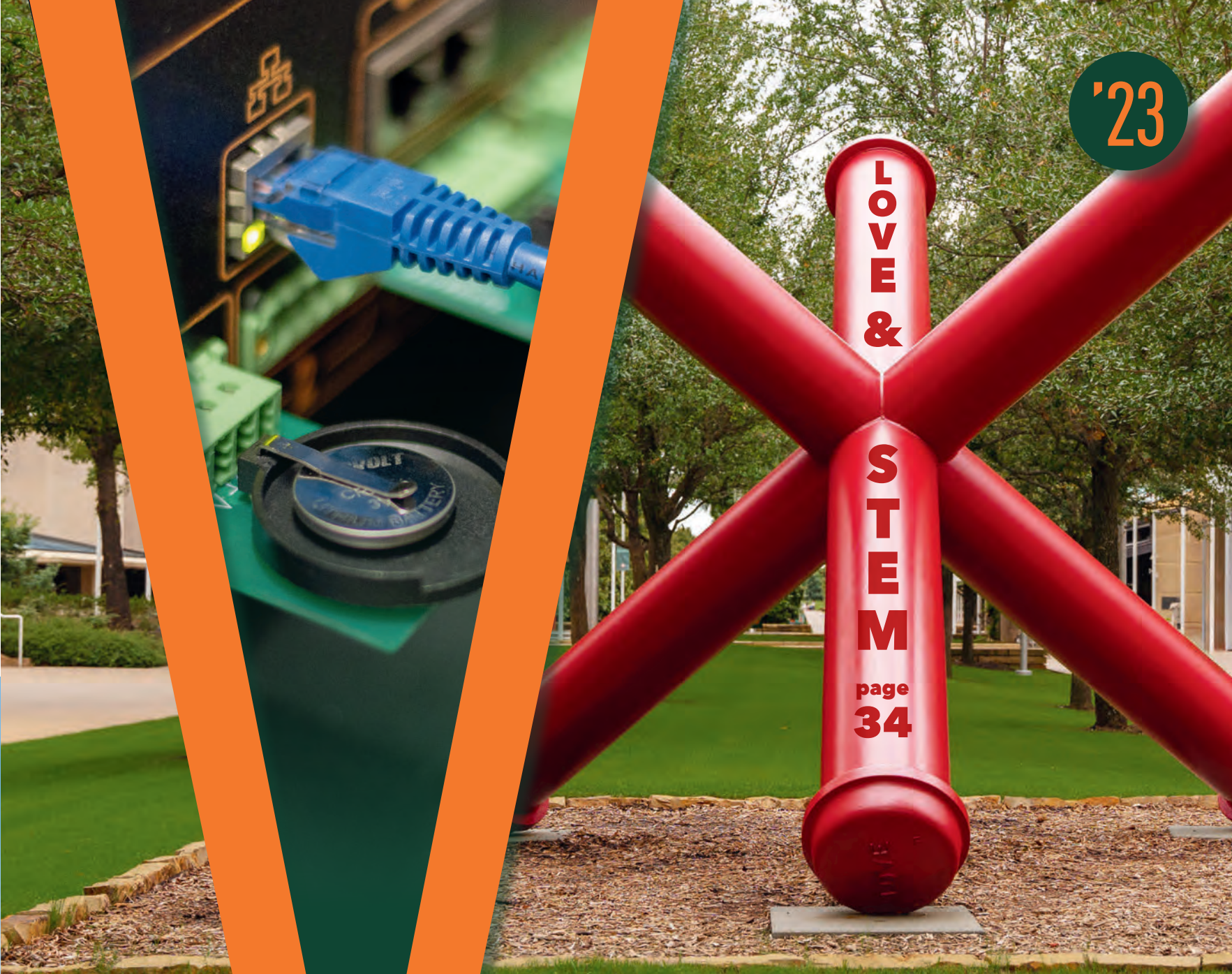

VOYAGER

Interdisciplinary Research Leads to HISTORIC $30M Award

page 22

UT DALLAS | ERIK JONSSON SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

DEAN'S MESSAGE

One thing that makes the Erik Jonsson School of Engineering and Computer Science at The University of Texas at Dallas inspiring is that we are young enough that ongoing contributions by faculty, staff and students still contribute to the School's legacy.

For example, going forward, the Jonsson School magazine will now be known as *Voyager*, thanks to a computer engineering graduate student. In our school-wide naming contest, we received more than 150 unique titles, with *Voyager* submitted by student Sayantan Kundu winning the final round. The *Voyager* magazine name will endure long after he graduates.

Starting on page 22, you can read about the $30 million Department of Defense award to UT Dallas to create a prototype Energy Storage Systems Campus. The effort — led by Jonsson School faculty — is the largest allocation from a federal agency that the University has received to date! The award is a response to the national call by the Federal Consortium for Advanced Batteries to maintain and advance U.S. battery technology leadership. The work of experts in computer modeling, artificial intelligence, chemistry, prototyping and commercialization will investigate current battery system optimization as well as next-generation batteries.

This issue of *Voyager* tells of other legacy-building feats such as a student-athlete helping her team win the American Southwest Conference women's basketball championship last season and moving up to team captain, and two other student-athletes setting School and conference records in multiple races in cross country and track and field — the latter program only started in 2020.

This issue also tells the stories of married couples who are building the Jonsson School and UT Dallas legacy together, some working in the same lab on specific problems, and others working together more broadly on the overall mission of educating and supporting our students who are navigating their educational journey.

Thank you for joining us on our magnificent voyage.

Regards,

Dr. Stephanie G. Adams
Dean and Lars Magnus Ericsson Chair

VOYAGER Fall 2023

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On the cover: Inside the V: Researchers test a lithium-ion coin cell battery as part of the Jonsson School's new BEACONS center. Read more on p. 22. Outside the V: the Love Jack is an iconic, 10-foot steel sculpture of a jack donated by Margaret McDermott in 1976 and named for sculptor Jim Love. On p. 34, couples in the Jonsson School discuss how they found love and advanced their careers.

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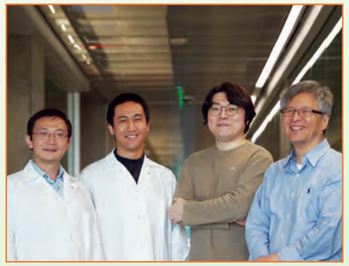
Theoretical researchers from materials science and engineering join forces with experimental researchers from mechanical engineering and supercharge their efforts to extend the capacity and stability of aqueous zinc-ion batteries, leading to a $30 million award from the U.S. Department of Defense.



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LOVE & STEM:

The Jonsson School welcomes all — including married couples.

DATA POINTS THE JONSSON SCHOOL

YEAR FOUNDED

1986

MAJOR ACCOLADES

43
National Science Foundation CAREER Awards

17
Young Investigator Program Awards

82
Fellows of major professional organizations

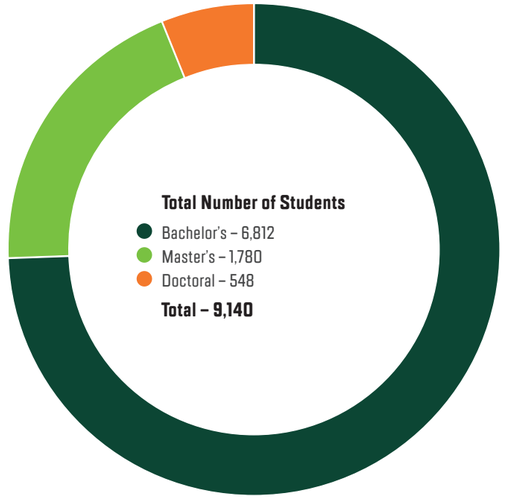
RESEARCH

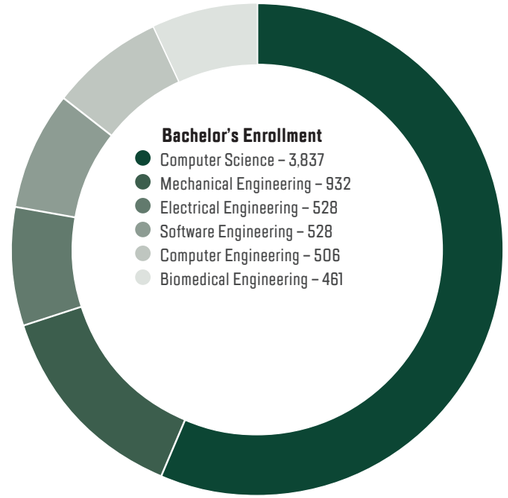
41%
of total research grants across the University

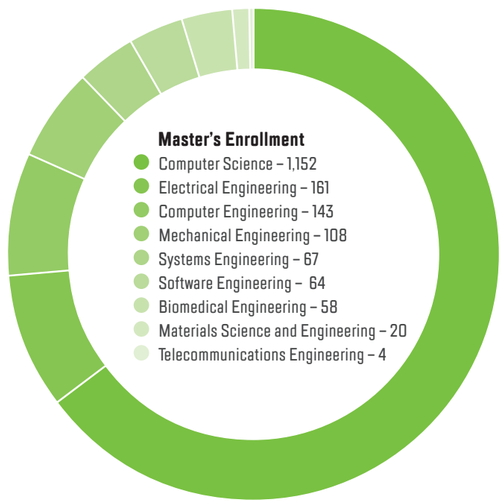
$60.9
million total research expenditures in 2022

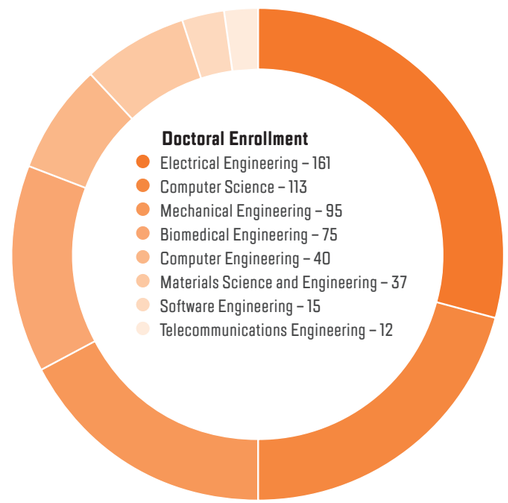
Top 20%
research and development expenditures in engineering (National Science Foundation 2022)

ENROLLMENT BY PROGRAM









DEGREES AWARDED (2021-2022)

1,342 BS

526 MS

107 PhD

TOTAL 1,975

TOP 10 INTERNSHIP EMPLOYERS

Advanced Micro Devices Inc.
Amazon.com
CBRE Group Inc.
Copart Inc.
Intel Corp.
Nokia Corp.
Paycom Software Inc.
Texas Instruments Inc.
TraxID
WorldLink Communications

85% MS students

9% PhD students

6% BS students

STUDENTS

111

National Merit Scholars in the Jonsson School freshman class 2022

ALUMNI

25,000+

total

70%

work locally

ENGINEERING APPROXIMATE STARTING YEARLY SALARIES

$81,837 average for BS

$87,222 average for MS

$111,563 average for PhD

COMPUTER SCIENCE APPROXIMATE STARTING YEARLY SALARIES

$93,302 average for BS

$121,222 average for MS

$130,000 average for PhD

DATA POINTS

5-YEAR GROWTH

IN JONSSON SCHOOL

18%

increase in program enrollment for

BS

360,000

square feet new construction within the past 5 years

PROGRAMS WITH THE HIGHEST ENROLLMENT INCREASE OVER 5 YEARS

63.28%

Computer Science

BS

155.36%

Computer Engineering

MS

88.24%

Software Engineering

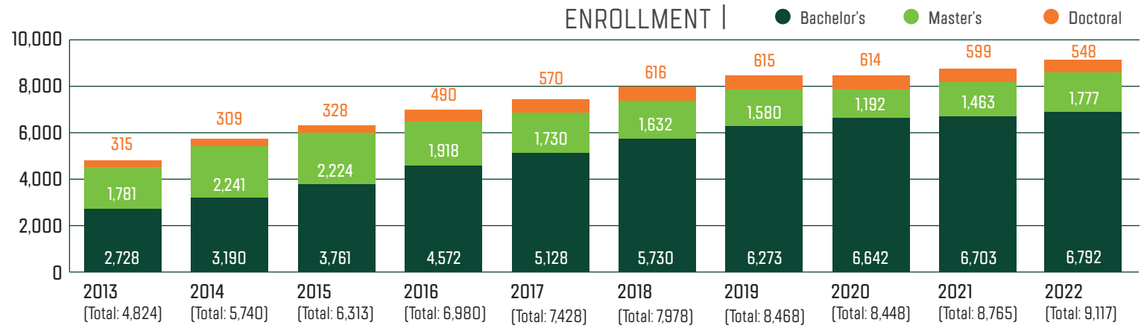
MS

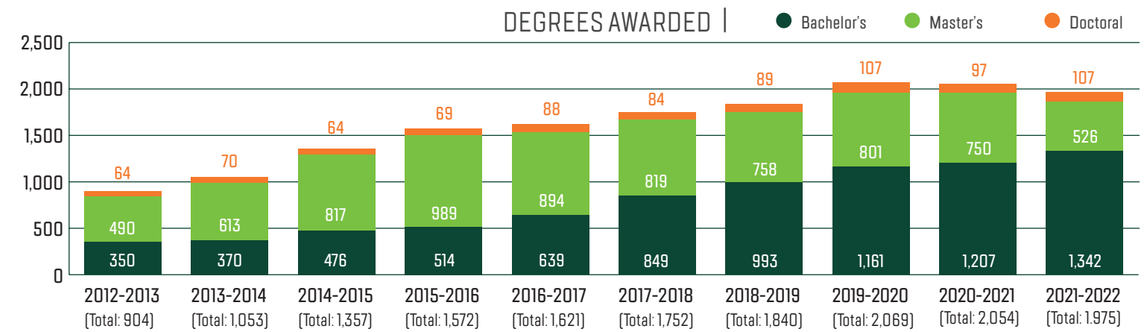
100%

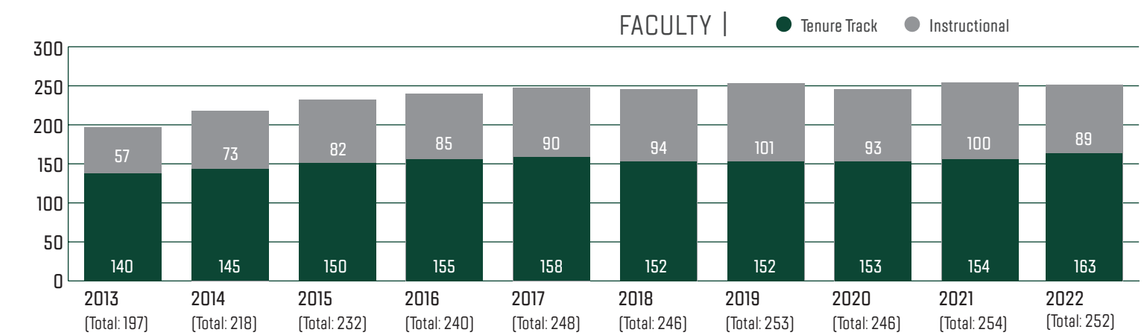
Computer Engineering

PhD

10-YEAR TREND







AT A GLANCE

$66,460,165

TOTAL ENDOWMENTS

$4,222,993	$1,117,450	$200,000
total raised toward New Dimensions: The Campaign for UT Dallas	value of major gifts	value of planned gifts
$552,377	1,068	1,087
value of annual gifts	total annual gifts	alumni donors

DRIVING INNOVATION

16	37	23	900+
business incubations	invention disclosures in 2022	patents in 2022	internships in 2022

UTDesign® CAPSTONE 2022

10	1,250	5,927	413
total national first place titles	total sponsored projects	total students who have completed Capstone projects	companies that have sponsored projects
858	64	40	
EPICS student participants	multidisciplinary projects	nonprofits served	

BUILDING A BETTER BIOENGINEERING DESIGN COURSE:

PROJECT-BASED LEARNING PREPARES STUDENTS FOR CAPSTONE

From left Ilakkia Maruthupandian, Desiree DeHart, teaching assistant Angeloh Stout, Dr. Christian Rivera, Mehak Kaul, Shishir Waghray and Kylah Reliford explored problems related to electrospinning in Rivera's junior design laboratory.

Junior year often marks a turning point as students edge closer to their goal of graduation. Students may have enough background knowledge to participate meaningfully, but they do not yet have the technical background to dive headlong into a senior design capstone program. They also need to build professional skills in high demand by employers.

Dr. Christian Rivera, assistant professor of instruction in the Department of Bioengineering at The University of Texas at Dallas, aims to reinforce several critical skills in a collaborative junior design course. He developed and launched the course, then described his findings during a work in progress talk delivered at a June 2023 American Society for Engineering Education (ASEE) conference held in Baltimore, Maryland.

"The field of bioengineering is rapidly evolving, and our educators must obtain feedback in best practices as they implement new pedagogical strategies," said Dr. Shalini Prasad, head of the Department of Bioengineering in the Erik Jonsson School of Engineering and Computer Science and Cecil H. and Ida Green Professor in Systems Biology Science. "Experiential learning is the cornerstone for training successful bioengineers as the field sits at the intersection of basic applied sciences and engineering. This junior design course has been designed to impart this experience through project-based learning."

Rivera was initially attracted to the University for its openness to innovation and opportunities for him to enhance his skills as an educator.

"The idea of developing a course from the ground up was very appealing to me," Rivera said. "I enjoy working with undergraduate students because they don't really know what they want to do yet in some sense, and I'm trying to help them figure that out."

Rivera completed his PhD in biomedical engineering at Georgia Institute of Technology, then decided to specialize in teaching. He completed his postdoctoral training at the University of Michigan where he realized that he needed to bridge a gap between research skills and skills required for industry roles. Rivera teaches statics, fluid mechanics and introductory biomechanics in addition to junior design.

"THERE ARE DIFFERENCES IN THE SKILLS THAT RESEARCH FACULTY WANT VERSUS WHAT INDUSTRY WANTS," RIVERA SAID. "WE WANT STUDENTS TO HAVE THE CHOICE AND OPPORTUNITY TO GO INTO BOTH RESEARCH AND INDUSTRY. HOW CAN WE BE MORE BALANCED IN WHAT WE TEACH?"

DEVELOPING SKILLS FOR THE REAL WORLD

At UT Dallas, all engineering and computer science bachelor's students are required to complete a senior design capstone program called UTDesign® Capstone. The program typically takes two semesters and requires students to work in teams to solve a problem for a sponsor, most of whom are industry partners.

This experience offers many benefits for students, Rivera said, but students also need more time to develop skills in teamwork, design and problem solving.

"The challenge is getting students familiar with the design process early," Rivera said. "Students need to apply the theory they learn to real world problems, so I'm trying to fill in that gap. I'm giving them more design experiences so that they have a better idea of how to deliver presentations, write reports and work on a team. Not all of their classes provide such experiences."

Rivera worked with Dr. Todd Polk, professor of practice and UTDesign director for bioengineering, and other faculty to improve vertical alignment, or transfer and reinforcement of skills from one course to another.

"The addition of junior design to the required biomedical engineering curriculum has been very positive," Polk said. "Students are showing up much more prepared for senior design. They have had exposure to the engineering design process and documentation requirements used in senior design, and that is accelerating the beginning stages of their capstone projects."

Rivera added, "I designed it such as a way it matches what Dr. Polk does. The students go through the same steps, so they get a preview of what's coming."

Rivera also connected with faculty who were teaching related areas. Biomedical engineering can incorporate skills from electrical engineering and mechanical engineering such as computer-aided design or CAD, as well as biology and chemistry.

"When I was designing the class, the faculty said I needed to hit certain subjects," Rivera said. "We needed more advanced circuits created with microcontrollers, more CAD, more fabrication and increased use of the machine shop. The students were doing some CAD during the first year, but some were not using it again until senior year. Some students have never even stepped foot in the machine shop. The idea was to give them more so that during senior year, they weren't thinking, 'Oh … I have this big project, and I also need to teach myself how to do all these things.'"

Rivera said he enjoyed having the opportunity to design his junior-level bioengineering course at UT Dallas and collaborate with peers across the United States.

ELECTROSPINNING AS AN ANCHOR PROJECT

Rivera's first challenge was to determine a group project that was cost-effective and also engaging for the students. He ultimately decided on electrospinning, a fiber production method that uses high voltage to draw polymers into ultra-thin threads on the nanometer scale.

"You have a polymer in a syringe, and you apply a very high voltage to a needle," Rivera said. "The polymer is charged and pulled to ground or a negative terminal due to the electrostatic attraction. This process then makes a very thin fiber which is ideal for biological applications."

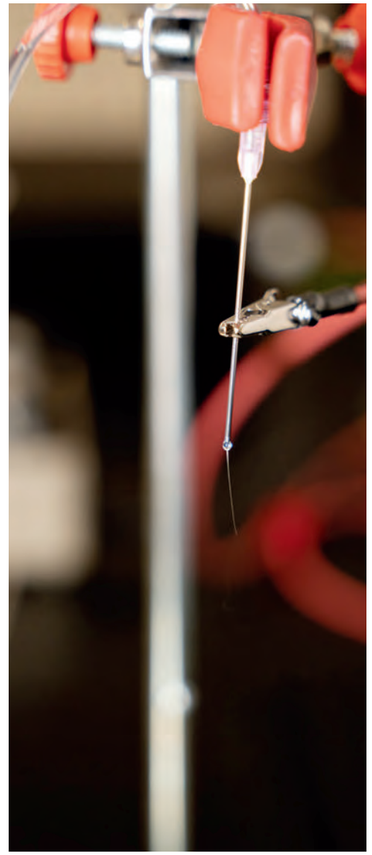
Future applications for electrospinning include tissue engineering and drug delivery, but Rivera was primarily concerned with the problem-solving skills students would build through the project.

Electrospinning also requires students to focus on controlling and testing several variables including the concentration of the polymer solution, voltage, feed rate and ambient conditions, Rivera said. These can all greatly affect the quality and properties of the fibers, and the students are tasked with creating engineering controls for these parameters.

"I learned about electrospinning in undergrad," Rivera said. "It's a very finicky process, so I thought it would be a good experience for students."

While electrospinning itself has not been applied broadly in industry, the students gain transferable skills.

Rivera said, "Electrospinning is something that's done mostly in the research space and is slowly getting more into industry. Students are trying to figure out all the kinks so that they can see what is needed for commercialization of a product."



Electrospinning produces a nanoscale polymer fiber that can be used for several applications including tissue engineering and drug delivery.

Stout is currently a PhD student studying biomedical engineering and a teaching assistant.

CALIBRATION WITH PEER FEEDBACK

Rivera emphasized that the new course is under development, so he wanted peer feedback from well beyond his circle at UT Dallas. Attendees at Rivera's ASEE presentation included professors of instruction at peer institutions as well as others from ABET. Rivera's efforts to connect with the broader engineering education community also reinforce the horizontal alignment of his course, or the extent to which the course teaches specific objectives that are common to peer institutions.

"The ASEE conference enables an exchange of ideas and receiving rapid feedback from a diverse audience across engineering," Prasad said. "It was essential for Dr. Rivera to attend and present at the ASEE conference. We are proud that he was able to attend with the Instructional Fellow Award from our department."

The dialogue generated at ASEE may inspire others at peer institutions to create or enhance similar courses as it helped Rivera to refine his course.

"Many people have heard of electrospinning, but they never thought about doing it in a course, or at least not as a big project," Rivera said. "A lot of people are thinking oh, this is really interesting. We may design a similar design course, or maybe this is a new project we could add. I'm letting people know that it's a possibility."

Rivera noted that future iterations of the course may offer more project options for students, depending upon resources and time available.

"Some students may not care about a thin fiber or anything of that nature," he said. "They may want to do something related to prosthetics, as one example."

Rivera takes the evaluation stage of his course design process to heart through peer interactions, then starts over again each semester with new tweaks to improve the student experience. From Rivera's perspective, each semester presents an opportunity to practice and model good design, both as an engineer and as a teacher.

The electrospinning device is connected to a high voltage source in order to produce the ultrathin polymer fibers.

Rivera (left) and Stout set up student-developed projects that were designed to control the humidity and ambient temperature as well as distance, factors that dramatically affect the output of the electrospinning device.

SPINNING INTO SENIOR YEAR: STUDENT REFLECTIONS

LAURA CARMONA

ANTICIPATED GRADUATION: MAY 2024

"My junior design project was to build a chamber that would monitor and maintain the ideal temperature for an electrospinning apparatus. I am grateful we took on this challenging project as a team and not individually. Corporate documentation, fabrication training, CAD sketches, coding and practicing professionalism are all important skills that I feel will help me when I'm working on my senior design project. I feel prepared for not only what senior design has in store, but also for what employers are looking for in engineering students. After graduation, I plan to modify limb prostheses to better suit the needs of amputees. Ideally, I would work with veterans to help them regain the abilities they once had prior to amputation."

DESIREE DEHART

ANTICIPATED GRADUATION: MAY 2024

"Junior design was a wonderful experience that taught me professional skills necessary for industry and other careers in the biomedical field. The course was uniquely beneficial because it bridged the gap between education and application. I learned how to design a device from beginning to end. The information provided in Dr. Rivera's course is extremely beneficial when conducting research, designing a device and working with a company in the real world. I plan to spend my time focusing on my studies, continuing research, beginning my senior design project and spending time with my friends and family."

MEHAK KAUL

ANTICIPATED GRADUATION: MAY 2024

"I collaborated with my teammates to design an automatic feedback-based temperature-controlled environment for electrospinning polyethylene oxide (PEO) fibers. I thoroughly enjoyed working with my team because we were all responsible and diligent in meeting our deadlines. This class has already prepared me for the workload I will encounter, and it has equipped me with valuable skills such as communication and teamwork. Following graduation, my plan is to continue with graduate school, then later secure a position in industry."

ILAKKIA MARUTHUPANDIAN

ANTICIPATED GRADUATION:
MAY 2024

"My team created a temperature control system for an electrospinning device. I really enjoyed working on my junior design project because it allowed me to implement the entire engineering process. I learned how to do corporate documentation and clearly explain our engineering process. Working on this project helped me gain professional communication skills, corporate documentation skills, CAD skills, electrical skills and fabrication skills. Following graduation, I would like to design and manufacture medical devices and possibly develop medical devices for clinical trials."

KYLAH RELIFORD

ANTICIPATED GRADUATION:
DECEMBER 2023

"My senior design project focuses on the discomforts associated with cleaning bathtubs, and we aim to design a robotic device that assists with this task. My experience so far has been great. I enjoy the diversity of backgrounds and skill sets each person brings to the table. It is an honor working with such amazing individuals.

Dr. Rivera's class helped refresh and solidify my CAD, electrical and coding skills in preparation for senior design. I initially felt underprepared, but now I feel ready. Dr. Rivera's course not only gave me confidence but also enhanced my communication skills. After graduating, I plan to work in industry before pursuing medical school. I'm working toward possibly becoming a physician."

SHISHIR WAGHRAY

ANTICIPATED GRADUATION:
MAY 2024

"The project that we completed involved creating a temperature-controlled chamber which would automatically maintain the temperature at a particular set point with minimal to no interfacing from the person. The experience working together on a team was great overall. Everything in the project ran smoothly, and I was glad to have the opportunity to work with them. My career skills were definitely enhanced as a result of taking this class, as it taught us a wide range of skills that are useful to engineers in the industry, as well as prepared us to work in a collaborative and team-oriented manner. Senior design may be one of the first long-term projects that students in this degree plan accomplish, and thus, this class was very useful to that end. My plans following graduation are to apply to and attend medical school."

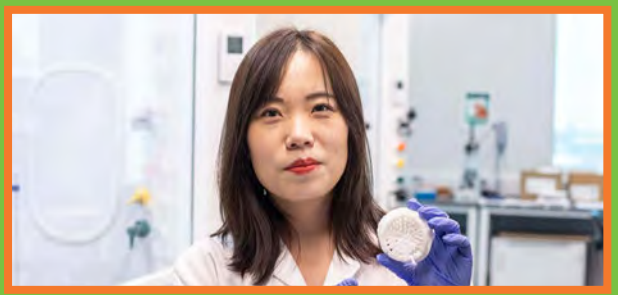
AWARDS $1 MILLION AND UP

Dr. Kyeongjae (KJ) Cho

$30 Million

Defense Advanced Research Projects Agency (DARPA), Creation of Prototype Energy Storage Systems Campus

(See Page 22 for Story)



Dr. Shuang (Cynthia) Cui

$1.5 Million

U.S. Dept of Energy, Non-Evaporative Drying of Porous Materials Using Thermo-Responsive Polymer/Felt Composites

$1.7 Million

National Science Foundation (NSF), ECO-CBET: GOALI: Condensing Water from the Air for Building Dehumidification and Decarbonization Using Thermo-Responsive Desiccants

Dr. Xianming Dai

$1 Million

DARPA, Young Investigator Program: Designing Flow-Separation Evaporative Cooling for 3D Heterogeneous Microsystems

Dr. Yichen Ding

$1.9 Million

National Institutes of Health (NIH), Volumetric Imaging and Computation to Characterize Cardiac/Electromechanical Coupling

Dr. P.C. Dave P. Dingal

$1.9 Million

NIH, Natural and Synthetic Mechanisms of Ligand Formation

Dr. Seth Hays

$2.3 Million

Congressionally Directed Medical Research Program, Targeted Plasticity Therapy for the Treatment of Post-Traumatic Stress Disorder

Dr. Theodore Moise

$3 Million

Consolidated Appropriations Act, North Texas Semiconductor Workforce Development Consortium

Dr. Kenneth O

$5.6 Million

Semiconductor Research Corp, TxACE Task 3160

Dr. Danieli Rodrigues

$1.9 Million

NIH, Multifunctional Ionic Liquid Application for Treatment of Preimplant Diseases

Dr. Mario Rotea

$1.6 Million

Consolidated Appropriations Act, UTD Wind Energy Center Space Consolidation

Page 34

Dr. Bilal Akin

Institute of Electrical and Electronics Engineers (IEEE) Fellow

Dr. Naofal Al-Dhahir

Member of the European Academy of Sciences and Arts (EASA); Fellow, Asia-Pacific Artificial Intelligence Association (AAIA)

Dr. Tariq Ali

UT Dallas President's Teaching Award for Undergraduate Instruction

Ivneet Banga

Second-Tier Baxter Young Investigator Award

Dr. Rodrigo Bernal Montoya

National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award, Revealing the Atomistic Fundamentals of Probabilistic Strength Distributions in Nanomaterials via High-Throughput Experimentation

Dr. Carlos Busso

IEEE Fellow

Dr. Qi Cai

Second-Tier Baxter Young Investigator Award

Dr. Ovidiu Daescu

Invested as Jonsson School Chair

Dr. Babak Fahimi

Fulbright Research Scholarship at the Polytechnic University of Timisoara

Dr. Joseph Friedman

Provost's Award for Faculty Excellence in Undergraduate Research Mentoring

Dr. Xiaohu Guo

Association for Computing Machinery (ACM) SIGGRAPH Technical Papers Best Paper Award

Dr. Rashaunda Henderson

Provost's Award for Faculty Excellence in Faculty Mentoring

Dr. Julia Hsu

Member of Inaugural Class of Simons Foundation Pivot Fellowship Recipients

Dr. Caroline Jones

NSF CAREER, A Systems Approach to Create Multiplexed Microfluidics to Study Human Immune Cell Dynamics

Dr. Gu Kang

American Society of Biomechanics (ASB) Junior Faculty Research Award

Dr. Sasya Madhurantakam

Second-Tier Baxter Young Investigator Award

Dr. Reza Moheimani

Industrial Achievement Award from the International Federation of Automatic Control (IFAC); American Society of Mechanical Engineers (ASME) Dynamic Systems and Control Division Nyquist Lecturer

Dr. Shalini Prasad

International Association of Advanced Materials (IAAM) Fellow

Dr. Zhenpeng Qin

Invested as Fellow, Eugene McDermott Professor; American Society of Mechanical Engineers (ASME) Fellow

Dr. Manuel Quevedo-Lopez

Invested as TI Distinguished University Chair in Nanoelectronics

Dr. Bhavani Thuraisingham

Taylor L. Booth Education Award from IEEE Computer Society

Dr. Walter Voit
BS'05, MS'06

Senior Member of the National Academy of Inventors (NAI)

Dr. Armin Zare

Air Force Office of Scientific Research (AFOSR) Young Investigator Program (YIP) Award, Stochastic Modeling and Analysis of Random Surface Roughness

Dr. Yue Zhou

NSF CAREER, Fast-Charging Energy Storage Devices Enabled by Modulating Internal Electric Field of Heterostructure

CHARGED UP for Battery Research:

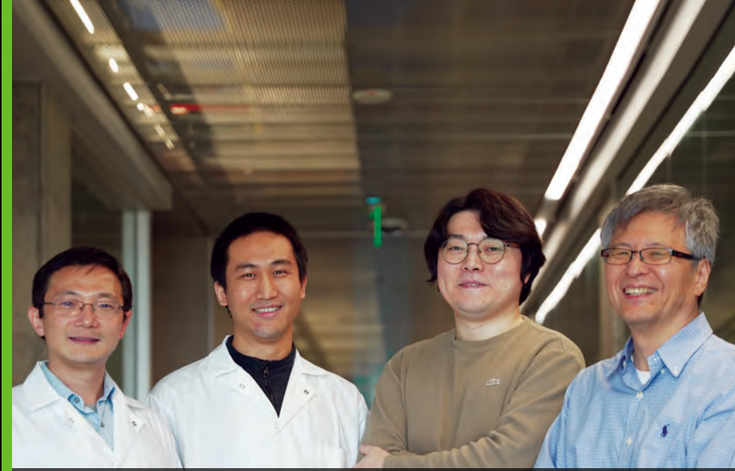
Collaboration Leads to New Center, University's Largest Grant

The production of electric vehicles and renewable energy sources including solar and wind is scaling up, so researchers across the globe are racing to develop a critical system component — grid-scale battery storage. Faculty from the Erik Jonsson School of Engineering and Computer Science discovered that they did not need to travel far to supercharge their research efforts.

Dr. Kyeongjae (KJ) Cho, professor of materials science and engineering, along with postdoctoral researcher Dr. Taesoon Hwang, joined Dr. Guoping Xiong, assistant professor of mechanical engineering and Siyu Tian, a doctoral candidate in Xiong's lab, to test if a commonly available clay additive could help extend the stability of aqueous zinc-ion batteries (AZIBs).

After the experimental and theoretical researchers began working together in December 2022, they secured an almost $600,000 National Science Foundation (NSF) grant in June 2023. By September 2023, the creation of Batteries and Energy to Advance Commercialization and National Security (BEACONS) center was announced at The University of Texas at Dallas to implement a $30 million grant from the U.S. Department of Defense toward battery research including AZIB systems.

"The innovations from KJ and Guoping are primed to make maximum impact, and their commendable success shows why we have a strategic focus on research collaboration," said Dr. Stephanie G. Adams, dean of the Erik Jonsson School of Engineering and Computer Science, holder of the Lars Magnus Ericsson Chair at UT Dallas and professor of systems engineering. "At the Jonsson School, we have recently identified five primary research thrusts with six cross-cutting technologies. Energy science and technology is one key research thrust where we have a competitive advantage in Texas and where we may see exponential growth in the coming years."



The battery research dream team includes from left to right Dr. Guoping Xiong, assistant professor of mechanical engineering; Siyu Tian, doctoral candidate in mechanical engineering; Dr. Taesoon Hwang, postdoctoral researcher in materials science and engineering; and Dr. Kyeongjae (KJ) Cho, professor of materials science and engineering. The partnership combines the best of theoretical and experimental research to improve research outcomes.

READ ON

UT DALLAS TO LEAD $30 MILLION BATTERY INITIATIVE

As announced by the Department of Defense on Sept. 18, 2023, The University of Texas at Dallas will receive $30 million over three years from the DOD to develop and commercialize new battery technologies and manufacturing processes, enhance the domestic availability of critical raw materials and train high-quality workers for jobs in an expanding battery energy storage workforce.

The award, which creates a prototype Energy Storage Systems Campus, is the largest allocation from a federal agency that the University has received to date. The project will leverage and stimulate over $200 million in private capital.

Dr. Kyeongjae (KJ) Cho, professor of materials science and engineering in the Erik Jonsson School of Engineering and Computer Science and co-principal investigator, will lead the project as the director of the Batteries and Energy to Advance Commercialization and National Security (BEACONS) center.

Key partners include LEAP Manufacturing, a consortium of energy storage companies; AUI (Associated Universities Inc.); the University of California, Berkeley; and the University of Chicago. The agreement provides funding from the DOD's Manufacturing Capability Expansion and Investment Prioritization Directorate.

"This initiative is a tremendous opportunity to showcase UTD's mission of research, service and teaching in the context of accelerating workforce development and next-generation solutions that are critical to our nation's economy and defense readiness," said Dr. Richard C. Benson, UT Dallas president and the Eugene McDermott Distinguished University Chair of Leadership. "The expertise of our faculty researchers, the excellence of our academic programs in engineering and science, and our demonstrated ability to leverage partnerships with industry put UTD in a unique position to lead this national effort to drive innovation in battery technology and manufacturing."

READ ON

Grid-Scale Battery Development

"Grid-scale battery storage is needed especially for wind and solar energy," Cho said. "AZIBs are extremely stable and suitable for large-scale stationary applications. They can take up space — as much as an entire city street corner underground — without safety concerns, but they need to have better energy density and cycle life."

Lithium-ion batteries are ubiquitous in smaller devices such as computers and cell phones. The batteries are now also used for electric vehicles and to provide backup power storage to individual homes with solar panels. However, they have several drawbacks, particularly for large-scale implementation.

"The energy density of lithium-ion batteries is high, so I expect we will continue to see them in use for many years, especially for smaller devices," Cho said. "However, lithium-ion batteries can be extremely dangerous at a larger scale."

Xiong added, "If lithium-ion batteries are damaged, they have the possibility of what we call thermal runaway, which means that they may catch fire easily. The fires are difficult to extinguish. This type of battery is not ideal for placing under a street corner or at an electrical vehicle (EV) charging station that is intended for large-scale storage."

Lithium-ion batteries also require several rare metals to produce, including cobalt, nickel and lithium.

"We have begun mining for cobalt again recently in the United States," Cho said. "However, if we want to use renewable energy as a more environmentally friendly choice, then we're probably defeating the purpose by focusing on rare metals for large batteries."

AZIBs function in a similar way to lithium-ion batteries, but they are ultra-stable and are not prone to catching fire when they are damaged since water electrolytes are intrinsically safe compared to combustible organic liquid electrolytes in lithium-ion batteries. However, when the zinc metal is submerged in a water-based electrolyte solution for an extended time, unpredictable side reactions can occur.

There are ways to separate the zinc from the contacting water in such batteries, Xiong said, but adding a coating on the zinc surface typically adds time and more costly materials to the process. So, Xiong's lab used a unique additive — swelling clay — to improve the batteries' performance by reducing the water activity.

"With AZIBs, the thermal runaway is not a concern," Xiong said. "We're looking more at extending the batteries' performance and cycle life."

Most materials used for battery fabrication need to be handled with utmost care, but the two swelling clay additives used for aqueous zinc-ion batteries (AZIBs) are an exception. Tian shows how laponite and bentonite can be shaped like putty.

READ ON

The BEACONS center will focus on four main goals:

- Optimizing existing battery systems, including integrating robotics and automation into manufacturing.
- Fostering the development of new battery chemistries that reduce the use of scarce raw materials.
- Identifying and tracking supply chain challenges for critical minerals, such as lithium, needed in energy storage systems.
- Developing the workforce needed for energy storage system development and manufacturing.

In addition, the initiative will provide access to facilities to help entrepreneurs design, develop and demonstrate novel energy storage systems.

Materials science and engineering doctoral student Manifa Noor mixes and grinds materials, including lithium salt, in one of the initial steps of the battery-manufacturing process.

Response to National Priorities

The National Blueprint for Lithium Batteries 2021-2030, published in 2021 by the Federal Consortium for Advanced Batteries, outlines several goals, including maintaining and advancing U.S. battery technology leadership by strongly supporting scientific research; science, technology, engineering and math education; and workforce development.

The agreement with the DOD is an outcome of more than a year of concerted efforts by UTD leaders and LEAP Manufacturing co-directors Dr. Thomas Campbell and John Stibal to respond to the federal agency's request for proposals.

BEACONS will include multiple UTD researchers in the Jonsson School and the School of Natural Sciences and Mathematics who work on energy storage technology, including experts in computer modeling, artificial intelligence, chemistry, prototyping and commercialization. Their work will center on developing safer, longer-lasting and more efficient next-generation battery technology, including alternatives to traditional lithium-ion cells.

UTD researchers are investigating current battery system optimization as well as next-generation batteries with alternative materials and designs, such as solid-state batteries, which use solid electrolytes instead of organic liquids or polymers, and aqueous zinc-ion batteries.

READ ON

Xiong focuses on testing underlying energy and thermal management solutions for a variety of applications, including battery storage.

A Powerful Combination

While Cho is well-known in his field, he previously focused on collaboration with experimental researchers in Korea where he has connections with industry and research institutes, in addition to those in the United States.

“I have been working on batteries for more than 10 years since I joined the University in 2006,” Cho said. “I did not know anyone locally who was focusing on my particular area of battery research. The partnership has been really productive, really fast since Guoping reached out.”

Cho was immediately interested when Xiong described a creative approach to stabilizing the AZIBs.

“When I heard that he was using the swelling clays, I thought — that’s just perfect,’ Cho said. “I knew that the battery would be extremely stable because of the water solution, but these clays can reduce water activity to improve the cycle life as an affordable, commonly available additive. The clays would meet all the requirements and provide a kind of innovative solution.”

This collaboration is mutually beneficial. Cho’s group provides theoretical analysis and recommendations based upon the atomic fundamental properties of the battery components and their interactions, and Xiong’s group provides experimental results and validates predictions made by Cho’s group.

“We look at nanoscale properties and interactions,” said Hwang, the postdoctoral researcher in Cho’s lab. “We were able to provide an atomic scale insight into how the water molecules would interact with the swelling clay, as well as how we could increase the cycle stability of the battery.”

Tian, the graduate researcher in Xiong’s lab, who on Oct. 27, 2023, successfully defended his PhD thesis “Interface Management for Safe and High-Performance Electrochemical Energy Storage Devices,” said, “It was really helpful to conduct experiments with the guidance of theoretical simulations. We predicted with modeling support that laponite is a superior swelling nanoclay to bentonite for separator-free AZIBs.”

The research on laponite and bentonite additives in AZIBs was published in summer 2023 in *Advanced Energy Materials* and *ACS Nano*.

Xiong’s laboratory allows for testing hundreds of coin cell batteries at once to expedite the research process.

READ ON

New Facility

The UT Dallas-led initiative will include construction of a research facility within a 1,200-acre area of the Richardson Innovation Quarter. The facility will include space for developing and manufacturing next-generation batteries, as well as energy storage solutions specifically tailored to defense applications. For example, defense systems operate at extremely cold or hot temperatures, encounter high shock and vibration, and may be stored for long periods then needed quickly for immediate use. Defense battery systems also are sometimes operated in environments where safety demands exceed current commercial requirements.

While the U.S. has been a leader in battery research and technology development, battery manufacturing and supplies of critical raw materials have traditionally been located outside of the country. The DOD initiative reflects efforts to bring advanced manufacturing and supply chains to the U.S., Cho said.

“We identified a unique area that satisfies the Department of Defense’s needs for battery technology,” he said. “This investment by the DOD will facilitate collaboration with our industry partners to help ensure reliable, domestic manufacture of lithium-ion cells, as well as the battery packs that support defense systems and advanced commercial systems.”

Hwang assembles the battery using a glove box, which protects researchers from exposure to hazardous materials inside batteries and the sensitive materials from water and oxygen.

Workforce Development | UTD Team

UT Dallas faculty members involved in the Department of Defense-funded battery research project include:

Dr. Kyeongjae (KJ) Cho, professor of materials science and engineering and co-principal investigator

Dr. Shuang Cui, assistant professor of mechanical engineering

Dr. Joseph Pancrazio, vice president for research and innovation, professor of bioengineering and co-principal investigator

Dr. Mihaela Stefan, department head of chemistry and biochemistry, and Eugene McDermott Professor

Dr. Laisuo Su, assistant professor of materials science and engineering

Dr. Cormac Toher, assistant professor of materials science and engineering

Dr. Guoping Xiong, assistant professor of mechanical engineering

Dr. Yue Zhou, assistant professor of mechanical engineering

READ ON

Xiong, who holds a patent for the AZIB technology, has plans to bring the new technology to industry. Tian plans to continue his work on battery research as a postdoctoral researcher following graduation.

"I plan to work more on introducing inorganic materials into battery electrolytes," Tian said. "We have several works in progress with exciting prospects."

Cho is optimistic about future possibilities, particularly with connections in Texas and across the United States.

"We are expanding well beyond our two labs," Cho said. "As the U.S. transitions to more renewable energy, there are many relevant technologies that need to be developed. We are growing the strength of UT Dallas to bridge the theoretical side with the manufacturing side, where we have a direct impact on U.S. economic development. We have an opportunity to lead."

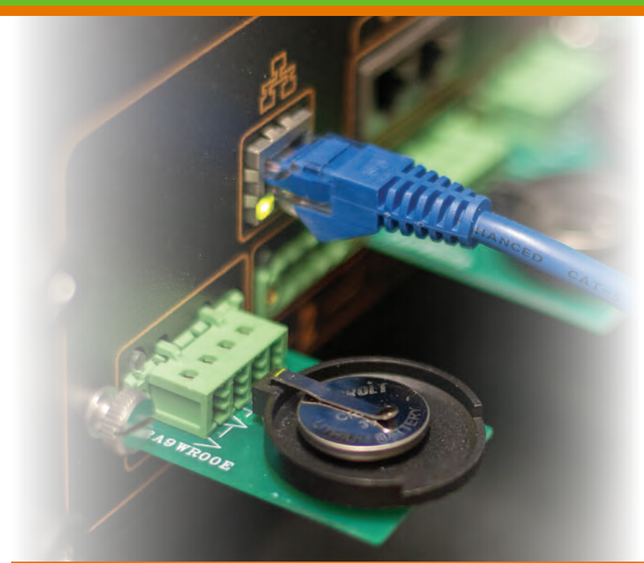
Tian assembles a test battery using gloves and a protective box that prevents contaminants from entering the workspace.

UT Dallas also will partner with community colleges in North Texas to train future employees with a range of expertise. A 2020 report from the U.S. Department of Energy's National Renewable Energy Laboratory projects that the battery energy storage industry will need a minimum of 130,000 additional workers in the U.S. by 2030; at least 12,000 of those workers will be needed in Texas. Earlier this year, Tesla broke ground on a Texas lithium refinery to produce the battery metal for electric vehicles.

"Renewable energy is a rapidly expanding area, and Texas is leading the country in the expansion of energy storage capacity," Cho said. "We need not only PhD-level experts, but also technicians who know how to safely handle batteries."

The initiative is a prototype for collaboration, said Dr. Joseph Pancrazio, vice president for research and innovation at UT Dallas and co-principal investigator on the project.

"UTD and our partners will ensure that laboratory research and creative ideas from small businesses translate quickly toward commercialization," said Pancrazio, also a professor of bioengineering. "As a national resource, the collaborative space we're creating will streamline the path of innovation in energy storage and battery technology, from prototyping and testing to manufacturing. Coupling technological advancement with workforce development ultimately will catalyze economic growth while bolstering national security."



Researchers at UT Dallas and elsewhere are investigating how to make lithium- ion batteries safer and longer lasting, more environmentally safe, and less reliant on expensive and rare minerals.

Cho displays a finished battery and the hardware used to test its efficiency.

Williams takes a shot at game against Concordia University Texas.

FROM ONES AND ZEROS TO X'S AND O'S

By Jeffrey Hackett

University of Texas at Dallas senior Blythe Williams has an enviable collegiate highlight reel, including winning the American Southwest Conference (ASC) women's basketball championship last season. This year, the software engineering major is elevating her leadership role as a team captain while managing expectations for herself and teammates. "We're trying to see if we can do what we did last season by taking it one game at a time," she said.

Echoing that sentiment, the Comets' head coach, confirms that hard work allows results to take care of themselves. Now in his second season, Coach Joseph "Joe" Shotland describes Williams as a Swiss Army knife who can play guard or power forward. A good rebounder and defender, he likens her ability to be a good rebounder and defender to that of to a well-known player on the Dallas Mavericks professional basketball team.

"Blythe exemplifies that you can be wildly effective when you're authentic to who you are," Shotland said. "Allowing her to be good at the things she's good at has been hugely helpful to our organization.

"Like the NBA's Luka (Doncic), she dictates the pace of play in a controlled way that's unique to Blythe. She leads by example and is very thorough in her approach on the court and in the classroom."

For one who often lets her performance do the talking, the soft-spoken Williams is working to become a more vocal leader on the court and with her software project teams in the Erik Jonsson School of Engineering and Computer Science. She credits her diligence and determination to military parents who set a high bar.

"My dad always says, 'If you don't want to be satisfied with just OK, you've got to put in the work,'" she said. "After telling me that for so long, it's become something I do subconsciously."

A place where she does flex her voice is on social media — which includes her own "Blythe Williams" YouTube channel and "Real Talk" Podcast. On YouTube, she shares everything from basketball-handling drills to recipes. On her podcast, she talks about everything from recent books she's read, to artificial intelligence to interviewing Shotland and sharing life advice on the transition from high school to college.

"I use it as a way to share my opinion in the most authentic form possible," she said. "Sharing what I think is right might help others or give insight."

On a recent podcast, Williams' character and genuineness shown through as she expressed gratitude for the education she's receiving at UT Dallas where she received an ASC Academic All-Conference Award.

"Not everybody has an opportunity like this, and my parents have invested a lot in me," Williams said. "I'm about to take the next step and I'm very thankful for the people I've met at UTD and all the relationships. You don't get here by yourself."

UT Dallas, the largest school in the American Southwest Conference, is moving from Division III to the Lone Star Conference and NCAA Division II after next season. Embracing the change, Coach Shotland reflected on the purity of Division III athletics that balances the competitive pressures of athletics with the demands of rigorous academics.

"It's a crazy time in college sports. The landscape is changing rapidly, and I feel blessed to be at UTD and to work with such high-level kids," Shotland said. "You know that you can count on them to be engaged and work hard while at the same time take their education seriously."

With an extra year of eligibility, Williams is weighing her options. After her expected graduation in December 2024, she says she'll consider entering the job market or perhaps pursue an advanced degree in computer science and continue playing for the Comets.

The University of Texas at Dallas women's basketball team celebrated its American Southwest Conference championship in February 2023 at the Mabee Athletic Complex in Abilene, Texas. Members of the team include (front row, left) Blythe Williams; (second row, from left) Lucy Rogers, Raylee Cave, Maggie Delascurain, Jordan Maxwell BS'23, Diane Hurst, Amanda Crowninshield, Maddie Edler and Kaylee Boykin; (third row, from left) Kyra Samuels, Raven Busby, Trystan Clark, Lauren Fulenwider, Anna Yellen, Cierra Trigg and Jackie Layng; and (back row, from left) Kyung Suk Oh, Coach "Joe" Shotland, Mia Rudin and Jordyn Hofmann.

"I'M VERY THANKFUL FOR THE PEOPLE I'VE MET AT UTD AND ALL THE RELATIONSHIPS."

BLYTHE WILLIAMS

Photo credit from left to right: Doug Feger; Dylan Kuester

TOP RACING TO THE

By Jeffrey Hackett

In 2020, at the height of the pandemic, The University of Texas at Dallas added track and field to the existing cross country team, firing the starter's gun on a program racing to the top of the American Southwest Conference (ASC). Two of the most decorated members of the team are scholarship athletes who have academic scholarships.

Distance runner Graeme Maclean, a computer science senior in the Erik Jonsson School of Engineering and Computer Science, is the first UT Dallas cross-country runner to win the ASC individual title while holding the school and conference record in the 8-kilometer (about 5 miles in 25 minutes and 34.6 seconds) race. Maclean is also an ASC Academic All-Conference honor student.

Teammate Trent Sakakini BS'21 MS'23 is an ASC Academic All-Conference honor student, too and a UT Dallas record holder in the 1,500-meter (3 minutes, 57 seconds), 800-meter (1 minute, 53 seconds) and 3-kilometer steeplechase (9 minutes, 24 seconds)races. With a master's degree in mechanical engineering, Sakakini is employed by Lockheed Martin Corp. as a guidance, navigation and control engineer and serves as a volunteer assistant to Danielle Kcholi, head cross country/track and field coach.

"I love the opportunity to be able to encourage and help out a program that helped shape me into who I am today," he said. "I have always looked up to the coaches I have had and I hope that I can help the team the same way my coaches have done for me."

The season for track and field covers two semesters and afternoons of glory that soon give way to months-long training cycles that entail fighting fatigue, injury or the alarm clock. The motivation to hit the pavement at 6 a.m. every day is also necessary to meet the rigors of the mechanical engineering program at UT Dallas.

"A lot of times, I'll do a homework assignment, then work the problems again just to make sure I knew the material well," Sakakini said.

Like his teammate, Maclean believes exceptional athletics does not happen without successful academics happening first. He credits self-discipline for much of his success in class and on the course. Maclean says incremental changes in performance, the result of daily training, mirror the extra effort he applies to class assignments. Like looking into a mirror, Maclean's identical twin brother Nick Maclean also attends UT Dallas as an arts, technology and emerging communication major focusing on computer game development.

"We both find UTD to be a great fit," Maclean said. "There is a very unique student culture here. When I talk to friends on different campuses, there's no other college even remotely similar to what we have. It's a place where everyone sort of finds their way to flourish. It's quite amazing."

That positive culture extends to the track and field program. As an assistant coach, Sakakini has seen a remarkable shift in the culture under Coach Kcholi — particularly in the quality of recruits — along with an elevated sense of community between the athletes and the coaches.

"My first year was a lot different than my fifth year," Sakakini said. "Coach Kcholi helped me find my path by recognizing what worked for me, and she was fully supportive. Honestly, my motivation came from the support of the coach and the team. You work hard to not let them down."

Mental toughness and perseverance are critical to success in any sport. To the uninitiated, distance running may appear to be an individual effort pounding a long, lonely road. But it becomes a team sport during the conference and national championships where scoring is based on placement, not time, cross country members said. In addition to the competitions, camaraderie and team spirit are fostered during early morning runs, they said.

"Our distance runners are in season from August to May, so they're training together all the time which creates this sense of commonality, putting in the work and supporting each other," Kcholi said.

Teamwork, problem-solving and self-discipline are just a few of the common traits shared by all student-athletes. Despite the occasional setbacks that come with every sport, the young cross country/track and field program is well-positioned for the upcoming transition to Division II competition. As the standard bearers, Maclean and Sakakini have set the pace academically and athletically for the team's future success.

"I get kind of lucky since students come here for the engineering and computer science programs because they don't have Division II options that match what we offer academically," Kcholi said. "The cool thing about Graeme and Trent is they each provide an equal ratio of talent and hard work."

GRAEME MACLEAN

TRENT SAKAKINI

Maclean runs up a snowy hill at the 2022 National Collegiate Athletic Association (NCAA) West Cross Country Regional in Spokane, Washington.

Sakakini breaks away from the pack at the 2022 ASC Cross Country Championships in Marshall, Texas.

Photo credit clockwise from top: Whitworth University Athletics; East Texas Baptist University Athletics; Dylan Kuester

LOVE & STEM

BY SALLY PARKER

The 10-foot-tall steel "Jack" created by American modernist sculptor Jim Love is a campus icon. It first arrived in 1976 as part of a contemporary art exhibit and was eventually gifted to The University of Texas at Dallas by Margaret McDermott. McDermott was a preeminent private benefactor of UT Dallas whose husband Eugene McDermott was one of three founders of the University. The sculpture affectionately known as the Love Jack has become a campus icon. The plaque for the sculpture reads, "Those who meet at the Love Jack may find love themselves."

Couples who work together are a rare breed. Rarer still are those who collaborate on research, cowrite grants and build programs as a team.

Eight couples who share ties to the Erik Jonsson School of Engineering and Computer Science described what dovetailing home and office looks like for them — and how The University of Texas at Dallas helps make that possible. Some work side by side; others are in different areas but share a deep commitment to the University and its mission.

Several pointed out that the so-called "two-body problem" — when a faculty recruit brings a partner who's also in the job market — was not a problem at all but an opportunity at UT Dallas.

"When I was interviewing, the interviewer said, 'I don't like that term, because it's not a problem,'" said Dr. Heather Hayenga, associate professor of bioengineering, whose husband, Dr. Clark Meyer, associate professor of instruction, joined her in the bioengineering department six months after she arrived.

All of the couples interviewed met outside of UT Dallas employment, either joining at the same time, or within years of each other.

"Smart people are attracted to smart people, and we welcome intelligent partners to join us on our journey of educating and training the next generation of diverse, highly sought-after engineers and computer scientists and contribute solutions to society's most pressing issues," said Dr. Stephanie G. Adams, dean of the Jonsson School and holder of the Lars Magnus Ericsson Chair at UT Dallas.

"Partners committed to the same mission enrich the classroom, laboratory and office environments of the Jonsson School and the University."

Adams is principal investigator of ASPIRE^2 (Adapting Successful Practices to foster an Inclusive, Respectful and Equitable Environment), a UT Dallas transformation initiative sponsored by the National Science Foundation's ADVANCE (Organizational Change for Gender Equity in STEM Academic Professions) program to recruit and retain more women tenure-track faculty members in STEM fields.

"Given the size and stature of UT Dallas, prospective candidates are encouraged to seek positions for their partners," she said.

While the nature of their work varies, every couple agreed it was great to have a partner who understands the unique demands of academia.

"Being a first-year academic has a way of eating your life in many ways," said Dr. Connor Delaney, assistant professor of chemistry at UT Dallas, who is married to Dr. Juyoung Leem, assistant professor of mechanical engineering. "So, it definitely is good to be doing it together."

Jonsson School faculty and staff members pose with their spouses who also work at UT Dallas at the iconic Love Jack sculpture on the University mall. Back row (from left to right) Tonya Griffin, senior director of finance and administration in the Jonsson School Dean's Office and Leonard Griffin, inventory control specialist in housing operations at UT Dallas; Dr. Joshua Summers, interim associate dean for undergraduate education in the Jonsson School and Cheryl Summers, project director in the Jonsson School Dean's Office; Dr. Heather Hayenga, associate professor of bioengineering, and Dr. Clark Meyer, associate professor of instruction in bioengineering. Middle row (from left to right) Dr. Weili (Lily) Wu and Dr. Dingzhu Du, both professors of computer science; Dr. Rebecca McClain, assistant professor of instruction in materials science and engineering, and Dr. Kyle McCall, assistant professor of materials science and engineering; Guzal Fayzullaeva, finance operations coordinator in the Department of Mechanical Engineering, and Djakhangir (DJ) Zakhidov, associate director of the Center for Simulation and Synthetic Humans at UT Dallas. Front row (left to right) Dr. Connor Delaney, assistant professor of chemistry in the School of Natural Sciences and Mathematics at UT Dallas and Dr. Juyoung Leem, assistant professor of mechanical engineering.

DR. WEILI (LILY) WU & DR. DINGZHU DU

PROFESSORS OF COMPUTER SCIENCE IN THE JONSSON SCHOOL; CO-DIRECTORS, DATA COMMUNICATION AND DATA MANAGEMENT LAB

When Weili Wu and Dingzhu Du sit down to have dinner, the conversation is likely to be a lively one about big data or other trending topics in computer science.

"Even when we come back home, we continue and want to finish because we can't finish everything in the daytime," Wu said.

The pair met in the computer science department at the University of Minnesota. When Wu completed her PhD in 2002, she joined UT Dallas, moving with their young children and her parents, while Du stayed in Minnesota and served as a program director at the National Science Foundation.

It was a challenging time for Wu, as both a parent and a junior faculty member working on tenure. The University was instrumental in recruiting Du as a professor and co-director of the Data Communication and Data Management Lab.

"The dean and department chair provided a lot of the help to make this happen," she said.

Their three grown children are following their parents into the "family business," pursuing PhDs in business school for careers in academia. Wu said it's the natural result of growing up with professor parents who work together and talk about it at home.

"When our kids were very small, they heard about this paper or that research. And they also know what being a professor, working in academia, what the life looks like," she said. "I didn't purposely influence my kids, but that's because from the time they were very young, they have lived in this environment."

Wu said being a couple means she and Du understand each other deeply — a professional advantage, she added.

"If there's a conflict, we can find a good way to solve that," she said. "In that, we can make the work very efficient."

Dr. Weili (Lily) Wu (left) met her husband Dr. Dingzhu Du when Wu was a PhD student at the University of Minnesota. The couple has been married more than 20 years and has worked at UT Dallas for 21 years. They currently work together as directors of the Data Communication and Data Management Lab at the Jonsson School.

LEONARD GRIFFIN

INVENTORY CONTROL SPECIALIST IN HOUSING OPERATIONS, UT DALLAS

TONYA GRIFFIN

SENIOR DIRECTOR OF FINANCE AND ADMINISTRATION, JONSSON SCHOOL DEAN'S OFFICE

Leonard Griffin (left), an inventory control specialist in housing operations, met Tonya Griffin (right), a senior director of finance and administration in the Jonsson School, as high school students in Texas, and they have been married for over 28 years.

When Tonya and Leonard Griffin met in a Dallas high school, it wasn't an instant connection. She first learned of Leonard from her sister — and Tonya observed him from a distance.

"I was not very warm and friendly," she recalled. "But then as I watched him and how he interacted with people, I warmed up because I saw the nature of his character. And it was beautiful. He was a nice guy."

The Griffins started dating and have been together ever since — he proposed to her at church in front of 600 people — and they have two daughters and four grandchildren. Their connection to UT Dallas began when Tonya joined the University in 2009; Leonard followed four years later. They both love the buzz of possibility on campus, the excitement of celebrating student achievement.

"It's a real uplifting place to work," said Tonya, who didn't feel the same way in her previous corporate jobs.

She has witnessed the University's growth in her work managing budgets for it.

"We're always trying to find ways to improve things and adapt and adjust to the changes," she said.

The Griffins start their day together commuting to work, and they often meet up during the day for a lunch or coffee break.

"If we're having a bad day and need some positive energy, we have each other to meet with," Tonya said.

Leonard agreed.

"I'll meet her up at the corner of one of the buildings, grab her hands and we just walk and talk — and even better, if we can get something really bad to eat," he said. "It's just that there's nothing like someone that gets you, someone that's got your back, sincerely."

The Griffins are pictured in Broken Bow, Oklahoma, in Dec. 2022, celebrating Christmas in a cabin with their children and families. They have two daughters, Zakiya and Zaravia, and four grandchildren, Jayla, Jade, Judah and Janelle. The couple had just finished taking a big family photo, and Tonya requested a photo be taken of the two of them on the porch.

DR. JUYOUNG LEEM

ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING IN THE JONSSON SCHOOL

Juyoung Leem and Connor Delaney were taking a break from the stresses of graduate school when they met in a ballroom dance class at the University of Illinois Urbana-Champaign.

“Around this time, both of us were getting a little bit tired of working hard in the lab and getting too many failures from the experiments,” Leem said, laughing.

Added Delaney: “It was a little PhD crisis moment for both of us.”

After graduation, they made it a priority to find postdoc and faculty positions in the same area, she in mechanical engineering and he in chemistry. They have been together for over six years, living in Illinois and California before joining UT Dallas in August 2023.

“We’re really fortunate to be together because not everyone is able to get jobs at the same place,” Delaney said.

Dr. Juyoung Leem (left), assistant professor of mechanical engineering, met Dr. Connor Delaney, assistant professor of chemistry, when they were both graduate students at the University of Illinois-Urbana-Champaign. The newlyweds have been together for six years, and both began working at UT Dallas in August 2023.

As scientists in different fields, they agree sharing their work has made them stronger communicators. Each serves as a sounding board to clarify ideas and trim jargon for audiences who don’t have the same intimate knowledge, such as scientists in other disciplines and the general public.

Their hours as new tenure-track faculty are long, but they still find time to decompress. One or two nights a week, they venture out to explore the food scene. Lately, they’ve been fascinated with Texas barbecue, Delaney said.

“One day we’ll get a house, and Juyoung knows that I’m going to buy a smoker,” he said. “It’s inevitable.”

DR. CONNOR DELANEY

ASSISTANT PROFESSOR OF CHEMISTRY IN THE UT DALLAS SCHOOL OF NATURAL SCIENCE AND MATHEMATICS

CHERYL SUMMERS

PROJECT DIRECTOR, JONSSON SCHOOL DEAN’S OFFICE

DR. JOSHUA SUMMERS

INTERIM ASSOCIATE DEAN FOR UNDERGRADUATE EDUCATION IN THE JONSSON SCHOOL AND PROFESSOR OF MECHANICAL ENGINEERING

Cheryl Summers (back left) met Dr. Joshua Summers (back right) in 1994 at the University of Missouri. The couple has been married 26 years. Joshua Summers, who is the interim associate dean for undergraduate education in the Jonsson School, started in January 2021, and Cheryl joined the School in December 2021 as a project director. They are pictured with two of their daughters, Julia Marie Hua (left) and Erika Michelle in their living room. Not pictured is Annika Noel.

Jonsson School faculty and staff share a passion for growing future citizen scientists. But the daily reality of their roles and the challenges they face, can be quite different.

For at least one couple in the Jonsson School, Cheryl and Joshua Summers, exploring those differences together has led each to a greater understanding of the other and their work. Cheryl manages financials for Dean Stephanie G. Adams’ three National Science Foundation grants. Joshua, a professor of mechanical engineering, previously headed that department.

“While Cheryl’s nonfaculty, she truly understands what a faculty life is like,” Joshua said. “And likewise, I’ve been able to learn what life as a staff member is like.”

Both stress that students get the best experience possible when faculty and staff work as peers. With Cheryl’s background in process improvement and accounting and Joshua’s engineering expertise, they’ve put their heads together on several projects, including one that greatly streamlined reimbursement processes and another that clarified instructions on faculty budget forms.

The Summerses moved to Dallas from Clemson University in Clemson, South Carolina, with their three daughters in 2020. Joshua joined UT Dallas that year, and Cheryl in 2021. As a higher ed family, they have spent sabbaticals in France and Mexico. Two of their daughters have attended high school abroad in Iceland and Sweden.

“They’ve heard me talk to prospective students: Focus on what your vocation is, what your calling is. Don’t worry about the GPA,” Joshua said. “The experiences you collect along the way will be a little bit different. And those experiences are what make you who you are.”

DJAHANGIR "DJ" ZAKHIDOV

ASSOCIATE DIRECTOR, THE CENTER FOR SIMULATION AND SYNTHETIC HUMANS, UT DALLAS

GUZAL FAYZULLAEVA

FINANCE OPERATIONS COORDINATOR, JONSSON SCHOOL DEPARTMENT OF MECHANICAL ENGINEERING

Djakhangir (DJ) Zakhidov, associate director of the Center for Simulation and Synthetic Humans at UT Dallas, met Guzal Fayzullaeva, finance operations coordinator in the Department of Mechanical Engineering, in Tashkent, Uzbekistan, when Zakhidov was visiting his grandmother. The couple has been married nine years and have other family members who currently or in the past have worked at UT Dallas.

From left to right: Sofia Zakhidov, Fayzullaeva, Zakhidov and Sanjar Zakhidov visit a park for an Easter egg hunt.

When DJ Zakhidov and Guzal Fayzullaeva met on an arranged coffee date when he was visiting relatives in Uzbekistan 10 years ago, they were both doing family members a favor. But to their surprise, the sparks flew.

Zakhidov had to return home to Dallas two days later. But within three months, they were married, and a year later, they were living together in Dallas.

UT Dallas has always been a second home for Zakhidov. His father Dr. Anvar Zakhidov is a professor of physics and co-founder of the Alan G. MacDiarmid NanoTech Institute at UT Dallas. His mother, Nadira, was a web specialist in the Eugene McDermott Library.

Zakhidov started working at the university in 2012. He said watching his father's commitment to building the institute inspires his own journey into the metaverse, developing education simulations using augmented and virtual reality tools. Fayzullaeva said after noticing how happily immersed Zakhidov was in groundbreaking work, she joined UT Dallas in finance operations last year "to be a part of something big."

Now with two small children and her mother and sister's family living nearby, their University roots are growing deeper.

"UT Dallas has always provided a strong foundation for trying new things, for being creative or exploring," Zakhidov said. "It provides all the support and encouragement for anybody that's wanting to try. There's just some kind of a unifying spirit, and it feels like a place that's on the rise."

DR. CLARK MEYER

ASSOCIATE PROFESSOR OF INSTRUCTION IN BIOENGINEERING IN THE JONSSON SCHOOL

DR. HEATHER HAYENGA

ASSOCIATE PROFESSOR OF BIOENGINEERING IN THE JONSSON SCHOOL

Clark Meyer and Heather Hayenga go to work every day with a shared, deeply personal drive to engineer medical cures.

The two met in 2008 as bioengineering graduate students at Texas A&M University while working in adjoining labs. They've been researchers together ever since.

"It's rewarding and encouraging to have a partner not only in life but also in research," Hayenga said. "Having someone you're so like-minded and similar with, you can live life to the fullest and you can also do research to the fullest."

Hayenga's father passed away in her arms from a heart attack when she was an undergraduate student — a motivating force behind her decision to pursue cardiovascular research.

In graduate school, she and Meyer began researching the growth and remodeling of atherosclerotic arteries, work that continues. They combine Meyer's expertise in finite element modeling and Hayenga's in pathophysiology. Funding includes a Research Project Grant (R01) from the National Institutes of Health (NIH).

In 2014, not long after joining the Jonsson School, Hayenga learned she had solitary fibrous tumor, an extremely rare form of genetic cancer akin to sarcoma. There is no cure, only spot treatments.

The pair went straight to work with a research partner to find ways to use gene editing to reverse the mutation. It works really well — in theory. But in practice, delivery is proving less efficient. So, they keep pushing forward, aware of what's at stake but finding strength in a shared purpose.

"It sharpens your focus because it couldn't feel more important," Meyer said.

Above: Dr. Clark Meyer (left) and Dr. Heather Hayenga (right) met at Texas A&M University in College Station, Texas, while in graduate school for biomedical engineering. Hayenga is an associate professor of bioengineering, and Meyer is an associate professor of instruction in bioengineering. They work in neighboring research labs at the Jonsson School while studying atherosclerosis and a rare cancer.

Right: Meyer and Hayenga are pictured with their son Thomas, age four, at a city park.

DR. MARIO ROTEA

DIRECTOR, THE WIND ENERGY CENTER AT UTD (UTD WIND); SITE DIRECTOR, WINDSTAR, A NATIONAL SCIENCE FOUNDATION INDUSTRY-UNIVERSITY COOPERATIVE RESEARCH CENTER (IUCRC); PROFESSOR OF MECHANICAL ENGINEERING IN THE JONSSON SCHOOL

ANDREA TURCATTI

PROGRAM DIRECTOR, UTDESIGN® EPICS (ENGINEERING PROJECTS IN COMMUNITY SERVICE)

Andrea Turcatti and Mario Rotea share the same goal when it comes to their work: to build a more sustainable future through engineering and design.

Turcatti leads UTDesign® EPICS, a service-learning program in which students help solve real-world technical challenges for nonprofits and is a partner program with UTDesign Capstone, an award-winning capstone program for Jonsson School students. Rotea co-founded WindSTAR, an IUCRC for wind energy research and directs UTD Wind, a research center.

Each program fuels the future of human-centered technology — whether by designing smarter wind turbines that deliver energy more effectively and reliably or by helping students hone technical and business skills to advance engineering and science.

"Every university in this country that is reputable is looking at the cutting edge," Rotea said. "The question is how to differentiate. So identifying areas where we can make a difference and distinguish ourselves is part of the job."

Rotea and Turcatti met in their hometown in Argentina. When they were dating, he sometimes tutored her and her friends as they wrapped up teaching degrees, she recalled. Just a month after they married, they moved to Minnesota so Rotea could begin his PhD studies.

"It was a big change, especially when you go from a place where there is no snow," Rotea said. "We arrived in August and by November, I was wondering, 'What have I done?' "

Turcatti laughed and asked: "You were asking that?"

Now that their three children are grown, both freely admit they work a lot because they love it.

"The growing aspect of the University provides us with a lot of opportunity to do a lot of different things that are ready to be implemented, and that is very attractive," Turcatti said.

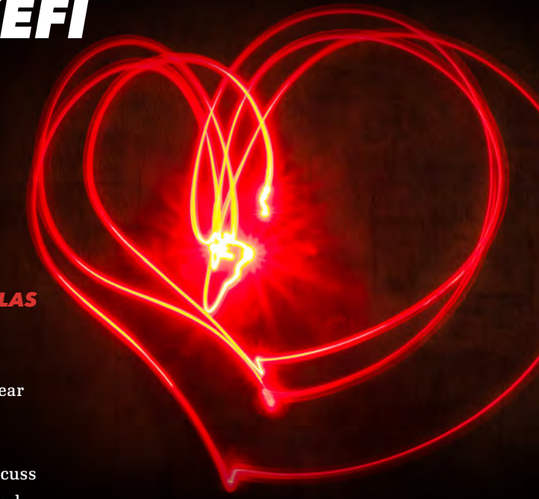
Dr. Mario Rotea and Andrea Turcatti met in their hometown of Rosario, Argentina, and have been married 37 years. Rotea, who joined the University in 2009, is former head of the Department of Mechanical Engineering and is currently a professor of mechanical engineering. Turcatti joined the Student Success Center in 2009 and has served UTDesign since 2013 where she is currently director of UTDesign EPICS. The couple has three children and one grandchild born in 2023.

DR. KIANOOSH YOUSEFI

ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING IN THE JONSSON SCHOOL

DR. FATEMEH (LEILI) IZADITAME

RESEARCH SCIENTIST, DEPARTMENT OF GEOSCIENCES IN THE SCHOOL OF NATURAL SCIENCES AND MATHEMATICS AT UT DALLAS



With a toddler and a newborn, there are days Kianoosh Yousefi and Leili Izaditame don't know which end is up.

"I need a full week just to recover from two days on the weekend," said Yousefi, adding that Izaditame is home with a cold their daughter, Rira brought home from day care.

The couple joined UT Dallas in January 2023, and their weekdays are filled with teaching and research. Yousefi's research group, the Flow Dynamics and Turbulence Lab, studies air-sea energy fluxes to help forecasters better predict extreme weather and plan oceanic wind turbine placement. Izaditame studies river and coastal soil pollution and its relationship to sea level rise and aquatic pollution.

The two met in 2015 in an English language class in Tehran, Iran, while preparing for their orals. Both were in the process of applying for graduate programs abroad. They moved to the United States together later that year and married in the States in 2016.

As early-career scientists, they discuss the challenges they face in their work. Mentoring graduate students who aren't much younger than they are has led to some self-reflection, Yousefi said.

"I'm a workaholic. If you ask my wife, she would say, 'He works 24/7.'," he said. "She tries to remind me that you should not expect the same thing that you expect from yourself from other people."

Research ideas are always running in the background, he added, and the boundary between work and life can be thin. With closely related research pursuits, someday, when time allows, the two may collaborate.

"Having a person that has a clear understanding of that as a partner is really important," Yousefi said. "It's really helpful to resolve a lot of issues or challenges."

Dr. Kianoosh Yousefi and Dr. Fatemeh Izaditame met in their home country Iran and have been married seven years. The couple worked together during their PhD programs and while completing their postdocs. They are pictured here in 2021 when Izaditame first visited UTD. Yousefi is an assistant professor of mechanical engineering in the Jonsson School, and Izaditame is a research scientist in the UT Dallas Department of Natural Sciences and Mathematics.

DR. BEN PORTER & AMY PORTER

Ben Porter (left) and Amy Porter (right) knew each other in high school but started dating in college after a chance meeting at a restaurant over winter break in their first year. The couple has been married 17 years and have two children, Jackson (second from left) and Luke (third from left). Ben Porter is an associate professor of instruction in the Department of Bioengineering, and Amy Porter is the director of operations at the Texas Biomedical Device Center (TxBDC) at UT Dallas.

DR. KYLE MCCALL & DR. REBECCA MCCLAIN

Kyle McCall (left) and Rebecca McClain (right) met when they were graduate students at Northwestern University in Evanston, Illinois. The newlyweds have been married since the beginning of the fall 2023 semester and joined the Jonsson School during the 2021-2022 academic year. McCall, assistant professor of materials science and engineering, shares some laboratory space with McClain, assistant professor of instruction in materials science and engineering, but they primarily work independently.

FROM BRAZIL AND BACK

BY ERIC BUTTERMAN

Alumna returns home and starts two successful companies, creating a chain reaction by recruiting others to UT Dallas

With a bachelor's degree in pharmacy and a master's degree in chemistry, Dr. Izabelle de Mello Gindri PhD'16 started her journey with the Department of Bioengineering in the Erik Jonsson School of Engineering and Computer Science at The University of Texas at Dallas.

A decade later, de Mello Gindri is the co-founder of two startups, one of which has quickly risen to become one of the biggest producers of absorbable pellets used for hormone replacement therapy and to treat metabolic disorders in her native country of Brazil.

Dr. Izabelle de Mello Gindri PhD'16 started two successful biomedical companies in Brazil.

"Izabelle is a testament to following your passion," said Dr. Stephanie G. Adams, Jonsson School dean. "Who could have predicted that degrees in pharmacy, chemistry and bioengineering would have led to this? Izabelle's experience and accomplishment are true testaments to the possibilities when we work across the aisles or benches in STEM."

de Mello Gindri credits her bioengineering experience in the lab of Dr. Danieli Rodrigues, associate professor of bioengineering, with successfully broadening her set of skills.

"Dr. Rodrigues opened doors at UT Dallas and motivated me through research tools and opportunities to present and explain my work and learn from other collaborators and colleagues," de Mello Gindri said. "She taught me to look further into problems

LEFT: Entrance to bio meds Brasil

From left to right Dr. Danieli Rodrigues, associate professor of bioengineering, with de Mello Gindri in their Jonsson School lab when she was a UTD student.

with a multidisciplinary view."

de Mello Gindri's company, named bio meds Brasil, produces hormonal and nonhormonal absorbable medications for more than 50,000 patients. Hormone replacement pellets produced target hormones such as testosterone, estradiol, estriol and oxytocin, and medications such as gestrinone, which is used to treat conditions such as endometriosis, uterine fibroids and heavy menstrual bleeding. The nonhormonal medications include NAD, a coenzyme used to slow the effects of aging; tadalafil, which is used to treat erectile dysfunction, enlarged prostate and high blood pressure; anastrozole, a molecule used to inhibit conversion of testosterone in estradiol; and metformin, which is used to treat insulin resistance and other clinical conditions such as polycystic ovary syndrome.

The second company she founded, Iaso Biodelivery, works in the development of drug delivery systems. This company is currently working on the development of an implant to treat overactive bladder and another implant that goes under the skin to treat Alzheimer's disease.

"Sometimes, creating a drug makes a difference when it comes to the pharmacy field, but other times, it is in making it easier for people to use the drug," she said. "I enjoy focusing on the science but also the fact that I can have an impact in daily living is a huge motivator for me."

Adams said that type of motivation attracts many to the field.

"It has long been established that one of the things that makes bioengineering a desirable field of study is the opportunity to help others," said Adams, holder of the Lars Magnus Ericsson Chair and a professor of systems engineering.

> **"I enjoy focusing on the science but also the fact that I can have an impact in daily living is a huge motivator for me."**
>
> — Dr. Izabelle de Mello Gindri PhD'16, co-founder of two biomedical startups

bio meds Brasil produces hormonal and nonhormonal absorbable medications for more than 50,000 patients.

Jonsson School Dean Stephanie G. Adams (left) and Rodrigues (right) visit de Mello Gindri (middle) at her company during a South American recruiting trip.

Though she graduated in 2016, de Mello Gindri's impact is still felt at UT Dallas. Her work was instrumental in the establishment of a new research line in the Rodrigues laboratory.

"Combining her background in pharmacy, chemistry and bioengineering, she contributed to the development of novel coatings for dental and orthopedic implants," Rodrigues said. "This work has resulted in multiple publications, a patent and federal funding."

"I knew she would return to Brazil and make a difference! I am proud of her achievements as a graduate student and now as a CEO, but personally, I think the most remarkable attributes that define Dr. de Mello Gindri are her courage, perseverance and creativity. I hope her story continues to inspire the new generation of researchers, entrepreneurs and international students."

Additionally, de Mello Gindri helps recruit students from Brazil, such as when Rodrigues and Adams came as part of a recruiting trip.

"I had the opportunity to connect with Dr. Rodrigues and Dean Adams here in Brazil when they visited Universidade Federal de Santa Catarina," de Mello Gindri said. "The visit shows the Jonsson School's commitment and vision to broadening international collaborations."

Adams said she was delighted to visit de Mello Gindri at bio meds Brasil as part of her trip to Brazil this past summer.

"I didn't know much about her company, but as someone who is a direct benefactor of a similar technology, I instantly understood the importance of her work," Adams said.

To de Mello Gindri the earning of a PhD at UT Dallas would be a life-changing opportunity and the knowledge consolidated in the experience would help her support Brazil's growing scientific community.

"Our country is making remarkable developments in this field," she said. "To watch our company grow and make a difference and encourage others is more than I could have ever imagined. But UT Dallas helped me imagine, shape and gave me the skills that were important in making this happen."

In Rodrigues' lab, de Mello Gindri uses atomic force microscopy.

de Mello Gindri is scheduled to give the UT Dallas doctoral hooding address in spring 2024.

Rodrigues in 2023

NEW FACULTY MEMBERS 2023

Dr. Shaheen Ahmed

Assistant professor of instruction in electrical and computer engineering

Previous Position:
Postdoctoral research fellow in the Department of Radiology, UT Southwestern Medical Center; lecturer in electrical and computer engineering, UT Dallas

Dr. Rawan Alghofaili

Assistant professor of computer science

Previous Position:
PhD student and research assistant, George Mason University

Dr. Kevin Brenner

Assistant professor of materials science and engineering

Previous Position:
Postdoctoral fellowship in electrical engineering, Stanford University

Dr. Yi Ding

Assistant professor of computer science

Previous Position:
Postdoctoral associate, Massachusetts Institute of Technology

Dr. Sourav Dutta

Assistant professor of electrical and computer engineering

Previous Position:
Research engineer and components research, Intel Corp.

Dr. Yongsheng Gao

Assistant professor of bioengineering

Previous Position:
Research associate in bioengineering, Harvard University

Dr. Daniel Gibney

Assistant professor of computer science

Previous Position:
Postdoctoral fellow, The Georgia Institute of Technology

Dr. Brian Kim

Associate professor of bioengineering

Previous Position:
Associate professor of electrical and computer engineering, University of Central Florida

Dr. Juyoung Leem

Assistant professor of mechanical engineering

Previous Position:
Postdoctoral fellow, Stanford University

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Dr. Bingzhe Li

Assistant professor of computer science

Previous Position:
Assistant professor, Oklahoma State University

Dr. You Li

Assistant professor of bioengineering

Previous Position:
Instructor, Department of Radiology, Stanford University

Dr. Xinchen Ni

Associate professor of mechanical engineering

Previous Position:
Postdoc, Querrey Simpson Institute for Bioelectronics, Northwestern University

Dr. Hossein Pedram

Assistant professor of instruction in electrical and computer engineering

Previous Position:
Lecturer in computer engineering, University of Washington Tacoma

Dr. Laisuo Su

Assistant professor of materials science and engineering

Previous Position:
Research associate, Texas Materials Institute, The University of Texas at Austin

Dr. Xinda Wang

Assistant professor of computer science

Previous Position:
PhD student and research assistant, George Mason University

Dr. Yanwen Xu

Assistant professor of mechanical engineering

Previous Position:
PhD student and research assistant, University of Illinois-Urbana-Champaign

Dr. Kianoosh Yousefi

Assistant professor of mechanical engineering

Previous Position:
Associate research scientist, Department of Civil Engineering and Engineering Mechanics, Columbia University

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LEADERSHIP PROMOTIONS AND ADDITIONS 2023

Dr. Dinesh Bhatia MS'87, PhD'90

Head of the Department of Electrical and Computer Engineering

Bhatia is a Jonsson School alumnus and longtime faculty member of the Department of Electrical and Computer Engineering. His leadership experience includes being the inaugural head of computer engineering in the early 2000s, where he oversaw the electrical and computer engineering graduate program for six years and served as interim co-head of the department.

Dr. Benjamin Carrion Schaefer

Assistant Dean for Graduate Student Success

Carrion Schaefer, associate professor of electrical and computer engineering, will develop, lead, assess and implement strategic actions targeting recruitment and retention, the student experience and the professional development opportunities of a diverse graduate student body. He served as a Dean's Fellow during the 2022-2023 academic year during which he focused on graduate student success.

SERVICE AT SCALE:

UT DALLAS CHAPTER OF ACM EARNS INTERNATIONAL RECOGNITION, HOSTS TOP-RANKED HACKATHON

More than 500 students attended the fall 2023 kickoff event of the UT Dallas chapter of the Association for Computing Machinery (ACM). Representatives from several companies introduced themselves and discussed upcoming recruitment opportunities.

Computer science and software engineering are fields well-suited to introverts with hours spent coding and designing, but that doesn't mean students majoring in these fields are isolated at The University of Texas at Dallas. One in six students is enrolled in the Department of Computer Science.

Through the UT Dallas chapter of the Association for Computing Machinery (ACM), students find professional resources as well as a social outlet where they can connect with hundreds of other like-minded students and have numerous opportunities to expand their skills. Because of the group's strategic efforts, they were one of five top-performing student chapters to receive an ACM Excellence Award in 2023.

"The ACM student organization housed within the Department of Computer Science in the Erik Jonsson School of Engineering and Computer Science for years has been a consequential driving force for student engagement," said Dr. Ovidiu Daescu, holder of the Jonsson School Chair at UT Dallas and head of the Department of Computer Science. "The organization hosts a plethora of computing-related activities, including organizing hackathon events and industry presentation nights, driving sponsorship of events, promoting research through self-guided and faculty-guided research projects and contributing to student scholarship support."

Jocelyn Heckenkamp, senior computer science major, has served as ACM president in 2023 in addition to studying abroad and attending military training in the summer. Heckenkamp said the experience has helped to prepare her for leadership roles in her future career.

The organization has expanded its programming over the past 12 years in order to help students connect more meaningfully with each other, with faculty and with future employers, supporting the goals of the University and the organization itself.

"ACM's official mission statement at our chapter is to build a greater, more collaborative computing community at UTD," said Jocelyn Heckenkamp, computer science senior and president of ACM. "I chose UTD because it seemed like it had the nerdiest culture, and ACM has been such a big part of my experience."

INTERNATIONAL EXCELLENCE

Worldwide, ACM includes roughly 100,000 members, more than half of whom reside outside the United States. More than 500 colleges and universities participate in ACM chapters. Just five ACM Excellence Awards are designated for top-performing student chapters each year, and the UT Dallas team was recognized specifically for Outstanding Service.

Heckenkamp identified four main programs where the group excels: ACM Projects, ACM Research,

ACM Technical Interview Prep and the ACM Mentor Program. All except for the mentor program are competitive — students must apply and may participate just one semester for most programs.

"ACM gives us the chance to be more creative — we're not limited by the course content," Heckenkamp said. "You can work on whatever project you want."

ACM Projects organizes teams of four to five students who complete a software project over the course of 10 weeks and then present their work to a panel at a competitive presentation night. ACM Research is a 10-week research program that connects student teams of four to five with research professors, and students participate in a poster competition at the end of the semester. ACM Technical Interview Prep provides in-depth instruction in data structures, algorithms, technical interview questions and interview practice. Students conclude the program by participating in a mock interview. Finally, the ACM Mentor Program connects junior- and senior-level students with first-year students to provide advice on classes, the college experience and internships.

The UT Dallas chapter of ACM reports more than 600 members and more than 100 student leaders dedicated to organizing events. They also organize HackUTD, one of the largest hackathons in the region, and participate in tech talks and volunteer events.

"I found a community in ACM. I felt like I belonged," said Saksham Sangraula BS'23, former ACM president and recent computer science graduate. "At its core, ACM is a student organization,

The 2023 ACM officers demonstrate their school spirit by displaying the mini version of the Whoosh, UTD's signature sign. Officers include from left to right (top row) Solomon Pierce, Nick Burnett, Michael Zhao, Farhan Jamil, Fatin Chad, Aswhin Ravishankar; (second row) David Tepeneu, Michael Hellman, Ridwan Amin, Mike Nguyen, Susan Zhang; (third row) Ben Wang, Naveen Mukkatt, Faisal Hasan, Shannon Carter, Karina Batra, Siddhant Patel; (fourth row) Sanika Kulkarni, Caleb Hernandez, Abis Naqvi, Kacie Yee, Manasi Vipat, Isindi Cela; (fifth row) Jaszmine DeFranco, Shivani Zala, Aaryaa Moharir, Nina Rao, Neha Thomas; (sixth row) Sydney Khamphouseng, Jocelyn Heckenkamp, Sisi Aarukapalli, Aarian Ahsan and Azia Bay-Asen.

and students are trying to have fun, be together and learn. I had to remember not to take the job too seriously, that I was volunteering, even though I was effectively running a large organization."

ACM at UT Dallas is not simply a place for professional networking, Sangraula said. The group also seeks to build a series of social events to help students connect and unwind. The group has dedicated space in the Engineering and Computer Science South building and even publishes its own yearbook. Hundreds of students attended the organization's kickoff meeting in August 2023 at which student leaders had a unique opportunity to leverage their public speaking and leadership skills.

"I am planning to go into the military, and ACM has prepared me for that in a way with the leadership challenges and leading such a huge group of people," Heckenkamp said.

HACKUTD APPROACHES MAX CAPACITY

HackUTD, one of the largest outreach events hosted by ACM at UT Dallas, has doubled and tripled attendance since its inception 10 years ago. The event now attracts more than 1,000 hackers and this year expects to reach capacity at 1,200 participants. Major League Hacking has ranked UT Dallas as one of its top 50 schools in North America, and HackUTD is one of the largest hackathons in Texas.

"I heard about HackUTD through word of mouth," said Michael Zhao BS'23, director of HackUTD and primary event organizer. I won the State Farm first place challenge at my first event."

HackUTD is hosted as an in-person event. Initial hackathon organizers were looking for a way to engage students who might not have previously participated in a hackathon and wanted to build coding skills. While participants are now invited from across the region, including at other institutions across Texas, the group's goal is still to provide an entry point for all students interested in coding, including those outside of computer science.

"More than 1,000 people show up, and we have more than 190 projects," said Zhao, a computer science master's student. "It's completely free, and we focus on reaching out to beginners. About 50 percent of our participants are joining for the first time. Practicing skills in this focused environment is why I like to go to hackathons. I think everyone should be required to participate in a hackathon."

The event requires dozens of sponsors who are interested in the recruitment possibilities of the event and want to build talent pipelines. They provide mentorship, resources and more throughout the event.

"We're looking at quality improvement now," Zhao said. "We're looking at improving the projects, the resources and the mentors. Also, we want to have good food! Our goal is to make HackUTD a once-in-a-lifetime experience for every single participant."

With quality amenities and travel stipends for competitive teams at other schools, HackUTD organizers must maintain strong relationships with corporate sponsors.

"HackUTD would not be possible without sponsors like State Farm and Toyota," Zhao said. "We want to keep those good relationships going and continue to look for fresh new companies to join the sponsorship effort. Our team heavily utilizes personal connections to find and retain sponsors."

As with other programs hosted by ACM, HackUTD also provides invaluable leadership training to its student organizers.

An event the size and scale of HackUTD requires a large planning team. Leaders from left to right include (top row) Jordan Tan, Daniel Liu, Farhan Jamil, Michael Zhao, Dylan Nguyen, Arjun Venkat, Parth Amrute, Kevin Ge, Amrit Rathie, Caleb Lim; (middle row) Adelaide Dunning, Abigail Smith, Nam Truong, Evan Ngo, Sharun Naicker, Abdullah Hasani, Esmond Tsang, Mike Nguyen, Josh Das, Geeth Gunnampalli, Shaz Kumar; (bottom row) Mitchell Vu, Kelly Zhou, Lisa Wu, Muskaan Bansal, Shagun Dalal, Purva Pawar, Shreya Kuntumalla, Bhuvana Madiraju, Shoaib Huq and Salman Jaher.

Photo credit pages 50-53: Shoaib Huq

"The biggest transition I had to make from participant to leader was learning how to lead a big group of people," Zhao said. "I had to be open to learning and have one-on-ones with officers. I have learned that with all we have done, the struggle is worth it."

SPOTLIGHT: FACULTY SPONSOR JOHN COLE

The UT Dallas chapter of ACM would not be what it is today without the support of its faculty sponsor: John Cole. Cole set out to revive the group around 12 years ago, in part because of the professional benefits he experienced from the organization.

"I found that ACM was very valuable to my career," Cole said. "I joined when I was a student, and I prefer that our students join the national organization."

Cole is a professor of instruction in the Department of Computer Science. He who began his teaching career immediately following graduate school at the Illinois Institute of Technology. He then worked for nearly 40 years in industry, including nearly 30 years running a small software house that did consulting as well as sold original software products. Cole has a background in psychology and computer science, and he said he returned to teaching largely for philosophical reasons, as he wanted to influence the next generations. He displays in his office a printout of a punch card from a mainframe computer to illustrate the dramatic advancements in technology since he launched his career in the 1970s.

"The University is not a job, it's a community," Cole said. "Student organizations are maybe as important as what we do in the classroom."

Professor John Cole (right), faculty mentor and professor of instruction in computer science, along with many student leaders over the years have built ACM into a powerful hub for recruitment and community. He is pictured here with Saksham Sangraula BS'23 (left), former president of ACM.

Cole wants computer science students to be well-rounded thinkers and communicators who are invested in their communities. If they're learning about ChatGPT, then they should understand how it was created, Cole said. If they're providing written responses, then they should use correct punctuation and present their ideas cogently. Finally, if students are learning to code, then they should apply their skills in time-bound situations as Cole did on the job. HackUTD was originally started to provide students with hands-on coding experiences.

Cole is a frequent fixture at evening events held when students are available, and he encourages other faculty to get involved. He adds a stabilizing influence to a group that includes hundreds of new participants each year, yet recognizes that the group is self-perpetuating.

"I live just a few minutes from campus," Cole said. "I'm here in the evening most weeks. But the students lead ACM."

Heckenkamp added, "I am really proud of how we have grown. We celebrated our tenth year of HackUTD, then we received the award. We're really grateful to Professor Cole for everything."

THE
JONSSON SCHOOL

JOIN OUR **WINNING TEAM**

In order to solve society's most pressing problems, enterprising faculty deserve the support and structure necessary to work across disciplines. Housed at The University of Texas at Dallas, one of the fastest-growing universities in the United States, the Jonsson School has six departments that are focused on five research thrusts of national significance. With a joint bioengineering building opening this fall at UT Southwestern Medical Center and a newly established Innovation Quarter launched with the City of Richardson to support entrepreneurship, tenure-system faculty will have the opportunity to excel together in the laboratory, the classroom and the marketplace. We are now hiring for multiple positions at all ranks in the research thrusts and individual departments.

ADVANCED MANUFACTURING

The national need for innovative products and processes aligns with the growth of industry in the Dallas area and Texas.

ENERGY SCIENCE AND TECHNOLOGY

Breakthroughs in energy generation, conversion and storage are critical for improving global living standards, economic advantage and long-term sustainability.

HEALTH INNOVATIONS

North Texas is well-positioned to address persistent health disparities with its ecosystem of hybrid public-private partnerships.

SEMICONDUCTOR SCIENCE AND TECHNOLOGY

Semiconductors are a core Jonsson School strength, and continued innovation is critical for national competitiveness and sustainable development.

TRANSPORTATION SCIENCE AND ENGINEERING

Continuous advancements will improve the safety, efficiency and quality of the lives of drivers on roads in Texas and the United States.

THE UNIVERSITY OF TEXAS AT DALLAS
ERIK JONSSON SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

engineering.utdallas.edu/careers

COLLECTIVE DATA, INDIVIDUAL HEALTH:

DISTINGUISHED LECTURER EXPANDS FROM GENOMICS TO PHENOMICS

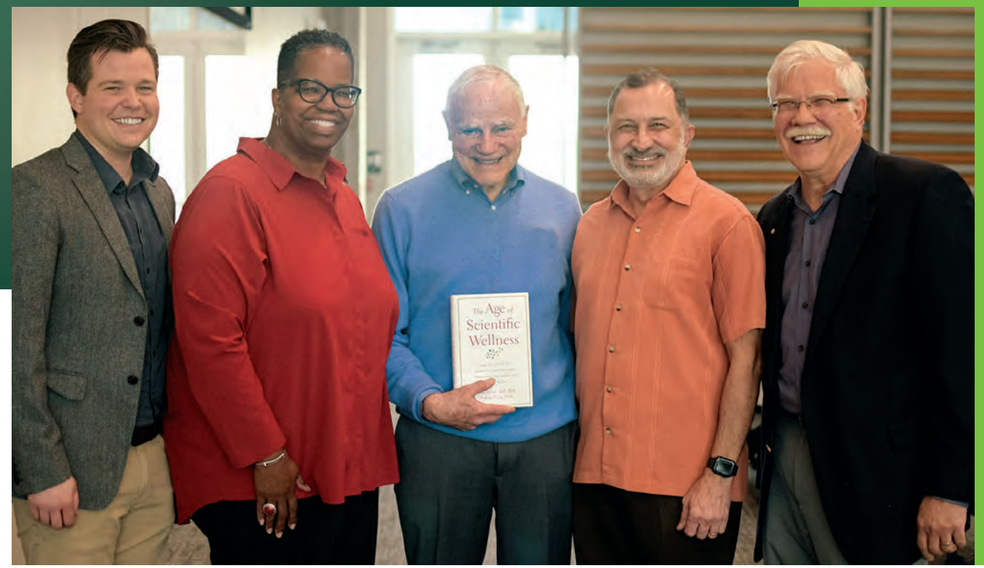
Fragments of data about our health are collected continuously by our watches and smartphones and then transmitted to our electronic health records. How can these loose data points translate into meaningful, long-term health solutions?

Dr. Leroy (Lee) Hood, the CEO and founder of Phenome Health, a nonprofit dedicated to delivering health innovation and enacting social change, discussed this question and more earlier this year during the Jonsson School Distinguished Lecture titled "The Transition from Genomics to Phenomics in Precision Population Health." Genomics refers to the study of an organism's DNA and while phenomics refers to the more comprehensive study of an organism's traits including its DNA and behavior and its environment.

The lecture series is designed to inspire students, faculty and staff from across The University of Texas at Dallas and spark interdisciplinary conversations.

"Lee is a rock star with expertise that spans the fields of biology, medicine, engineering, data science and more," said Dr. Stephanie G. Adams, dean of the Erik Jonsson School of Engineering and Computer Science and holder of the Lars Magnus Ericsson Chair. "His lecture awakened our brains. I felt energized and challenged by his presentation. Lee is a testament to what can be accomplished if we are willing to cross disciplinary lines and imagine what is possible. In order to solve the challenges of the 21st century facing the STEM community, we will need more talent like Lee."

"I felt energized and challenged by his presentation. Lee is a testament to what can be accomplished if we are willing to cross disciplinary lines and imagine what is possible."
— Dr. Stephanie G. Adams
Jonsson School Dean



From left to right Dr. James Yurkovich, lecturer in systems engineering and chief innovation officer at Phenome Health; Dr. Stephanie G. Adams, Jonsson School dean; Dr. Leroy (Lee) Hood, distinguished lecturer and Phenome Health's CEO and founder; Dr. Poras Balsara, vice dean of the Jonsson School and professor of electrical and computer engineering; and Dr. Stephen Yurkovich, head of the Department of Systems Engineering; meet following Hood's lecture. Hood holds a copy of his book *The Age of Scientific Wellness*, released in April 2023, which details the new phenomics-based approach to wellness.

Hood is credited with coining the term systems biology. He is a rare member of the three national academies: the National Academy of Engineering, the National Academy of Sciences and the National Academy of Medicine. Hood is also a serial entrepreneur and helped create several companies including Amgen, now one of the world's leading independent biotechnology companies.

BIOTECHNOLOGY AND THE HUMAN GENOME PROJECT

Hood played a major role in developing the DNA sequencer used in the Human Genome Project, a publicly funded international effort to study all of the DNA of a single human genome sequence, and in the 1990s, was at the forefront of the project. Hood has continued his work into an expansive future by employing big data approaches for studying the origins of health and advancing more targeted disease prevention and treatment — precision human health.

Hood began his lecture by describing how the field of phenomics has been made possible due to major advancements over the past 20 years.

"There were no good tools for generating enormous amounts of data that could be used in de-convoluting everything," Hood said.

Today, with big data on the rise, truly individualized approaches to health — focusing on wellness rather than upon disease treatment

and management — will soon be possible through phenomics, Hood said.

Phenotypes are more specific than genotypes in that all of an organism's observable characteristics are influenced by its genotype or specific DNA sequence, its behavior and its environment. Each individual has a unique phenotype. When studying the phenotypes of a million or more people, scientists can provide precise recommendations for disease interventions such as diet, exercise and even medication.

Hood described the changes over the past 50 years as a series of paradigm shifts, beginning with the merger of biology and engineering in the 1970s and then movement to the Human Genome Project, which was launched in 1990 and completed in 2003.

The original Human Genome Project cost around $3 billion to produce a single human genome sequence. This major scientific advance has led to breakthroughs in the study of immunology and genetics. However, it was just the beginning of a shift toward more individualized health made possible through electronic health records and systems biology approaches to health.

FROM DISEASE MANAGEMENT TO WELLNESS AND PREVENTION

New tools that can provide more granular insights are enabling health care providers to take a very different approach toward maximizing wellness.

"It will mark the beginning of the end of many chronic diseases," Hood said. "I'm very optimistic about that possibility."

Hood described how individual health passes through three distinct phases: wellness, disease and transitions from one to the other. The goal is to detect disease at its earliest stage so that in middle age, individuals could extend their health span, not just their life span. That way, people would spend a greater portion of their lives in a wellness phase rather than in a disease phase. By focusing on targeted disease interventions for individuals, medicine would undergo a dramatic shift from the current emphasis on disease treatment and management toward wellness. Additionally, when needed, physicians would have substantially more accurate data about how a specific disease intervention might perform.

For example, some individuals are genetically predisposed to having high cholesterol while others are not. Those individuals with low predispositions can reach healthy cholesterol levels through diet and exercise alone, Hood said. Those with predispositions, however, may be identified through a genetic test and prescribed statins — the only effective therapy.

Brain health is another dimension of health that can be impacted through disease interventions in middle age, Hood said. BrainHQ, a commercially available app developed by researchers at the University of California, San Francisco and used by athletes such as former quarterback Tom Brady, analyze more than 25 different cognitive features via a variety of assessments and activities. Hood emphasized that using this brain-training regimen has provided people with the ability to restore lost function, as validated in dozens of clinical trials.

"The majority of 80-year-olds could return to function at the same level as they did in their mid-30s," Hood continued.

PHENOMICS AND PERSONALIZED HEALTH

Through phenomics, big data is employed to predict how people with specific phenotypes will respond to disease interventions and how their health recommendations can be custom-designed.

"How we find the biological age is enormously complicated," Hood said. "We look at a series of algorithms. Then we move on to data analysis, which is the most exciting part. Moving from correlation to causal inference makes a much bigger difference."

Hood envisions that aging itself will be considered more relative in terms of a person's biological age versus their chronological age. The major features of behavioral interventions may include exercise, diet, stress management and intermittent fasting recommendations.

Body mass index (BMI), as one example, misclassifies up to 30 percent of people, but it is currently the best tool that is widely available, Hood said. With better, more intuitive systems and health metrics such as data-driven BMIs, physicians would gather much more comprehensive information, and individuals could obtain insights about how behavioral changes like starting a new strength training routine or adjusting their sleep schedules will impact their overall health. He describes this concept as "P4 health": predictive, preventive, personalized and participatory.

Hood identified several major problems facing the United States health care system, which he said lags among high-income countries due to a lack of wellness-focused medicine. Those problems include quality of care, an aging population that will require more resources, value-based care and diversity, equity and inclusion.

Here inclusion refers to including a broad enough sample size to account for variability according to ethnicity and also including groups that may not have had the access or ability to participate in clinical trials in the past. In other words, scientists need data that is representative of the entire human population to help the largest number of people. Where the Human Genome Project was concerned with a single genome, Phenome Health's Human Phenome Initiative will collect data from more than a million individuals that span the diversity represented in the U.S. population.

Researchers will integrate newly collected data and contextualize known mechanisms captured in Google and UC San Francisco knowledge graphs. Through Google's Biomedical Data Commons, there are a staggering 50 billion nodes, 850 billion edges, 215,000 variables and 566 properties.

Next, through hyperscale artificial intelligence, an educated system similar to ChatGPT will be fed individual data to derive actionable recommendations that will then be delivered to clinicians. Ultimately, each person can have a digital twin to simulate the effectiveness of certain disease interventions — without needing to implement these disease interventions on the individual.

At the event, Adams noted that school leaders from across the University including Dr. Inga Musselman, provost, vice president for academic affairs and the Cecil H. Green Distinguished Chair of Academic Leadership, and Dr. Steven Small, dean of the School of Behavioral and Brain Sciences and Aage and Margareta Møller Distinguished Professor in Behavioral and Brain Sciences, were present. Adams and Dr. James Yurkovich, who currently serves as chief innovation officer at Phenome Health as well as being a member of the Industrial Advisory Council for the University's Department of Bioengineering and part-time systems engineering lecturer in the Jonsson School, introduced Hood. The scale and scope of an endeavor such as what Hood presented are massive.

"The numbers and statistics Hood shared echo why we must have diversity in science," said Adams, also a professor of systems engineering. "For our students — keep dreaming, keep pushing, get out of your comfort zone. The work we need to do is transdisciplinary."

> ***"The majority of 80-year-olds could return to function at the same level as they did in their mid-30s."***
> *— Dr. Leroy "Lee" Hood*
> *CEO and founder of Phenome Health*

Mercy Koech, an electrical engineering PhD student, enjoys spending time at the Plinth, a campus gathering spot located on the Student Union Mall.

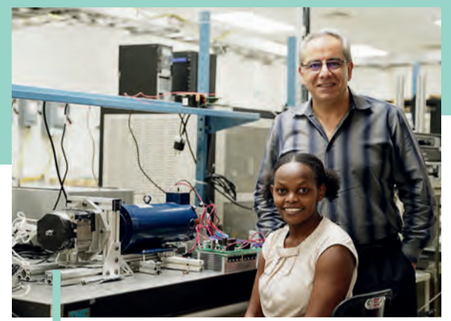
EMPOWERED LEARNER

Q-and-A with Mercy Chelangat Koech

Mercy Chelangat Koech, an electrical engineer from Kenya, has relocated to The University of Texas at Dallas to pursue a PhD in electrical engineering in the Erik Jonsson School of Engineering and Computer Science. Driven by her humanitarian spirit, Koech has started her career by focusing on serving populations living with limited access to electricity and is aiming to do even more as she studies sustainable energy and electric transportation at the Renewable Energy and Vehicular Technology (REVT) Lab led by Dr. Babak Fahimi, professor of electrical and computer engineering in the Jonsson School and Distinguished Chair in Engineering at UT Dallas.

"My spouse Dr. Morgan Kiani, professor of electrical engineering at Texas Christian University, met Mercy at a conference and introduced me to her," Fahimi said. "I noted a significant overlap in terms of our technical interests, humanitarian goals and research activities. Her area of research is focused on the sustainability of an electrified automotive industry, and I am thrilled to see her results. At UT Dallas, Mercy is reinforcing her academic strength and already producing impressive, transformative research outcomes to become a leader in her field of expertise."

In question-and-answer style, Koech shares more about her commitment to developing innovative solutions, what reminds her of home and how she stays focused as she ramps up her PhD studies.



Koech begin her PhD program in Texas after she found common ground with Dr. Babak Fahimi, professor of electrical and computer engineering (right).

Tell me about yourself. I understand you are an international student from Kenya, and you started your PhD in electrical engineering at UT Dallas in spring of 2023.

I began my journey with an undergraduate degree in electrical engineering from Moi University in Kenya. Upon graduation, I went to industry where my passion for bringing electricity to underserved communities ignited. During feasibility studies, I learned that over 60% of Africa's population lives without electricity. Building the necessary infrastructure proved to be a formidable challenge, as there was no return on investment for the energy provider.

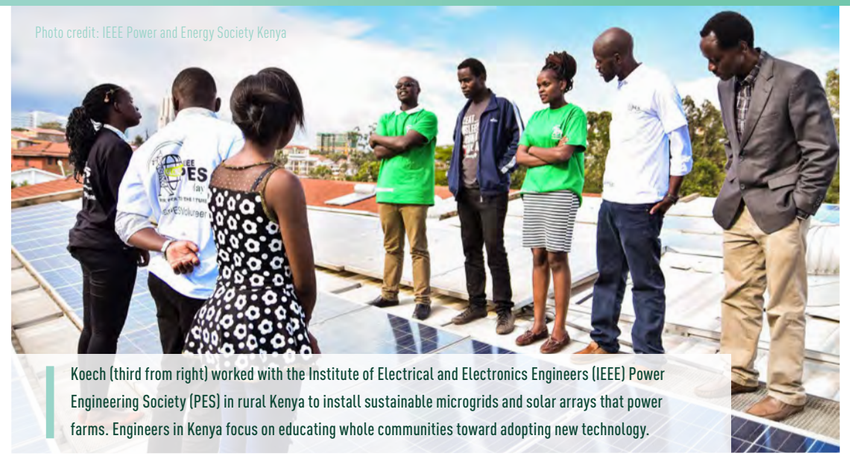
Eager to make a difference, I joined a solar startup, collaborating with industrial, health care and educational institutions. However, it was through my involvement with the Institute of Electrical and Electronics Engineers (IEEE) as a volunteer that my horizons expanded exponentially, immersing me in a vibrant community of like-minded individuals. With the research amassed over the past five years, I felt it was important to consider graduate school to share and publish perspectives from different parts of the world.

How was your transition to Texas? How has it been so far?

I had heard of many stories from friends about international student life but experiencing it firsthand has been surreal. I felt like my entire life was fitted into three suitcases. My REVT lab mates come from different parts of the world, yet we find common ground in our shared love for pickles, egg omelets, cookies, tea and coffee. Chapati — a soft bread like naan — was embraced as an integral part of the Kenyan cuisine from Indian immigrants involved in the construction of the Kenya-Uganda railway.

So far, I have enjoyed the beauty of the campus — my favorite place is the Plinth. Intercultural Programs (ICP) has enriched our experience with memorable trips such as the Texas Rangers vs. Detroit Tigers baseball game as well as the "Moulin Rouge" musical, which helped us learn more about the American culture. I have also visited the Dallas Zoo which reminded me of the African savannah back home.

Photo credit: IEEE Power and Energy Society Kenya



Koech (third from right) worked with the Institute of Electrical and Electronics Engineers (IEEE) Power Engineering Society (PES) in rural Kenya to install sustainable microgrids and solar arrays that power farms. Engineers in Kenya focus on educating whole communities toward adopting new technology.

How did you find your passion for renewable energy?

Working with the IEEE Smart Village (ISV) program that combines renewable energy, community-based education and entrepreneurial opportunities in a developing world reignited my passion for engineering. I wanted to see the overall impact of the projects I was involved in, particularly how they benefited the community. Through IEEE, I not only built a global network, but also found a deeper connection to the far-reaching influence of my work. I was also motivated to make more impact in off-grid communities.

How is your experience working with Dr. Fahimi, director of the REVT Lab?

Working with Dr. Fahimi has been an incredibly enriching experience, as he has a unique ability to ignite one's passion. His guidance as an advisor has been highly beneficial for my personal and professional growth during these past few months. Dr. Fahimi has genuine concern for his students' overall well-being and he is willing to share invaluable insights. I approach each day with an open mind, embracing a continuous learning mindset.

Education here is more practical. I have always been interested in the technical side of how technological infrastructure systems are created. The beauty of being here is learning how the devices used to drive industrial machines and consumer electronics are developed, tested and certified for different applications.

Two years ago, you were recognized by IEEE as a Smart Village Ambassador and a Women in Power society leader. You are also now serving as a governing board member at large representative on climate change and served with the IEEE's Power and Energy Society. How has this organization impacted your career development?

After two years of working in industry, I took a few months' break to rethink my career direction. The break provided me with an opportunity to be more involved with IEEE, a global engineering organization offering extensive networks and support for students and young professionals. I faced many challenges as a female engineer. Through IEEE, I sought insight from senior members while at the same time mentored young engineers who aspired to follow the path.

Given IEEE's global presence in over 190 countries, I was eager to connect and expand my knowledge base. As I became more involved, I proactively promoted our projects and established connections through video interactions. I made it my goal to connect with three new people a day. To date, I have worked with volunteers from over 50 countries.

You have previously served a number of organizations including the Maa Trust, an organization dedicated to supporting the Maasai ethnic group, and the Tech-Gaa Hub, a women's group that teaches tech literacy in Kenya. What are some challenges individuals face in rural communities like those in East Africa?

People living without access to electricity encounter numerous challenges, with education being the foremost concern. Our aim is to integrate technology in the communities without compromising their cultural lifestyles. The Maasai are an indigenous tribe that have historically lived as pastoralists at the heart of the famous tourist destination Maasai Mara National Reserve. I lived with them in a tent working with IEEE Smart Village to understand the community energy-related needs.

In many developing countries, people own communication devices such as mobile phones but lack access to charging stations. Another key aspect is health care, where people are forced to travel far to find a hospital or clinic. With solar powered health centers, medicines can be refrigerated and medical devices can operate reliably without interruption to provide necessary life support operations.

How can technology like smart microgrids and solar technology help address climate change while also improving the quality of life for people currently living off the grid?

These technologies not only contribute to addressing climate change by reducing carbon emissions but also uplift the living standards of off-grid communities, enhancing their overall well-being, resilience and sustainable development. With communities reducing reliance on fossil fuels, their health improves, and they can use solar to power productive appliances such as water pumps, fans, fridges, irrigation systems, cold storage, flour millers and bakeries, all of which are essential for daily life.

While many solar systems are currently imported, I hope that more localized solutions will be produced so more people are educated on the importance of these technologies. With increasing electronic waste production, I hope that more recycling solutions can be considered.

You mentioned that the role of the community is central in rural Kenya and that land is allocated to each village, not to individuals. Why is education so important in this context?

In some communities in Kenya, land is communally owned. Through ISV, I was engaged with Bright Hope International, a nongovernmental organization (NGO) based in Illinois to implement a solar-powered water pump that provided water for the farm's drip irrigation, engaging 100 farmers and serving over 2,000 people who benefit from the water for their basic needs. Following the success of the project, the community members offered an additional five acres of land to expand the project. Women also no longer have to travel far to fetch water.

I have noticed that one connection will often lead to another. These well-knit cultures still exist. Educating people is a key component — the little inputs can often have the most impact.

Have you stayed involved in IEEE at UT Dallas?

I arrived in January, but I have to say I am impressed with the team members of IEEE UT Dallas, some of whom also work in Dr. Fahimi's lab. They offer several educational training seminars, workshops, tutoring sessions and partner with companies such as Murata, Texas Instruments Inc. and Intertek to promote professional development. It is cool to see the networking taking place at UTD.

Where do you see yourself going next?

I aspire to complete my PhD and get a fulfilling job that will allow me to bring impactful technology back to my home country. I am inclined to serve the communities that have the most need.

With the right skills and partnerships, I hope to start an NGO that will provide solar energy to power productive applications in various communities that solve the challenges they are facing. It will not be easy to make this change — it's going to take partnerships with a lot of people and organizations.

It's an honor being here. I am grateful to the UT Dallas community for providing us with the resources to continue our education, make our dreams come true and be hopeful about the future.

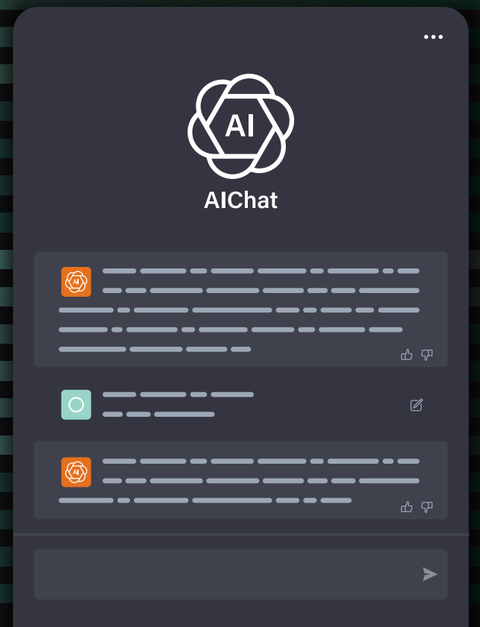
The REVT Lab includes (left to right) Ahmad Nabizadah, Behnam Mosammam, Ethan Winchell, Kevin Largent, Dustin Pundt, Vahid Rafiei, Allison Pham, Aaron Brown, Thor Westergaard, Fahimi, Majid Ghasemi and Koech. The lab is home to graduate and undergraduate researchers from across the globe who are working on a broad range of projects related to renewable energy and sustainable development.

UTD TECHNOLOGY EXPERTS SEPARATE CHATGPT

FACT FROM FICTION AT COMMUNITY FORUM

University of Texas at Dallas technology experts dispelled misconceptions and highlighted advantages of a new artificial intelligence (AI) tool that has stirred growing chatter about its power to change communication, education and the workforce.

"Students could potentially use it to get their homework done," said Dr. Gopal Gupta, professor of computer science and one of the panelists at the "ChatGPT: Fact vs. Fiction" forum held spring semester in the Edith O'Donnell Arts and Technology Building lecture hall at UT Dallas. "It is a double-edged sword. We've got to teach students to be honest and use it as a tool to learn."



Science reporter Adithi Ramakrishnan of *The Dallas Morning News* moderated the forum.

The forum sponsored by *The Dallas Morning News* and moderated by science reporter Adithi Ramakrishnan also featured Dr. Xinya Du and Dr. Jessica Ouyang, both assistant professors of computer science in the Erik Jonsson School of Engineering and Computer Science, and Dale MacDonald, associate dean of research and creative technologies in the Harry W. Bass Jr. School of Arts, Humanities, and Technology.

ChatGPT is an AI text chatbot released for the web in late 2022. It uses technology that replicates how people write by quickly processing a large database of books and online material and analyzing how words are put together. Users can ask ChatGPT a question or ask it to write a song, poem, letter or essay, and within seconds, it will provide an answer or complete the task.

When asked if students could use ChatGPT to write their assignments for them, the panelists said that while the threat of cheating is real, there are legitimate academic applications for the tool.

MacDonald pointed out that since ChatGPT and similar technologies have quickly become ubiquitous, it's essential that teachers use AI chatbots in the classroom so that students can learn about them.

"It is becoming clear that it's important that students use it and that teachers get students to use it so they can have these ethical conversations," he said. "Our students are going to have to have this literacy."

Du said educators can adjust to ChatGPT by changing the way they assign work to students.

"We can come up with questions that are more challenging — charts, analysis," he said. "We can also have students write critiques of the AI-generated content."

Assigning critiques could be a rich vein for teachers to mine. Ouyang said the answers that ChatGPT produces can be riddled with errors, giving students an opportunity to enhance other skills.

"It might switch the names of two characters from the book you're supposed to be writing an essay on," she said. "And unless you are critically reading the essay that it has written for you, you may not realize or notice that."

The panelists emphasized that ChatGPT is just a tool, one that works via a technology called pattern matching. It predicts the next word in a sentence based on the

massive amount of content it has reviewed as part of its machine learning.

"Any logical behavior is there by chance," Gupta said. "If you ask ChatGPT what is two plus two, it says 'four,' because that is what's out there."

But if more people in the data set ChatGPT was trained on had said five, that's the answer ChatGPT would provide, he said.

When asked about the stories of chatbots seemingly expressing emotions with their human chat partners, the panelists reassured the audience.

"Don't worry," Ouyang said. "ChatGPT is not going to develop sentience and come after us."

The reason behind that kind of behavior is the way the chatbot is trained in pattern matching, she said.

"It responds as it's seen humans respond in the past," Ouyang said. "If you say, 'I love you,' the chatbot will say it back."

Gupta likened ChatGPT to a child repeating what the adults in their household have said without understanding the meaning or context.

"It may or may not be right, but it sounds right," he said.

Ouyang also noted some energy-use and privacy protection concerns with the technology.

"There is a lot of environmental concern with the carbon footprint of training these models," Ouyang said. "The amount of electricity they use is staggering."

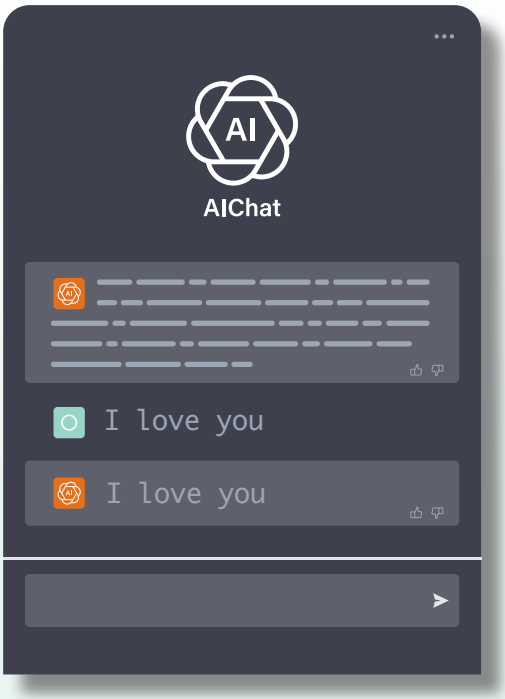
And while she doubts OpenAI, the company that developed ChatGPT, is selling user data, Ouyang said that online privacy is still a major worry.

"It's always a concern that anything you put on the internet could be collected," she said.

Meanwhile, MacDonald reassured the audience that AI will not replace humans in the workplace.

"AI is not going to take your job," he said. "A human who can use AI is going to take your job."

MacDonald also cast doubt on the longevity of ChatGPT's popularity, noting that people's attention spans quickly drift from one new thing to the next.



"It responds as it's seen humans respond in the past. If you say, 'I love you,' the chatbot will say it back."

– Dr. Jessica Ouyang, assistant professor of computer science

"This is still at a very high hype state," he said. "Until people come up with actually good reasons to use it, it may not bear the investment."

Dr. Xinya Du

Dr. Gopal Gupta

Dale MacDonald

Dr. Jessica Ouyang

THE POLYKARP KUSCH LECTURE SERIES

ROBOTICS

PAST | PRESENT | FUTURE

Robots are becoming ubiquitous. Food delivery robots roll casually throughout The University of Texas at Dallas campus. Lawn-mowing robots crisscross the field outside the Administration Building. Drone-racing is now a team sport with its own student organization. What's next?

At the 2023 Polykarp Kusch Lecture, Dr. Mark W. Spong, professor of systems engineering and electrical and computer engineering in the Erik Jonsson School of Engineering and Computer Science and holder of the Excellence in Education Chair at UT Dallas, explained the history of robotics as well as his prediction for the future to a University-wide audience who asked questions about ethics and sustainability.

"My work has been at the intersection of control theory and robotics," Spong began, as he described the breathtaking speed of technological advancement throughout his career.

Since 1985, top faculty at UT Dallas have delivered lectures in the Polykarp Kusch Lecture Series. The lecture series is named for Polykarp Kusch, a Nobel laureate and professor of physics, with the intent to inspire the lively mind. Kusch was a celebrated teacher and a prominent physicist who left Columbia University to work at UT Dallas through its early years as a state institution and was a professor emeritus at the time of his death in 1993.

Dr. Stephanie G. Adams, dean of the Jonsson School and holder of the Lars Magnus Ericsson Chair at UT Dallas, introduced Spong as the author of a textbook on robot modeling and control that has been used broadly by students internationally for more than 30 years.

"His solutions have stood the test of time and became the new foundation and standard in the field," said Adams, also a professor of systems engineering. She described Spong, who served as Jonsson School dean from 2008 until 2017, as an educator at heart who devised robots that could play chess and air hockey and that would be more appealing to his audience of students. Spong also founded UTDesign®, a signature senior capstone design program that successfully matches companies with student design teams.

Spong has numerous accolades in engineering including being a fellow of the International Federation of Automatic Control (IFAC) and the Institute for Electrical and Electronics Engineers (IEEE). He has received the IEEE Third Millennium Medal, the Nyquist Lecture Prize, the Rufus Oldenburger Medal from the American Society of Mechanical Engineers (ASME) and many more.

Robots are now seen everywhere from manufacturing to medicine to household items including a "robot cat litter box," Spong quipped. But how did they get their start?

Scan the QR code to read the full story with Spong's answer, his definition of a robot and his prediction for future robots.

ABOVE: From left President Richard C. Benson, Jonsson School Dean Stephanie G. Adams, Polykarp Kusch Lecturer Dr. Mark W. Spong and Provost Inga H. Musselman. The lecture typically attracts leaders and attendees from across the University.

LEFT: A cohort representing the UT Dallas chapter of the National Society of Black Engineers (NSBE) asked Spong about some of the ethical implications of using robotics. From left, Dlet Habtemariam, Rami Ismail and Julian Gay, all computer science majors, met after the event for conversation.

JONSSON SCHOOL NEW DIMENSIONS PRIORITIES:

- Impart knowledge through teaching and research to the next generation of global leaders in engineering and computer science
- Enable greater access to higher education for underrepresented and non-traditional students
- Continue to lead in new and emerging research fields led by the best faculty in the country

LEFT: University President Richard C. Benson welcomed guests to the President's Gathering to honor their contributions. Guests included faculty members, industry leaders, distinguished alumni and many more.

RIGHT: Dr. Walter Voit BS'05,MS'06 shared a laugh with Dean Stephanie G. Adams. Voit, an associate professor in the Department of Materials Science and Engineering and the Department of Mechanical Engineering, was recently named a senior member of the National Academy of Inventors. He is also the founder and CEO of Adaptive3D, a company that Desktop Metal acquired in 2021.

ABOVE: Dr. Fatemeh Hassanipour (front left), assistant dean for inclusive excellence and professor of mechanical engineering in the Jonsson School, chatted with Debjani Biswas MS'93.

RIGHT: Attendees gathered in the Axxess Atrium, which was named after the company formed by John Olajide BS'04, a speaker at the event and campaign co-chair.

BELOW: Olajide reminisced about his experiences as a Jonsson School engineering student who was about to graduate. "I remember it was a time of great pride but also great uncertainty," Olajide said. "I knew I was going to make an impact. I also knew I couldn't do it alone."

ABOVE: Dr. Manuel Quevedo-Lopez (right), head of the Department of Materials Science and Engineering, visited with distinguished alum Chris Progler PhD'97 , CTO at Photronics (left).

ABOVE: Neel Gonuguntla, member of the Dean's Executive Council of the Jonsson School and executive board member of the U.S. India Chamber of Commerce, hugged Tulika Bhatia (right).

HALFTIME RALLY:

PRESIDENT'S GATHERING RECOGNIZES JONSSON SCHOOL BENEFACTORS

University of Texas at Dallas leaders gathered recently to celebrate the halfway point of *New Dimensions: The Campaign for UT Dallas*, the second major fundraising campaign in University history and to honor supporters of the Erik Jonsson School of Engineering and Computer Science.

"Time and again, I am reminded of how fortunate our students and faculty are to interact on a campus like this one," said University President Richard C. Benson, holder of the Eugene McDermott Distinguished University Chair of Leadership. "Generous benefactors are ensuring that generations of bright minds will choose UT Dallas as an ideal destination for a rigorous academic experience, to conduct cutting-edge research or to work in a fulfilling career."

The Jonsson School goal for *New Dimensions* is to raise $75 million. Jonsson School Dean Dr. Stephanie G. Adams emphasized that the School's strategic priorities include ensuring student and faculty success, expanding the school's infrastructure and building a culture of inclusive excellence.

"My goal for the strategic planning process over the past year has been singular — to help the Jonsson School become the best it can possibly be," said Adams, holder of the Lars Magnus Ericsson Chair and also a professor of systems engineering. "We have raised $40 million, so we're over halfway to meeting our *New Dimensions* target."

The final speaker was John Olajide BS'04, the founder and CEO of Axxess, a health care technology company based in Dallas. He has served as a campaign co-chair along with Ron Nash since the start of the public phase of the *New Dimensions* campaign in 2021. His philanthropy includes creating multiple funds, scholarships and sponsorships for engineering and computer science students attending the Jonsson School. The event location — the Axxess Atrium — was named for Olajide's company.

"It's clear that I am home. One of my greatest blessings is being part of the UTD family," Olajide said. "I am living a life beyond my parents' wildest dreams. We all want to make a difference — please continue to give."

Erik Jonsson School of Engineering and Computer Science
The University of Texas at Dallas
800 West Campbell Road, ECW 32
Richardson, Texas 75080-3021

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The $120 million, five-story Texas Instruments Biomedical Engineering and Sciences Building was dedicated this fall. The facility supports dozens of faculty from both the Jonsson School and UT Southwestern Medical Center.