects with diverse groups in mind and apply for funds designated to make research more equitable and inclusive. NSF provides dedicated funding through its Facilitation Awards for Scientists and Engineers with Disabilities to ensure researchers who have disabilities can be fully engaged.

“I define ethics as doing the right thing and doing things right,” Pearson said.

She emphasized that multiple professional organizations including the Association for Computing Machinery, the American Institute for Chemical Engineers, the Institute for Electrical and Electronics Engineers, the National Society of Professional Engineers and ASCE all have defined JEDI principles as expected standards of practice to varying degrees through their codes of ethics and their policies.

UT Dallas established the Living Our Values Task Force to learn more about how the University is addressing issues in the classroom and in the UT Dallas community.



As a response to the task force’s recommendations, the recently renamed Office of Diversity, Equity and Inclusion has expanded its scope from looking beyond merely diversifying the University’s student, faculty and staff populations to cultivating a culture where policies and practices are just, equitable and inclusive. Toward that goal, Pearson led efforts resulting in UT Dallas becoming a charter member of the American Association for the Advancement of Science’s STEMM Equity Achievement (SEA) Change initiative, as part of a cohort of institutions working on change strategies.


Also at the University level, Adams and Dr. Inga Musselman, vice president for academic affairs, provost and holder of the Cecil H. Green Distinguished Chair of Academic Leadership at UT Dallas, are principal investigators on a three-year, \$1 million NSF-funded grant for ASPIRE<sup>2</sup> (Adapting Successful Practices to foster an Inclusive, Respectful and Equitable Environment), a project designed to address gender equity among faculty across the University. Musselman, who attended the virtual event, lent her support to Adams and Pearson for addressing the critical topic. 



Photo credit: <https://creativecommons.org/licenses/by-sa/3.0/igo/>

Sheppard's breakout group used satellite imagery to study ecological issues, such as this composite image of Hereford, Texas, that depicts changes in vegetation growth.

# A COMET SHINES IN INTERNATIONAL SPACE

**Anja Sheppard** BS'22 joined The University of Texas at Dallas as a member of the Eugene McDermott Scholars Program — a comprehensive honor awarded to incoming high school students from throughout the country who excel in academic achievement, leadership and service. She continued to excel. As a junior, she was named a Barry M. Goldwater Scholar, one of the oldest and most prestigious national scholarships in STEM. As a senior, Sheppard was named a National Science Foundation Graduate Research Fellow, a highly competitive program for graduate students pursuing a degree in STEM fields.

In addition to her numerous academic accomplishments, Sheppard also mentors her peers and serves as a UT Dallas Student Ambassador. This past year, Sheppard served as an ambassador at the global level when she became a delegate to the Space Generation Congress. She represented university students and young space professionals to the United Nations, space agencies, industry and academia. Sheppard shares the experience as a delegate in her words.



Anja Sheppard



Dr. Mark W. Spong

In October 2021, I took the trip of my dreams: a week in Dubai for an international space exploration congress. As a NASA intern, I have been involved with space exploration for a few years now, but this was my first chance to engage in-person with other young professionals from around the globe on pressing topics in the industry. This was my first university-sponsored trip after COVID-19, and it wouldn't have been possible without the support of my advisor Dr. Mark W. Spong, professor of systems engineering in the Jonsson School and holder of the Excellence in Education Chair at UT Dallas, and funding from the Eugene McDermott Scholars Program. But enough preface – what is a space congress? And why did I attend?

I became involved with aerospace back in high school, when I competed in the NASA Student Launch rocket competition. I never imagined my interest in space accompanying me through my career, because my major at UT Dallas is computer science. However, as I pivoted toward working on autonomous vehicles in internships and research, I began to imagine myself working on space robots. In 2020, I was accepted as one of a few Pathways interns at NASA's Johnson Space Center, placing me into a

competitive co-op program that would allow me to rotate between school and work throughout the remainder of my degree program. While at NASA, I worked on communication infrastructure for the International Space Station mission control, flight software for the upcoming Gateway station and perception for the Valkyrie humanoid robot.

Everything fell into place last summer when I became a member of the Space Generation Advisory Council (SGAC), an international group of young professionals in the space industry with a permanent appointment in the United Nations Committee on the Peaceful Uses of Outer Space. SGAC organizes several project groups on topics such as ethics and human rights, satellites, space policy and more. Additionally, they organize the Space Generation Congress, which takes place each year just before the International Astronautical Federation's conference, the IAC. The congress is a high-intensity, three-day event, where 150 selected delegates from around the world join together for panels, discussions and keynote speeches. Additionally, each delegate is a part of a smaller breakout group, which hosts a workshop dedicated to a specific space-related topic and formulates recommendations that are then presented to the United Nations. This event is a great opportunity to gain fresh perspectives on pressing technical and political questions in the space industry. When I received word that I had been accepted to attend the Space Generation Congress, I was excited beyond words. At the time, I had no idea what an incredible community I was about to join. I took a leap of faith, boarded a plane and made my way to Dubai.



Sheppard worked as an intern at the Johnson Space Center in Houston. This International Space Station model was right next to her desk.

On the first day of the congress, I arrived at the event venue bleary-eyed and a bit jet-lagged. The first event on the schedule was a small breakfast while everyone checked in. I sat down in the corner, nursing a cup of coffee and watching the excitement unfold around me. As people entered the room, eyes would light up and friends would run to each other for a big hug. These were friends who spanned continents and were only able to see each other when they attended the congress. From that moment on, I knew that I had stumbled across something really positive that could create community across political and social barriers, all in the name of furthering space exploration. I saw the mission of the International Space Station unfolding before my eyes: international cooperation for the sake of something greater.

I quickly acclimated to the group dynamic, introducing myself to people and trying to remember as much about each person as possible — their name, where they were from and what they did. I met an enthusiastic Moroccan student who was living in Japan, a young professional from Cyprus, and a space policy enthusiast from The University of Texas at Austin. The next couple of days were a blur. I woke up early in the morning for a full day of events that didn't end until 10 p.m. We watched panels from Blue Origin, the president of the International Space University, heads of space agencies and companies working to leverage space in order to combat climate change. I soaked it all in as best as I could, taking notes on new topics and asking questions of the panelists and speakers. My breakout group focused on earth observation, which is the use of satellite imagery to keep tabs on ecological issues from a top-down point of view.

After final presentations from the breakout groups and closing remarks, the Space Generation Congress was at an end. From there, each of the delegates was released to explore Dubai and attend the IAC, which started up the next day. I only had two days left

in Dubai, so I visited the old city and the souks (Arab marketplaces) with some new SGAC friends, then attended technical and plenary sessions at the IAC. I heard from the new astronauts from United Arab Emirates, as well as some NASA astronauts who had helped them train.

Overall, my experience in Dubai was more incredible than I could have ever imagined. I made lifelong friends, networked with important figures in the space industry and found a place for myself in the community. I discovered a way to combine my technical expertise in space robotics with my interests in ethics by joining the SGAC Space Policy Project Group. In the end, the most valuable aspect of this trip was building an international community of friends who are enthusiastic about where space exploration will take us. I know that in the future, these will be the people I will collaborate with professionally to help usher in a more peaceful world. I'll continue collaborating virtually with this new global network on SGAC projects until we see each other again at the next Space Generation Congress!

Following graduation from UT Dallas, Sheppard began her PhD and plans to work for NASA. ↗





DEVELOPING

[R7]

SYSTEM LOG

FREQUENCY: 2.8

BANDWIDTH: 1270

SECTOR-A

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BLOCK-A

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**PARTNER PROFILE:**

# ENTREPRENEUR STEPS UP BUSINESS THROUGH UTDESIGN PROGRAMS

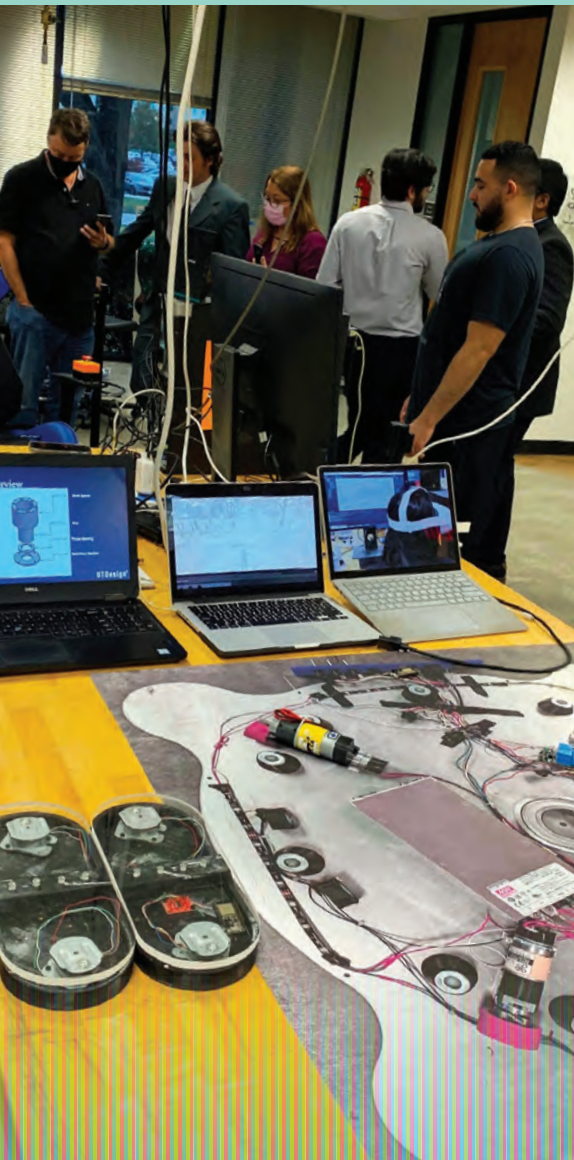
Rick Tett MS'21, center, tests the rotating virtual reality controller chair created by one of his many capstone teams. Braydon Schramm BS'21, second from right, was Tett's first hire at HoboLoco.





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15679 15679  
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Students in the UDesign® Makerspace spend hours creating, testing and refining project designs for corporate clients, including startup businesses like HoboLoco. The experience encourages hands-on application of the skills students have been building throughout their degree programs.



Entrepreneur Rick Tett MS'21 holds a notable record at The University of Texas at Dallas. So far, he has sponsored 17 UDesign® Capstone and EPICS projects through the Erik Jonsson School of Engineering and Computer Science. The signature program assigns student teams to corporate mentors as they complete sponsored projects over a period of one to two semesters.

The student teams Tett sponsored have developed prototypes of his ideas for new products including a novel dual foot peripheral device that can be used for controlling movement in virtual reality, for PC gaming and for teleoperation of robots. He started his company HoboLoco after receiving the first patent on the controller that takes the steering scheme of a two-wheel hoverboard from the physical world into the digital world.

“The name HoboLoco — a mashup of hoverboard locomotion — came up while brainstorming with two of my classmates in Entrepreneurship 6370, my first business class at UT Dallas,” Tett said.

Tett dons a pair of distinctive glasses and regularly visits venues like the Capital Factory, a coworking space for entrepreneurs, to pitch his business. He has delivered presentations about the problem of locomotion in virtual reality and telerobotics at events for entrepreneurs including Dallas Startup Week, One Million Cups and several virtual conferences. He participated in the first cohort of the Capital One Accelerator which was conducted in partnership with The DEC Network and UT Dallas. However, his history with Jonsson School leaders began decades ago through tech networking events in the Dallas-Fort Worth area.

“I’ve always had ideas for products but never pursued them,” Tett said. “With HoboLoco, I have jumped on the unique opportunity. I am convinced that this product has the potential to become as useful and ubiquitous as a gamepad. The feet have been underutilized in gaming and computing for far too long.”

#### SEEING THE INVISIBLE GORILLA

Tett is a father of three including engineer Emily Levy PhD'21, visual effects artist Stuart Tett and actuary Marshall Tett. Tett is also a grandfather of six. He said he has always enjoyed training the next generation of engineers and inventors. After working for a series of companies, he established himself as an independent contractor in the telecommunications industry where he found a niche working for startups.

To mentor up-and-coming engineers, Tett served on the board at Sci-Tech Discovery Center in Frisco, Texas, where he began searching for new exhibits to add to the center. Pete Poorman, director of corporate relations in the Jonsson School, first informed Tett about the UDesign EPICS program at UT Dallas, a hands-on, human-centered design program. Tett mentored two student teams working on exhibits.

“I have a passion for raising STEM awareness,” Tett said. “One EPICS project was about the fascinating phenomenon called inattentional blindness. We sometimes are blind to things that are right in front of us, because we’re not looking for them.”

Tett continued, “There’s actually a famous example of inattentional blindness called the Invisible Gorilla. The EPICS team developed a game where a participant is driving down the road and there are some

things designed to take some mental focus like reading a text or changing a radio station. The idea is to go to the end and see if the people noticed some items in the road. If people ran over the cyclist or baby, you’ve kind of proven your point.”

Tett himself may have been unaware of the full possibilities of UDesign, but soon after initiating the EPICS projects, he told Poorman about another idea, a foot-operated controller for virtual reality. Poorman thought that would make a great capstone project.

“Rick practically leapt out of his chair,” said Poorman about when he told Rick there were UDesign Capstone project openings. “He was eager to sponsor a capstone team to build a prototype.”

#### UTDESIGN LEADS TO HOBOLOCO

Tett was in the midst of filing the first patent but thought it would be great to get the help of a team of senior computer science students, challenging them to test and build the device that resembles a hoverboard.



Pete Poorman, Director of Corporate Relations

“The projects were a little out of their area because they involved electronics and some physical structures,” Tett said. “But they ended up building my first functional prototype.”

Multiple student teams helped Tett refine and enhance the product as he mentored students through their senior capstone projects. The first project began with a device intended to be used while standing. After testing the product, subsequent teams switched to a seated model and added a rotating virtual reality chair.

Tett, who holds a bachelor’s degree in computer science from Iowa State University, decided to enroll as a student in a program designed for entrepreneurs in the Naveen Jindal School of Management at UT Dallas. Tett’s daughter Emily also joined the Jonsson School, pursuing a doctorate in mechanical engineering at the encouragement of her father and Poorman.

“I’ve always wanted to get an MBA, but I had a family to raise and get through school, so it had to wait until now,” Tett said. “I suppose I also had something to prove to myself since I am not proud of my undergrad GPA. It meant a lot to me to graduate with high distinction and become a member of Phi Kappa Phi and Beta Gamma Sigma honor societies.”

#### THE VENTURE DEVELOPMENT CENTER AND BEYOND

Tett completed his master’s degree in 2021 and won several pitch competitions along the way. He moved HoboLoco’s operations from his home office to the Venture Development Center (VDC) at UT Dallas, then hired his first employee.

“One of the team leads was a senior named Braydon Schramm,” Tett said. “I just



Tett’s daughter Emily Levy completed her PhD in mechanical engineering at the Jonsson School in 2021 and currently works in industry. Tett and Levy are pictured at commencement. “While I like teaching people and research, I love the design work,” Levy said. “I could definitely see myself returning as a mentor.”

saw so much potential in him. So, I hired him. We decided we needed our own 3D printer, so we have a 3D printer in the VDC now. Braydon's been cranking out new designs and prototypes."

The controller device has numerous possible markets beyond gaming, including virtual training simulations, telemedicine and remote defense operations.

Though Tett has already sponsored a record number of student teams, completed a master's degree, moved operations to the VDC and has two more projects this fall, he has even bigger plans in mind for student engagement across the University.

"I look forward to seeing UT Dallas continue to expand these interdisciplinary makerspaces and capstone programs," Tett said. "We are creating an environment where students all across campus from arts and technology to engineering and computer science can build and invent together. I highly encourage students to build or join a startup after they graduate while they have flexibility and energy. Perhaps they will take an interest in HoboLoco and help me raise funding and build and sell products." ↗



Team Magic Feet sponsored by HoboLoco in Fall 2021 focused on the movement of feet in locomotion through virtual reality. The team included (left to right) Daniel Villaseñor BS'21, Jalen Weber BS'21, Luis Hernandez BS'21, Rick Tett MS'21, Kane Bobier BS'21, Alejandro Hernandez BS'21 and Patrick Hoover BS'21.

## CAPSTONE PROJECTS SPONSORED BY HOBOLOCO

Telepresence Robot with Simultaneous Movement and Actions, Fall 2022 and Spring 2023

Rotating Virtual Reality Controller Platform, Summer and Fall 2021

Magic Feet: Shoe-Mounted Locomotion Controller, Summer and Fall 2021

HoboLoco Foot-Controlled Game Controller, Fall 2020 and Spring 2021

Optimize Design of Foot-Operated Controller for Gamers, Fall 2020 and Spring 2021

Rotating Virtual Reality Controller Chair, Fall 2020 and Spring 2021

Rehabilitation Game, Spring 2020

Multifunctional Controller, Spring 2020

VR Chair, Fall 2019 and Spring 2020

HoboLoco Foot-Operated Virtual Reality Controller, Spring and Summer 2019

HoboLoco — The Game Changer in VR Locomotion, Fall 2018

HoboLoco VR Locomotion, Spring 2018

### ADDITIONAL PROJECTS

Candora LLC, Autonomous Robotic Cleaning Device, Fall 2022 and Spring 2023

Candora LLC, Terms and Conditions Assistant, Spring 2020

SkyKick (Tett's employer)  
A High-Volume, Low-Latency Cloud-Based Data Collection and Reporting System, Fall 2018

EPICS Sci-Tech Discovery Center, Inattentive Blindness, Spring and Fall 2019

EPICS Sci-Tech Discovery Center, CAVE Virtual Reality Experience, Spring and Fall 2018



As part of the strategic priority for last year, L.A.U.N.C.H. (Leveraging our Attention to Undergraduate and Graduate Student Needs, Challenges and Hopes), faculty and staff members in the Jonsson School shared advice to their college-aged selves in a weekly schoolwide email.



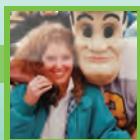
## HERE IS SOME OF THEIR WISDOM:



**Dr. Betsy Willis**

*Director of Operations for the Department of Bioengineering  
Chair of Dean's Staff Advisory Group for the Jonsson School*

"Never be afraid to ask a question. Take ownership and responsibility for your college experience."



Purdue University



**Dr. Dinesh Bhatia**  
**MS'87, PhD'90**

*Interim Co-Head of the Department of Electrical and Computer Engineering (ECE) and ECE Professor*

"Do what you are passionate about – it will bring out your creativity. It will make you happy."



UT Dallas



**Julian Fenison**

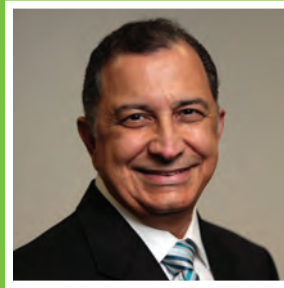
*Web Specialist in the Office of Strategic Marketing and Communications*

"Each day is another chance to mold yourself into the best version of you. Stay patient with the process, learn from life and enjoy the journey."



University of Arkansas at Pine Bluff

LEADERSHIP  
PROMOTIONS  
AND ADDITIONS  
2021-2022



**Dr. Poras T. Balsara**

*Vice dean and professor of electrical and computer engineering*

**Previous Position:**

Associate dean for academic affairs, Jonsson School at UT Dallas



**Dr. Ovidiu Daescu**

*Head of the Department of Computer Science and professor of computer science*

**Previous Position:**

Interim head of computer science, Jonsson School at UT Dallas



**Dr. Joshua Summers**

*Head of the Department of Mechanical Engineering and professor of mechanical engineering*

**Previous Position:**

Director of graduate studies in mechanical engineering and professor of mechanical engineering, Clemson University

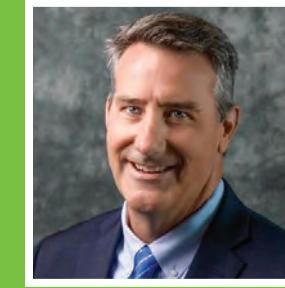


**Dr. William Anderson**

*Assistant dean for research*

**Previous Position:**

Associate professor of mechanical engineering, Fellow, Eugene McDermott Professor, UT Dallas



**Dr. Stephen Crynes**

*Assistant dean for student success*

**Previous Position:**

Assistant director of transfer relations, University of Wyoming



**Dr. Fatemeh Hassanipour**

*Assistant dean for diversity and strategic initiatives; professor of mechanical engineering*

**Previous Position:**

Associate professor of mechanical engineering, UT Dallas



**LaKisha Ladson MA'18**

*Assistant dean of strategic marketing and communications*

**Previous Position:**

Director of marketing and communications, the Jonsson School at UT Dallas



**Dr. Gregory Newman**

*Assistant dean of IT operations*

**Previous Position:**

Associate dean for academic affairs and workforce technology, Collin College

NEW  
FACULTY  
MEMBERS  
2022

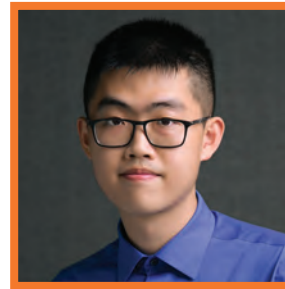


**Dr. Polimyr Caesar Dave P. Dingal**

*Assistant professor of bioengineering*

**Previous Position:**

Postdoctoral fellow, Department of Molecular and Cellular Biology, Harvard University



**Dr. Xinya Du**

*Assistant professor of computer science*

**Previous Position:**

Postdoctoral research associate, University of Illinois at Urbana-Champaign



**Dr. Mona Ghassemi**

*Associate professor of electrical and computer engineering (ECE), Chairholder of Texas Instruments Early Career Award in ECE*

**Previous Position:**

Steven D. Lane Junior faculty fellow, College of Engineering Faculty Fellow and assistant professor, Virginia Tech

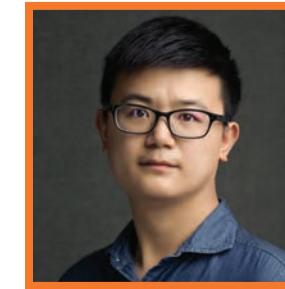


**Dr. Levi Good**

*Assistant professor of instruction in bioengineering*

**Previous Position:**

Senior research scientist, UT Southwestern Medical Center



**Dr. Yunhui Guo**

*Assistant professor of computer science*

**Previous Position:**

Postdoctoral researcher, University of California, Berkeley



**Dr. Ifana Mahbub**

*Assistant professor of electrical and computer engineering*

**Previous Position:**

Assistant professor in electrical engineering, University of North Texas



**Dr. Rebecca McClain**

*Assistant professor of instruction in materials science and engineering*

**Previous Position:**

Research and development chemist at ZS Pharma Inc. and Fulbright fellow



**Dr. Kristin Miller**

*Associate professor of mechanical engineering and bioengineering*

**Previous Position:**

Associate professor of biomedical engineering, Tulane University

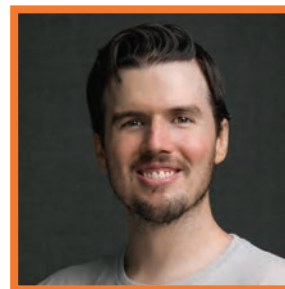


**Dr. Hui Ouyang**

*Assistant professor of mechanical engineering*

**Previous Position:**

Associate professor of instruction, UT Dallas



**Dr. Brian Ricks**

*Assistant professor of instruction in computer science*

**Previous Position:**

Research assistant, UT Dallas



**Dr. Berrak Sisman**

*Assistant professor of electrical and computer engineering*

**Previous Position:**

Postdoctoral researcher, National University of Singapore; assistant professor of computer science, Singapore University of Technology and Design



**Dr. Yapeng Tian**

*Assistant professor of computer engineering*

**Previous Position:**

PhD student and research assistant, University of Rochester



**Dr. Cormac Toher**

*Assistant professor of materials science and engineering in the Jonsson School; assistant professor of chemistry and biochemistry in the UT Dallas School of Natural Sciences and Mathematics*

**Previous Position:**

Assistant research professor, Department of Mechanical Engineering and Materials Science, Duke University



**Dr. Yue Zhou**

*Assistant professor of mechanical engineering*

**Previous Position:**

Assistant professor of electrical engineering and computer science, South Dakota State University

