AEROSPACE ENGINEERING // COMPUTATIONAL ENGINEERING // ENGINEERING MECHANICS 2023

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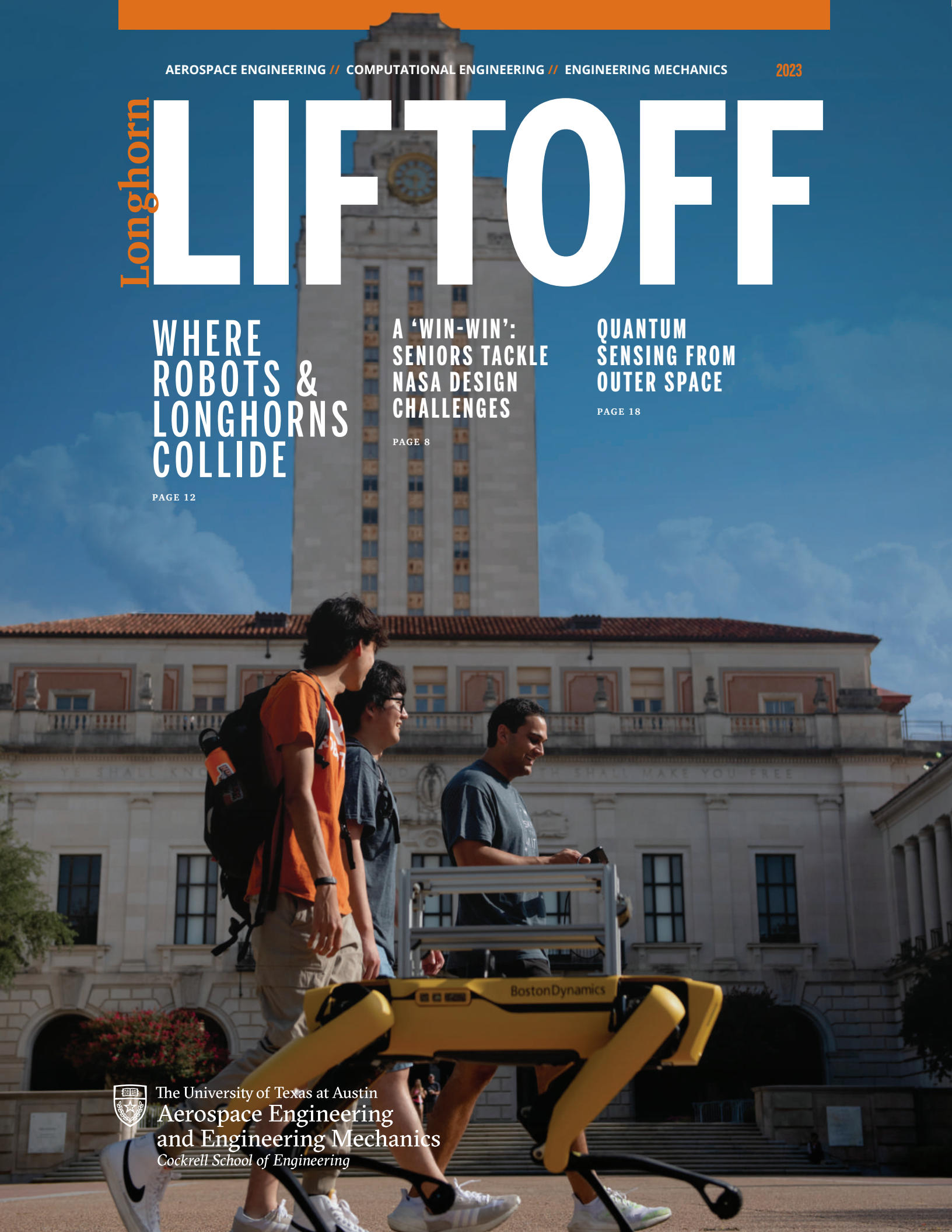

The University of Texas at Austin
Aerospace Engineering and Engineering Mechanics
Cockrell School of Engineering

LONGHORN LIFTOFF

Longhorn Liftoff is published for alumni and friends of the Department of Aerospace Engineering and Engineering Mechanics in the Cockrell School of Engineering at The University of Texas at Austin.

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FROM THE CHAIR

It has been another eventful and productive year at Texas ASE/EM. As we kick off a new fall semester (and hopefully some cooler weather!), I am excited to share some highlights of last year's most memorable events, new groundbreaking research, innovative student projects, faculty and alumni updates and much more in this issue of Longhorn Liftoff.

As our department and the fields of aerospace, computational and mechanics continue to grow at an unprecedented rate, we have been working hard behind the scenes to recruit new faculty and staff to support this growth. And as part of the University and Cockrell School strategic planning process, we have been developing a new strategic plan that will break down the department's vision, mission and priorities for years to come. I look forward to sharing more information about the new plan once the details have been finalized.

Finally, I enjoyed visiting with those of you who were able to join us for various events over the past year, including alumni happy hours, the official unveiling of our Launch Texas program and our Academy of Distinguished Alumni induction ceremonial banquet. We will continue to plan events like these and more and I hope to see many of you in attendance. Please watch your email inbox for upcoming event details, follow us on social media and keep us updated with your contact information and good news.

Until then, Hook 'em!

Clint Dawson

CLINT DAWSON
CHAIR, DEPARTMENT OF AEROSPACE ENGINEERING AND ENGINEERING MECHANICS
COCKRELL FAMILY REGENTS CHAIR IN ENGINEERING #2

We had a great time hosting our Houston-area alumni reunion at the NASA-JSC Gilruth Live Oak Pavilion this spring!

VIEW MORE PHOTOS:
flic.kr/s/aHBqjAEPWw

JAH AWARDED ‘GENIUS GRANT’

Moriba Jah, an astrodynamicist, space environmentalist and ASE/EM associate professor, was awarded a MacArthur Fellowship, often referred to as the “genius grant,” last fall. The award recognizes Jah’s work to track and monitor the more than 30,000 human-made objects orbiting the earth.

Jah is one of 25 individuals selected for the five-year fellowship — a no-strings attached “investment in a person’s originality, insight and potential.” Recipients are nominated based on proven talent, extraordinary originality and dedication to their creative pursuits.

Jah has developed tools for more precisely determining the locations and possible orbital paths of the active and inactive satellites, rocket bodies and other debris in space. This knowledge gives scientists a better picture of where objects are related to each other and when a collision could occur.

In tracking these objects, Jah and his colleagues have built complete catalogs of space objects in orbit. These tools — ASTRIAGraph and Wayfinder, a new version designed specifically for use by the general public — are online visualization tools, freely available to all, that integrate information from governments, industry and researchers.

“The orbital highways are getting crowded, and the services and capabilities that we depend upon are in jeopardy of being lost due to collisions from orbiting space debris, and it’s very difficult to predict where and when those things might happen,” Jah said.

Jah is an outspoken advocate for space environmentalism, a framework for treating Earth’s orbit as a finite natural resource that needs to be preserved and protected. Jah has proposed policies to create a circular space economy, preventing pollution in the form of single-use satellites and incentivizing companies to reuse satellites rather than abandon them.

In addition to his research, Jah is a co-founder and chief scientist at Privateer. His fellow co-founders in the private space venture are Alex Fielding, who co-founded technology company Ripcord, and Steve Wozniak, co-founder of Apple. Together they focus on similar areas to Jah’s research, collecting data on objects in orbit to allow space operators to move safely and effectively.

“Moriba is leading the way in one of the most important areas of space exploration — navigation in the increasingly crowded space above the earth and the prevention of more pollution in space,” said Roger Bonnecaze, dean of the Cockrell School. “He is one of a kind, and we are proud to have him in our Texas Engineering community, advancing space environmentalism and tracking orbital debris in new and incredibly impactful ways.” ■

WATCH: TEXAS IN DEPTH:
bit.ly/JahMacArthur

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- FEATURED ALUMNA -

STEPHANIE WILSON'S SKILLS FOR SUCCESS

When it comes to achieving career goals, distinguished alumna Stephanie Wilson (M.S. ASE 1992) is a great example to follow. Wilson, who became a NASA astronaut in 1996, has taken part in three space missions, spending a combined 42 days in space. She currently serves as the deputy chief for all assigned NASA crew and also is eligible for flight assignment to return to the space station, or maybe even to land on the moon.

In her Cockrell School commencement keynote address this spring to the nearly 1,400 Cockrell undergraduates getting their degrees, Wilson highlighted several skills, beyond technical capabilities, that are crucial to becoming a good engineer.

COMMUNICATION:

The ability to communicate well with many different types of stakeholders from a variety of backgrounds is important in all areas of engineering. Wilson learned just how important this skill is while working in space with a dedicated crew of people continuously living there while conducting research in a variety of areas. "If you are a good communicator, that will help you frame the problem in a way that is understandable to your team," Wilson said.

LEADERSHIP AND FOLLOWERSHIP:

Graduates should not only work to develop their leadership style – they should learn to be a follower when the situation demands it as well. "In space flight, in some cases, the leadership role is well established with the commander, and in some cases the leadership role changes by task," Wilson said. "Because of this, as astronauts, we have to be able to seamlessly flow between being a good leader and a good follower."

SELF-CARE AND TEAM-CARE:

A great teammate can anticipate what their colleagues need and get it for them to help solve a problem. "To be able to provide team-care, you have to employ good self-care," Wilson said. "These two things are interdependent and balanced and lay the groundwork for a strong team that works well together."

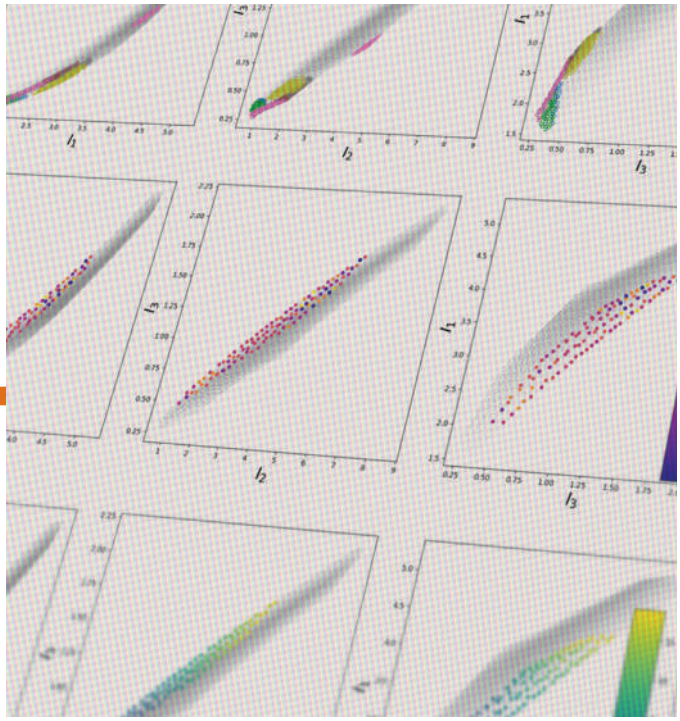
TEAMWORK:

All of these skills combined create the recipe for teamwork, which can lead to successful problem-solving. One such problem Wilson described as an "Apollo 13-like moment" during her second trip to space where she was on a team attempting to move a solar array on the ISS to another location. While unfolding the array, one of the guide wires caused a tear. To fix the problem, the team, comprising specialists in electrical engineering, spacewalking, robotics and mechanical engineering, had to quickly work together on a solution to keep the station from losing power. With just the materials they had on hand, they created "cufflinks" that covered the tear, allowing them to fully reconfigure the solar array and ensure power to the station. "This example highlights teamwork, but also brings together all of the skills that I have mentioned – good communication, self-care, team-care, leadership and followership," Wilson said. "All of those core skills were utilized in bringing forward a successful outcome to the problem."

MEET JAN FUHG

We're pleased to announce that Jan Fuhg will join ASE/EM as an assistant professor in January 2024. Fuhg, who is completing a Ph.D. in mechanical engineering at Cornell University this fall, also holds an M.S. and B.S. in computational engineering from Leibniz University Hannover in Germany. His research group develops theoretical and computational tools for modeling and forecasting the mechanics of materials across different lengths and time scales. To achieve this, Fuhg's work employs and develops advanced machine learning and numerical simulation methods.

Learn more about Fuhg in this Q&A.



Check out a recent article, ***Stress representations for tensor basis neural networks: alternative formulations to Finger-Rivlin-Ericksen***
arxiv.org/abs/2308.11080

WHY IS YOUR RESEARCH ON MATERIALS MEANINGFUL?

Materials are everywhere around us – everything is made of some kind of material. Engineering breakthroughs in the last 200 years or so have involved pushing materials to their limits by constraining them more and more. To do this reliably, we need to understand how these materials work – looking at how they behave if they are loaded, what effect temperature has, etc. This is called material characterization, which is what I do, but within computational simulations.

Material characterization is an important tool for computational mechanics since we need a very accurate understanding of a material's behavior before we can use it in our simulation. Why do we want to develop simulations? We can't build everything, and it can be expensive to build physical models, or sometimes even dangerous (e.g., building a structure with people inside). Developing simulations can be a cost-saving and safer solution. But these simulated approximations must be extremely accurate for them to be considered reliable.

My research aims to develop the tools that allow for a broad range of materials to be characterized quickly and accurately. They can then be applied to a wide variety of materials, such as biomedical equipment, prosthetics, artificial bones and more. One example of where this is useful is in the manufacturing process, such as 3D printing, which has the ability to create a lot of different materials very quickly. The turnover from these new manufacturing techniques is very fast, therefore characterization needs to be quick and accurate. Machine learning can have a big impact here.

WHY DID YOU DECIDE TO JOIN TEXAS ASE/EM?

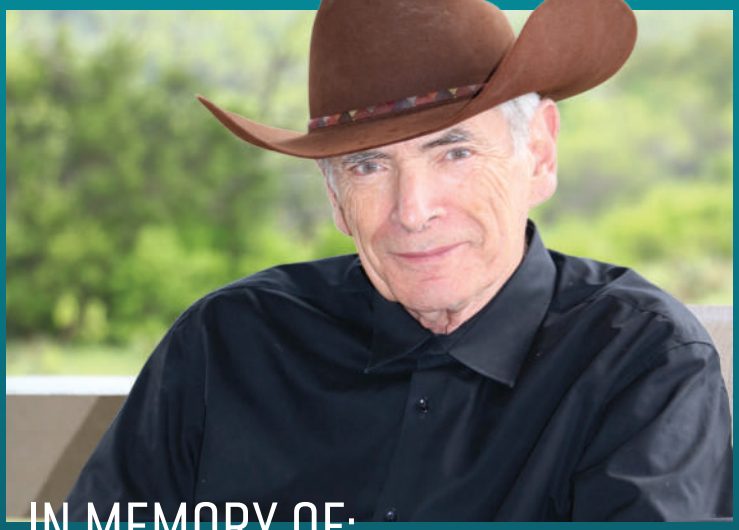
Austin's vibrant culture and the department's well-respected reputation made it an easy decision to apply. I also saw opportunities to collaborate on interdisciplinary work and develop good industry connections. Overall, UT has the full package, including an environment that allows for great potential and research breakthroughs to be possible. I'm excited to be a part of it.

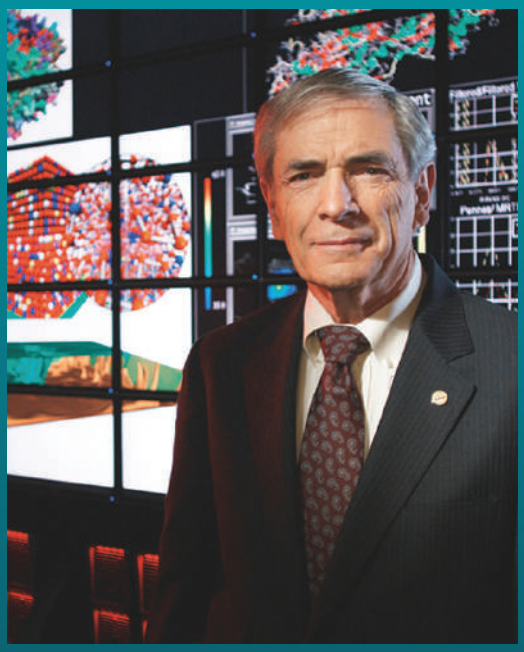
TELL US ABOUT YOUR TEACHING PHILOSOPHY.

I think it's important that students learn to think scientifically about engineering problems. The recent developments of AI could create a turbulent time in education for the next 10-20 years. Students should be capable of transferring their knowledge and skills to different disciplines. I encourage them to be open-minded and allow them to solve problems in many different ways.

WHAT FUTURE DO YOU SEE FOR AI?

It's going to be collaborative, and I think it has huge potential for us to replace the jobs that we don't want to do. But AI cannot acquire new knowledge easily, so that's where we need to come in as researchers, and that's where our students need to be – pushing further than we are now to advance what's possible. ■





IN MEMORY OF:

J. TINSLEY ODEN

J. Tinsley Oden, widely known as the founder of computational mechanics and the first director the Oden Institute for Computational Engineering and Sciences at UT Austin, died on Aug. 27.

His revolutionary treatise, "Finite Elements of Nonlinear Continua," first published in 1972, is cited as having not only demonstrated the great potential of computational methods but established computational mechanics as a new intellectually rich discipline built upon concepts in mathematics, computer sciences, physics and mechanics.

Shortly after the book's publication, Oden arrived at UT Austin in 1972 on a sabbatical as a visiting professor. In 1973, he was hired as a professor and started the Texas Institute for Computational Mechanics, the first manifestation of what was to ultimately become the world-renowned Oden Institute. Oden served as a faculty member in the Department of Aerospace Engineering and Engineering Mechanics (ASE/EM) for half a century, and during his time as the Institute Director, was the Associate Vice President for Research. He held the Cockrell Family Regents' Chair in Engineering #2 and was also a professor of mathematics and computer science. His research focused on topics in computational engineering and mathematics, including spectral el-

ements, foundations of mathematical theory of finite elements, dual-complementary variational principles, finite elastic deformation, shell theories, among many others.

"There are no words that can express the loss of our founding father," said Karen Willcox, director of the Oden Institute. "Tinsley had an immeasurable positive impact on our academic field, on UT Austin, on the state of Texas, and on each one of us as individuals. He was a visionary and an intellectual genius, and he was one of the kindest and most humble men I have ever known. We will miss him more than he could imagine."

A prolific writer and researcher, Oden was author or editor of more than 800 scientific works including 57 books. He educated and advised more than 45 doctoral students and dozens of post-doctoral researchers. He was a member of the U.S. National Academy of Engineering and a Fellow of The American Academy of Arts and Sciences. He served on a multitude of organizational, scientific and advisory committees, and was a founding member of the U.S. Association for Computational Mechanics and the International Association of Computational Mechanics.

Oden held seven doctorates (six Doctor Honoris Causa) and received numerous awards, including the SIAM Distinguished Service Award, the SIAM Prize in Computational Science and Engineering, the John von Neumann Award, the Newton-Gauss Congress Medal, the Stephen P. Timoshenko Medal and the O.C. Zienkiewicz Medal. In 2012 the USACM established the J. Tinsley Oden Medal. He was also inducted an honorary member of the ASE/EM Academy of Distinguished Alumni in 2020.

"In the future, there will be applications in areas we can't even dream about. This won't be solved without computational sciences and modeling. That's an example of what faculty and future students at the institute will be involved with — training the next generation."

– J. Tinsley Oden

In 2017, he stepped down as Institute Director, and in 2019, The University of Texas System Board of Regents voted to rename the Institute after him.

"Prof. Tinsley Oden was a pillar of the ASE/EM Department, the Oden Institute and UT Austin. His contributions to our department in teaching, research and service are monumental. He was the academic father and mentor to hundreds of students, postdocs and faculty. In addition, Tinsley was a true gentleman," said Clint Dawson, professor and chair of the ASE/EM Department. Shortly after his death, Oden was named the Cockrell Family Regents Chair Emeritus in Engineering #2.

Oden is survived by his wife of 58 years, Barbara, his two children, daughter Lee and son Walker, one grandchild and extended family. ■

READ THE FULL STORY:
bit.ly/JTinsleyOden

2023-24 FACULTY
PROMOTIONS

Congratulations to four Texas ASE/EM faculty members who received promotions this year!

Ufuk Topcu was promoted to full professor. **Brandon Jones**, **Manuel Rausch** and **Renato Zanetti** were promoted to associate professor. ■

FOLLOW US ON LINKEDIN

SPONSOR SENIOR CAPSTONE DESIGN

In ASE/COE Senior Capstone Design, students work on teams to develop realistic system concepts and present proposed system capabilities to meet industry objectives/ requirements in the areas of aircraft design, spacecraft/mission design and computational engineering. Sponsoring these projects provides the opportunity to mentor and build relationships with students, help off-set project costs, and gain new insights from students as they prepare for their engineering careers.

CONTACT

Carolyn Brunson at carolyn.brunson@utexas.edu for more information.

A 'WIN-WIN':

ASE SENIORS TACKLE NASA DESIGN CHALLENGES

TEAM THUNDERCATS

Project: Visibility Prediction of Foggy Environments Using Sensor Fusion and Deep Neural Networks

Team Members: Andy Hsu, Sriram Bommakanti, Benjamin Dunbar, Andy Pottinger

Team Advisors: Adam Nokes, Lori Magruder, Jeffrey Perry

THE CHALLENGE

To develop machine learning (ML) for big sensor data sets for aerospace applications where clear visibility is an issue, such as self-driving cars driving through fog, airplanes flying through fog, Earth observing satellites obstructed by clouds, etc.

Students used data from Sandia National Lab's artificial fog chamber where NASA Glenn scientists are working on the project, to develop their algorithms. Five measurement instruments are placed in the chamber, which is about as long as a bowling lane, and the room is filled with fog until it dissipates. Sensors include visible and infrared cameras, a LiDar camera, transmissometer and a laser diffraction instrument to quantify the intensity of the fog. Students also worked with ASE/EM associate professor and LiDar expert, Lori Magruder. Using this combined data from the experiment, students designed a neural network to quantify the intensity of the fog. The network will provide a more accurate method of calculating visibility, to enhance sensor data fusion in cloudy and foggy weather.

TEAM PERSPECTIVE

We chose this challenge not because it was easy, but because it was hard. Major hurdles were understanding the technical aspects, such as machine learning and signal processing.

WATCH THE FULL VIDEO OF TEAM THUNDERCAT'S EXPERIENCE:
youtu.be/K51MFmOgo4w

Two teams of aerospace engineering seniors made history this year by winning two NASA design competitions. Both teams participated in the annual NASA Glenn Research Center University Student Design Challenge, which invites undergraduate students to become involved in research and technology development. Each year, the center presents several aeronautic- and space-themed projects that encourage students to develop unique solutions to specific NASA mission problems. The winning teams traveled to NASA Glenn this summer to tour facilities and present their projects to Center Director Dr. James A. Kenyon. Learn more about the two winning teams and their solutions to the challenges they selected:

TEAM
NUCLEAR ELECTRIC CLOSED SYSTEM ENGINE (NECSE)

Project: Closed Brayton Generator Cycle for the Lunar Surface

Team Members: Asher C. Cura-Portillo, Conner D. Douthit, Robin E. Hormann, Russ Z. Lambert, Stephanie N. Gonzalez

Team Advisors: Adam Nokes, Raghav Mahalingam, Tim Allison

THE CHALLENGE

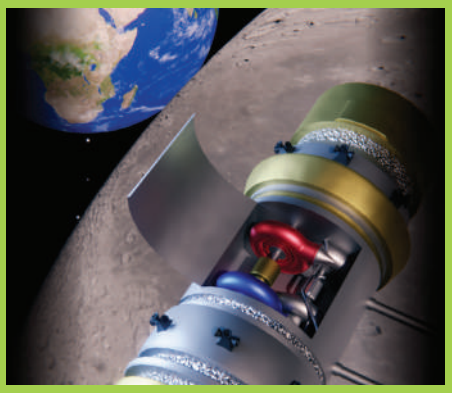
To design a greater than 50% efficient, and greater than 6 kw/kg specific power nuclear electric propulsion system, leveraging NASA technology.

The NECSE team developed a nuclear-thermal-powered electric propulsion system for space vehicles to allow for longer periods of travel – months to possibly even years – which could help advance space exploration. This type of efficient high-power energy could aid in establishing a long-term presence on the Moon, traveling to deep space, and even getting humans to Mars. Students designed the entire system, which includes several subsystems: a turbo alternator compressor, hot side heat exchanger, heat rejection heat exchanger, auxiliary cooler, recuperator, controller and power processing unit.

TEAM PERSPECTIVE

Our goal was to design a feasible power operations system that uses recent technological developments to maximize efficiency of the cycle. This required diving into component design and optimizing each subsystem.

WATCH THE TEAM'S VIDEO TO LEARN ABOUT EACH OF THESE SUBSYSTEMS:
youtu.be/D_vCM4Pvhto



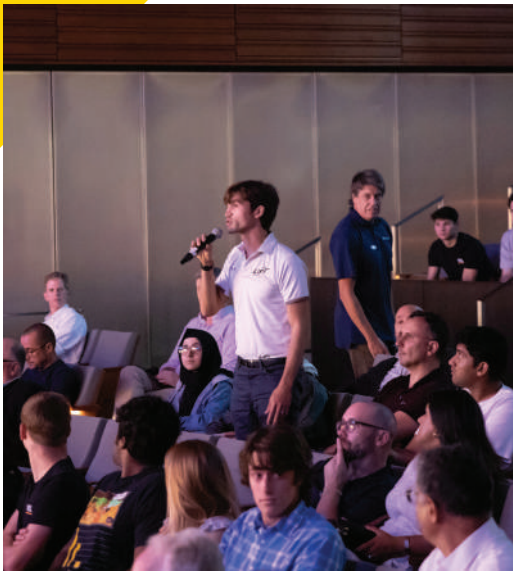
Two UT Austin spacecraft design teams took first and second place in the new annual SmallSat Alliance Collegiate Space Competition:
bit.ly/SmSat23

> "MY GOAL WHEN ADVISING THESE PROJECTS IS TO PRESENT OPPORTUNITIES TO STUDENTS THAT ARE RELEVANT TO CAREERS IN INDUSTRY, ACADEMIA AND GOVERNMENT IN WAYS THAT EXCITE BOTH THE STUDENTS AND THE PEOPLE ACROSS THE TABLE FROM THEM IN A JOB INTERVIEW."

– Adam Nokes, ASE/EM Lecturer, Senior Capstone Spacecraft Mission/ Design

LAUNCH TEXAS

NEW PROGRAM UNVEILED AT SPACE EVENT



On Nov. 4, 2022, the Cockrell School of Engineering, Department of Aerospace Engineering and Engineering Mechanics and Texas Innovation Center officially kicked off our new space tech entrepreneurial program, Launch Texas. Hundreds of students, faculty, alumni and members of the space tech industry came together in Mulva Auditorium in the Engineering Education and Research Center for the Go For Launch event, which featured alumnus and CEO of Blue Origin Bob Smith, a panel of experts on the future of the space economy and presentations by student founders of space tech startups.

Smith (Ph.D. ASE 1991) participated in a conversation with Kathleen McElroy, a professor in UT's School of Journalism and Media, answering questions that ranged from the realistic nature of sci-fi movies to books he is currently reading to the future of the space economy. Smith also took questions from the audience and then visited with aerospace engineering student groups afterward.

Smith's conversation was followed by a special panel on space innovation and technology in the new space era moderated by alumnus Matt Chasen (B.S. ME 1998, MBA 2004), founder and CEO of LIFT Aircraft. Panelists included Phnam Bagley, founding partner of Nonfiction and a futurist/aerospace architect; alumnus Payam Banazadeh (B.S. ASE 2012), founder and CEO of Capella Space; Todd Humphreys, ASE/EM professor; and Meagan Murphy Crawford, co-founder and venture partner at SpaceFund.

The panelists weighed in on the past and current ecosystem built around space, the fundamental space research areas and what's exciting about those, where investments in space tech could be made and what life will look like in the future with this new space economy.

The final portion of the program featured two UT startup pitches by student business founders who received inaugural Launch Texas funding to support their ventures:

Alex Nettekoven, a Ph.D. student in the Walker Department of Mechanical Engineering and founder of Multi AI, a company which provides the next step in autonomy for drones, aircraft and vehicles through its cloud-based mission planning AI.

Hailey Nichols, who received her master's degree in aerospace engineering at UT Austin and is founder of Locus Lock, which provides a robust software-defined radio to the market, giving end users precise heading and positioning that can be used for positioning, navigation and timing.

Both student founders were presented with inaugural Launch Texas Commercialization Fellow Awards.

The event closed with a reception and student project showcase that included the Texas Rocket Engineering Lab, Texas Aerial Robotics, Longhorn Rocketry and more. ■

LAUNCH TEXAS SPEAKER SERIES

We were honored to welcome two speakers this year to kick off our Launch Texas Speaker Series:

Playing with Fire: The Promise and Peril of New Space - Tom Markusic, founder of Firefly Aerospace, discussed New Space, entrepreneurship and his vision for the future. *Watch: bit.ly/LT-Markusic*

It Takes Grit! - Jana Rebmann (B.S. ASE 1988), president of Odyssey Space Research, discussed what it takes to start and run a business. "You can't be afraid to dig deep, take risks, see the silver lining where others don't and wear as many hats as needed (*even the ugly ones*)."

GET INVOLVED

Launch Texas is just getting started. Building a space ecosystem takes time and investment. And we are calling on our community to get involved, whether that's through gifts or volunteering to speak about your own experiences of entrepreneurship. For more information, **contact Maggie Scott** at margaret.scott@austin.utexas.edu.

The newest cohort of Launch Texas includes 11 aerospace engineering graduate students. Launch Texas is also looking for undergraduate seniors who want to participate. **For more information, visit ae.utexas.edu/launch-texas**.

WATCH

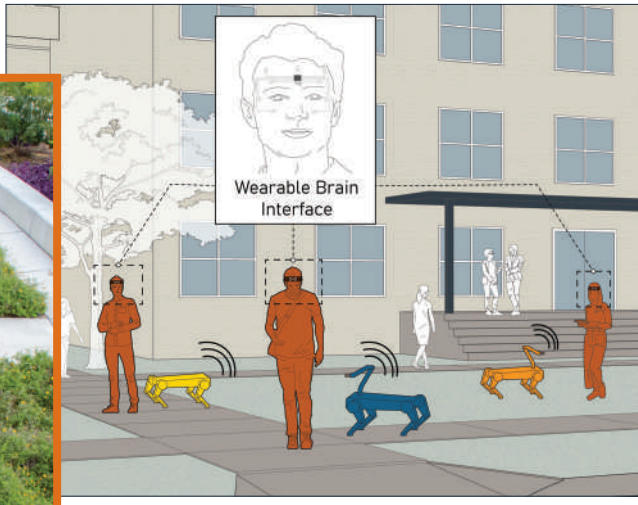
Launch Texas: Education, Exploration & Enterprise
bit.ly/LaunchTX


THE SKY
IS NOT THE
LIMIT

WHERE ROBOTS & LONGHORNS COLLIDE

It's a hot, summer morning on the Forty Acres and students are gathered in a tight circle near the UT Tower, petting and taking selfies with a dog that is more than eager to preen and dance for them, with more passersby joining by the minute.

This isn't your ordinary dog, however. It's bright yellow, remote-controlled, and has been the subject of global fascination for several years now. This dog's name is Spot, and it is a robot developed by Boston Dynamics that is part of an unprecedented research project happening now on the UT Austin campus.



MOCKUP REMOTE "OBSERVATORY"
Researchers will watch robot-human interactions through the eyes of the robots using a modified VR headset. The device will also measure the stress levels of the people observing the robots.

Earlier this year, an interdisciplinary research team kicked off a five-year project to create, operate and maintain a robot delivery network on campus. Underneath this goal is an even loftier aim: to develop the most extensive study to date about human-robot encounters in public spaces. Over time, researchers will learn how state-of-the-art, autonomous robotic fleets and real-world communities can best co-exist.

"Robotic systems are becoming more ubiquitous," said ASE/EM professor Luis Sentis who is leading the project. "In addition to programming robots to perform a realistic task such as delivering supplies, we will be able to gather observations to help develop standards for safety, communication and behavior to allow these future systems to be useful and safe in our community."

When the network is up and running, members of the UT Austin community will be able to order free supplies such as wipes and hand sanitizer via a smartphone app. The robots will deliver them to certain pedestrian zones on campus, door-to-door.

As the project progresses, don't be surprised to see more and more of these robots roaming campus, sometimes by themselves with remote monitoring and sometimes with human chaperones. If something goes wrong, the researchers can quickly shut the robots down.

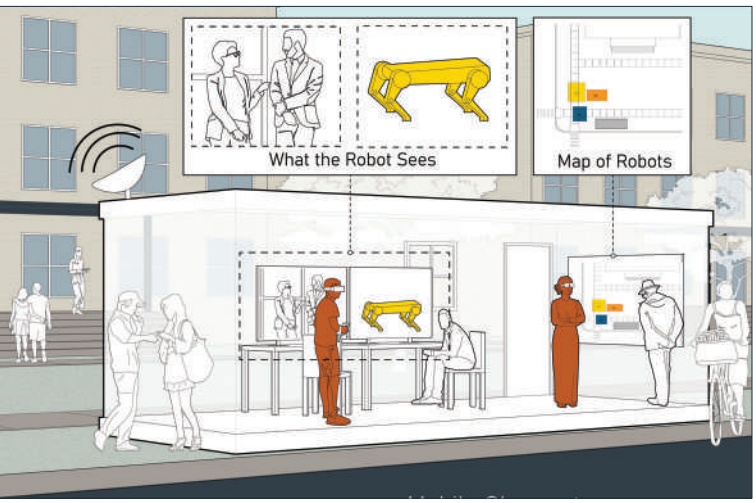
How do humans expect robots to behave in public? What actions do they find endearing, and which ones are off-putting or stress-inducing? Researchers will look out for all of these responses, while making sure the robots can complete their tasks.

ASE/EM professor Nanshu Lu's group has designed wearable brain sensors that will be worn by the people either traveling with robots or in a remote "observatory." They will be able to look through the eyes of the robot, and the device will also measure the mental load of this observation for long periods of time.

The researchers expect to gain insights from observing and interviewing people who encounter the robots in a variety of contexts. Importantly, the team knows reactions will vary widely and wants to develop tools for understanding the full range of experiences encountering robots on campus can produce. This work could help designers figure out how future public-facing robots should be designed to co-exist within diverse communities like UT Austin's, as well as how and where they should move.

This fall the first 'robot encounters' study will begin in the Texas Robotics laboratory located at UT's Anna Hiss Gym. Ryan Gupta, a Ph.D. student studying aerospace engineering, will be working on the project.

> "THE ROBOTS WILL MOVE AUTONOMOUSLY WITH VARIED BEHAVIOR IN ORDER TO GENERATE VARYING STRESS RESPONSES IN THE PARTICIPANTS. THESE BEHAVIORS INCLUDE SIMPLE NAVIGATION LIKE MOVING THROUGH THE SPACE AND LIDAR MAPPING AND EXPLORATION, AS WELL AS SEARCHING BEHAVIORS LIKE VISUAL MAPPING AND SEARCHING FOR OBJECTS OR PEOPLE."
>
> **– Ryan Gupta, an aerospace engineering Ph.D. student**



Gupta's work will focus on identifying which robot actions human participants find stressful. The next phase involves bringing in more participants and focusing on the identified stress-inducing behaviors to understand their impact on human comfort levels in shared indoor environments.

"I think right now the question is whether or not we can strongly correlate the human participant stress response with the robot teaming behavior," said Gupta.

The interdisciplinary research team encompasses members of more than a quarter of the 19 schools and colleges at The University of Texas at Austin. Members on the team study human-AI partnerships through the Good Systems research grand challenge. This new project is supported by a $3.6 million grant from the National Science Foundation, which expands work on their six-year project Living and Working with Robots, which kicked off in September 2021. ■

HAVE 2MIN 34SECONDS?

Watch the CBS News story on the new robot delivery network coming to campus:

bit.ly/Humans-Robots

THE RESEARCH TEAM

Luis Sentis, an ASE/EM professor in the Cockrell School of Engineering, is leading the project.

Nanshu Lu, an ASE/EM professor in the Cockrell School of Engineering, has designed brain sensors that will be worn by the people either traveling with robots or in a remote "observatory" to look through the eyes of the robot and measure the mental load of this observation for long periods of time.

Elliott Hauser, an assistant professor in the School of Information, will lead the development of a shared research database that will collect and relate the many types of data the team and its robots will generate.

Justin Hart, an assistant professor of practice with the College of Natural Sciences, is leading human-robot interactions in the community.

Keri Stephens, a professor in the Moody College of Communication, is leading the team's effort to integrate their different interdisciplinary approaches into their overall research outcomes.

Joydeep Biswas, an assistant professor of computer science in the College of Natural Sciences, is leading robot navigation in social environments.

Junfeng Jiao , an associate professor in the College of Liberal Arts, will research how urban informatics and smart cities research can inform deploying robots in social environments.

Samantha Shorey, an assistant professor of communication studies in the Moody College of Communication, is leading the group's work on ethnographic studies of the community and the research team itself.

YOUR BRAIN ON VR

MODIFIED HEADSET MEASURES BRAIN ACTVITY

A research team led by ASE/EM professor Nanshu Lu has modified a commercial virtual reality headset, giving it the ability measure brain activity and examine how we react to hints, stressors, and other outside forces. The research was published recently in Soft Science. The researchers created a noninvasive electroencephalogram (EEG) sensor that they installed in a Meta VR headset. The EEG measures the brain's electrical activity during the immersive VR interactions.

The technology will be used in the new robot delivery network taking place on the Forty Acres – the largest study to date on human-robot interactions, and will give humans the chance to see through the eyes of the robot. The VR headsets will be used by people either traveling with robots or in a remote "observatory." They will be able to watch along from the robot's perspective, and the device will also measure the mental load of this observation for long periods of time.

"If you can see through the eyes of the robot, it paints a clearer picture of how people are reacting to it and how operators can monitor their safety in case of potential accidents," said ASE/EM professor Luis Sentis who is leading the robot delivery project and is a co-author on the VR EEG paper.

The device could be used in many other ways as well, including helping people with anxiety and measuring the attention or mental stress of aviators using a flight simulator.

> "VIRTUAL REALITY IS SO MUCH MORE IMMERSIVE THAN JUST DOING SOMETHING ON A BIG SCREEN. IT GIVES THE USER A MORE REALISTIC EXPERIENCE, AND OUR TECHNOLOGY ENABLES US TO GET BETTER MEASUREMENTS OF HOW THE BRAIN IS REACTING TO THAT ENVIRONMENT."
>
> **– Nanshu Lu, professor of aerospace engnieering and engineering mechanics**

VR MODIFIED
Hongbian Li, a research associate in professor Nanshu Lu's lab, demonstrates the team's modified VR device.

The pairing of VR and EEG sensors has made its way into the commercial sphere already. However, the devices that exist today are costly, and the researchers say their electrodes are more comfortable for the user, extending the potential wearing time and opening up additional applications.

The best EEG devices today consist of a cap covered in electrodes, but that does not work well with the VR headset. And individual electrodes struggle to get a strong reading because our hair blocks them from connecting with the scalp. The most popular electrodes are rigid and comb-shaped, inserting through the hairs to connect with the skin, an uncomfortable experience for the user.

"All of these mainstream options have significant flaws that we tried to overcome with our system," said Hongbian Li, a research associate in Lu's lab.

For this project, the researchers created a spongy electrode made of soft, conductive materials that overcome those issues, an effort led by Li. The modified headset features electrodes across the top strap and forehead pad, a flexible circuit with conductive traces similar to Lu's electronic tattoos, and an EEG recording device attached to the back of the headset.

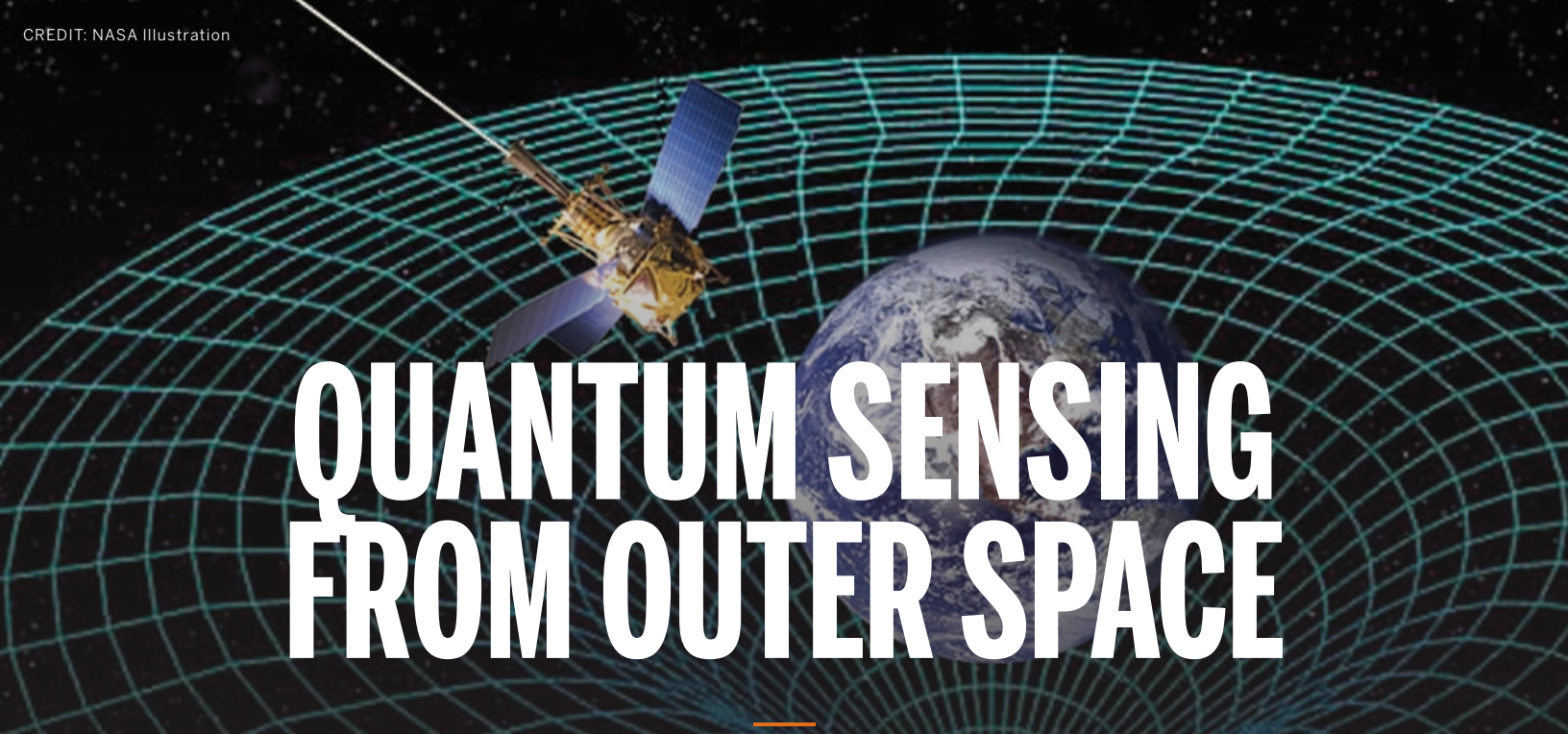
To test the viability of the VR EEG headset, the researchers created a game. They worked with José del R. Millán, a faculty member in the Chandra Family Department of Electrical and Computer Engineering and the Dell Medical School and an expert in brain-machine interfaces, to develop a driving simulation that has the user press a button to react to turn commands.

The EEG measures the brain activity of the users as they make driving decisions. In this case, it shows how closely the subjects are paying attention.

The researchers have filed preliminary patent paperwork for the EEG, and they're open to partner with VR companies to create a built-in version of the technology.

Other members of the research team include Hyonyoung Shin, Minsu Zhang, Nicholas Riveira and Susmita Gangopadahyay of the Chandra Family Dept. of Electrical and Computer Engineering; Andrew Yu, Heeyong Huh, Zhengjie Li, and Yifan Rao from the Dept. of Aerospace Engineering and Engineering Mechanics; Sangjun Kim from the Walker Dept. of Mechanical Engineering, Jessie Peng of the Dept. of Biomedical Engineering; and Gubeum Kwon of Artue Associates Inc. in South Korea. This work was funded by the U.S. Army Research Office, National Science Foundation and Army Research Laboratory. ■

THE BEST EEG DEVICES TODAY CONSIST OF A CAP COVERED IN ELECTRODES, BUT THAT DOES NOT WORK WELL WITH THE VR HEADSET. AND INDIVIDUAL ELECTRODES STRUGGLE TO GET A STRONG READING BECAUSE OUR HAIR BLOCKS THEM FROM CONNECTING WITH THE SCALP. THE MOST POPULAR ELECTRODES ARE RIGID AND COMB-SHAPED, INSERTING THROUGH THE HAIRS TO CONNECT WITH THE SKIN, AN UNCOMFORTABLE EXPERIENCE FOR THE USER.



CREDIT: NASA Illustration

QUANTUM SENSING FROM OUTER SPACE

Texas ASE/EM is leading a multi-university research team that will build technology and tools to improve measurement of important climate factors by observing atoms in outer space.

Researchers will focus on the concept of quantum sensing, which uses quantum physics principles to potentially collect more precise data and enable unprecedented science measurements. These sensors could help satellites in orbit collect data about how atoms react to small changes in their environment, and use that to infer the time-variations in the gravity field of the Earth. This will enable scientists to improve how accurately several important climate processes can be measured, such as sea level rise, ice melt rates, changes in land-water resources and ocean heat storage changes.

This will be the first effort to establish a new phase in quantum technology development, advancing beyond the quantum principles known in physics and actually translating them into usable device concepts.

“There have been tremendous advances in quantum methods recently, mostly in the context of computing,” said ASE/EM professor Srinivas Bettadpur, leader of the new project. “We want to use quantum sensing technology in space – where you can watch the entirety of the planet – to solve next-generation problems by observing, interpreting and understanding climate processes.”

The new Quantum Pathways Institute will receive up to $15 million in funding from NASA’s Space Technology Mission Directorate over five years and includes researchers from UT Austin, University of Colorado Boulder, University of California Santa Barbara, California Institute of Technology and the U.S. National Institute for Standards and Technology.

Researchers will specifically look at changes in gravitational forces and what that means for climate. As climate shifts – with ice caps melting and sea levels and temperatures changing – that changes gravitational forces around the earth and in outer space. Atoms orbiting the earth react to those gravitational changes. By measuring those reactions, the researchers can give better readings of changes in climate processes.

To build this technology from the ground up and make it space ready requires a large and diverse team of researchers. Bettadpur is an expert in orbital mechanics, gravity fields and space mission design.

ASE/EM professor Ufuk Topcu will apply his expertise in modeling complex systems to develop models for quantum sensing systems that can be used to improve their reliability and autonomous operation – both of which are key for space applications where device maintenance is not an option. Seth Bank and Dan Wasserman, professors in the Chandra Family Department of Electrical and Computer Engineering at UT Austin, will work with Daniel Blumenthal from UC Santa Barbara to develop the photonic, or light-based, integrated circuits for compact chips to measure small variations in Earth’s gravity from space. ■

A CLOSER LOOK AT TEXAS ASE/EM

DEPARTMENT OF AEROSPACE ENGINEERING
AND ENGINEERING MECHANICS

RANKINGS

#8
Aerospace Engineering
Graduate Program
U.S. News and World Report

&

#9
Aerospace Engineering
Undergraduate Program
U.S. News and World Report

STUDENTS

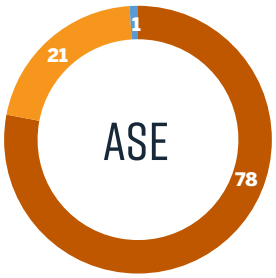
UNDERGRADUATE

ENROLLMENT	**626**
Aerospace Engineering (ASE)	517
Computational Engineering (COE)	109
UNDERREPRESENTED POPULATIONS	
Aerospace Engineering	37%
Computational Engineering	29%
WOMEN	
Aerospace Engineering	23%
Computational Engineering	34%
DEGREES AWARDED 2022-2023	
Aerospace Engineering Bachelor's	133
Computational Engineering Bachelor's	32

AFTER GRADUATION

ASE

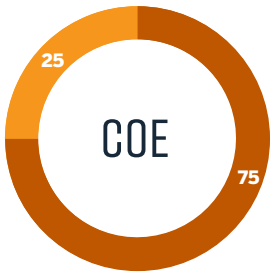
$77,900	**average starting salary**
78%	employed
21%	graduate school
1%	unknown



Top Employers: Applied Research Laboratories, Blue Origin, Boeing, Firefly Aerospace KBR, L3Harris, Lockheed Martin, NASA, Northrop Grumman, Raytheon, SpaceX, Tesla

COE

$100,600	**average starting salary**
75%	employed
25%	graduate school



Top Employers: Akuna Capital, AVEVA, Axiom Space, Charles Schwab, Cisco, ConocoPhillips, ExxonMobil, JP Morgan Chase, Southwest Research Institute, Texas Advanced Computing Center

A CLOSER LOOK AT ASE/EM

STUDENTS CONT.

GRADUATE

ENROLLMENT	204
Aerospace Engineering	180
Engineering Mechanics	24
Average GPA of admitted students	3.59
Ph.D. students receive full funding	96%
Women	16%
International	38%

DEGREES AWARDED 2022-2023
**ASE, EM & CSEM programs*

Master's	61
Doctoral	16

ALUMNI

6,094
alumni around the world

64
members of the ASE/EM Academy of Distinguished Alumni

OUR GRADUATES ARE LEADERS IN:

- **research**
- **government**
- **industry**
- **academia**
- **military**
- **and more**

LEARN HOW OUR ALUMNI ARE CHANGING THE WORLD:
ae.utexas.edu/alumni/profiles

HOME TO
6 *Astronauts* & THE **1ST** *Female Fighter Pilot*

FACULTY

TENURE/TENURE-TRACK FACULTY 38

HONORS & DISTINCTIONS

1	**Fellow, *MacArthur***
1	**Recipient, *Presidential Early Career award for Scientists and Engineers***
1	**Member, *National Academy of Sciences***
4	**Members, *National Academy of Engineering***
9	**Recipients, *National Science Foundation CAREER Award***
6	Fellows, *American Society of Mechanical Engineers*
6	Fellows, *American Institute of Aeronautics and Astronautics*
4	Winners, *AFOSR Young Investigator Program Award*
3	Fellows, *Society for Industrial and Applied Mathematics*
3	Fellows, *American Academy of Mechanics*
3	Fellows, *American Astronautical Society*
2	Recipients, *Office of Naval Research Young Investigator Program Award*
1	Recipient, *American Heart Association Career Development Award*
1	Recipient, *DARPA Young Faculty Award*

FEATURED AWARDS & RECOGNITION

Krishnaswamy Ravi-Chandar received the Takeo Yokobori Gold Medal from the International Congress on Fracture "for major contributions in the leadership of ICF and outstanding research in the field of fracture."

The Mary F. Wheeler Medal was established by the U.S. Association for Computational Mechanics in honor of Wheeler's sustained contributions to interdisciplinary and emerging areas including earth, environmental and energy science.

Karen Willcox received the J. Tinsley Oden Medal and was selected a fellow of the U.S. Association for Computational Mechanics.

Chad Landis was named a fellow of the Society of Engineering Science for his contributions to the SES and the technical community.

Nanshu Lu was elected a fellow of the American Society of Mechanical Engineers for "inventing wearable e-tattoos for biometric sensing and soft e-skins for soft robots to gain human-like sensations."

Moriba Jah and **Karen Willcox** were named to the U.S. Air Force Scientific Advisory Board, one of the most influential Federal Advisory Committees in science and technology.

VIEW MORE FACULTY AWARDS:
bit.ly/awards-honors

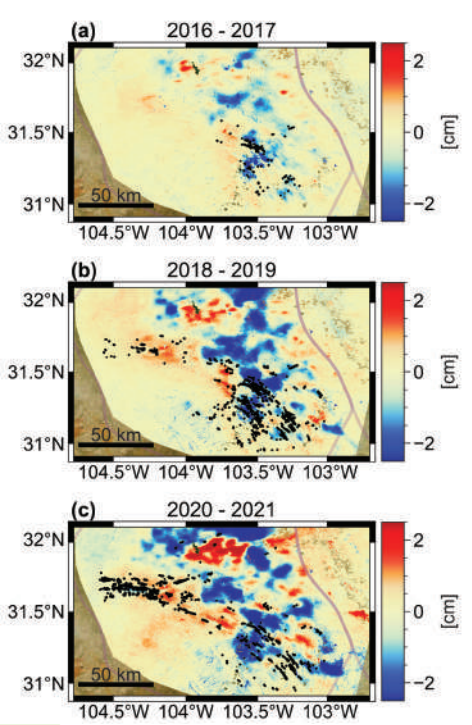
RESEARCH ON THE RISE

RESEARCH AREAS

- **Aerothermodynamics and Fluid Mechanics**
- **Computational Engineering**
- **Controls, Autonomy and Robotics**
- **Orbital Mechanics**
- **Solids, Structures and Materials**

$22.4MIL
in research expenditures

RESEARCH HIGHLIGHTS



Chen

Ann Chen is leading research that uses **spaceborne Interferometric Synthetic Aperture Radar (InSAR) data to detect surface deformation signals** associated with oil and gas production, high-rate wastewater injection and induced seismic events in West Texas. These measurements can be used to constrain subsurface hydrologic models and quantify the connections between injection-related stress perturbation and induced seismicity.

Akella

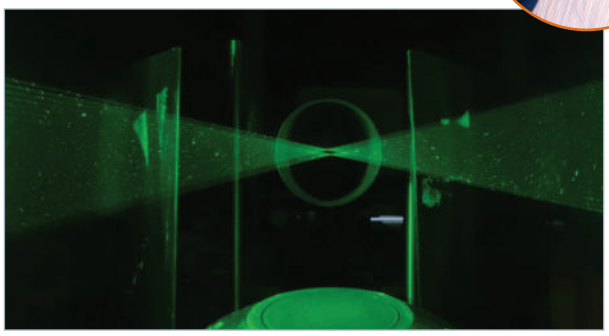
Maruthi Akella is collaborating on a **$4.5M grant funded by the Air Force Office of Scientific Research** that will focus on a set of foundational mathematical and computational developments to **enhance the autonomous navigation capabilities for successful operation in the cislunar space**.

Leszek Demkowicz is collaborating on a **$1.2M National Science Foundation grant** with the University of South Carolina that focuses on development of new tools for quantitative accuracy estimation to **broaden the applicability of Deep Neural Networks** and related simulation tools from error-tolerant applications (like social media and speech) to error-averse ones (predictive science).

Rui Huang and **Ken Liechti** are collaborating on research funded by the National Science Foundation to develop theoretical and computational models and experimental methods **to advance the fundamental understanding on the mechanics of multilayered van der Waals materials and heterostructures**. Such materials and structures have promising applications as novel detectors, sensors and quantum emitters.

Philip Varghese is leading research that will study the effect of **high pressure on Raman spectra of important fuel species** for applications in detonation engines and work with the **Naval Research Laboratory** to apply Raman spectroscopy to a shock ignition experiment in their facility.■

Varghese



VIEW A RECENT RESEARCH GRANT LISTINGS AT
bit.ly/ASE-EMGrants

TREL 2.0

TEXAS ENGINEERING ROCKET LAB'S FIRST HOTFIRE OF THE TXE-2 ENGINE

On May 9, TREL conducted a hotfire test of their TXE-2 engine, a 3D-printed copper-alloy rocket engine designed by students. The hotfire test – the first for this engine – was conducted by TREL's engine test team at Firefly's test facility in Briggs, Texas. Although it was aborted in order to prevent the injector from burning out and to keep the mixture ratio within a desired range, students say this test was a successful opportunity for students to learn and understand how to better prepare for future testing.

None of this work would have been possible without the support of TREL's sponsors and mentors. A special thank you goes to Firefly Aerospace, EOS, Elementum 3D and NI for supporting these students in their endeavors. With this monumental milestone accomplished, TREL says progress is headed in the right direction to launch Halcyon to space next year.

WATCH THE HOTFIRE

bit.ly/TRELHotfire

STUDENT AWARDS & RECOGNITION

Students Win Prestigious Fellowships and Awards

UNDERGRADUATE STUDENTS

Urvi Alamela (ASE) received a **2023 Brooke Owens Fellowship**, which was created to inspire students pursuing careers in the aerospace industry to recognize "exceptional undergraduate women and other gender minorities with space and aviation internships, senior mentorship, and a lifelong professional network." Alamela interned at Blue Origin.

Taj Lee (ASE) received a **2023 Patti Grace Smith Fellowship** that aims to help bring diversity to the U.S. aerospace industry and offers a paid internship at a leading aerospace engineering firm, mentorship and a cash award.

Katie Mulry and **Catherine Dominic** (ASE Class of 2023) are recipients of the **2023 Matthew Isakowitz Fellowship** which provides an internship, mentorship, networking and extraordinary summer opportunities to college and graduate students passionate about

commercial spaceflight. Mulry interned at Ursa Major and Dominic interned at Relativity Space.

Serena Shah (COE, far right) was on a team that took second place in the Research Lab category for the Undergraduate Studies Writing Flag Award for their paper titled, "Nordhavn: Copenhagen's Most Sustainable Modern Housing Development," which was written for D'arcy Randall's engineering communications Maymester course held in Copenhagen.

GRADUATE STUDENTS

Lauren Kendall (ASE Ph.D. student) is the recipient of a **National Science Foundation Graduate Research Fellowship Program Award**. Kendall's research focuses on utilizing Interferometric Synthetic Aperture Radar (InSAR), a rapidly evolving technique for mapping ground deformation from space, to study earthquake cycles in the Solomon Islands and Papua New Guinea region.

Brandon Clarke (EM Ph.D. student) won two awards from the Adhesion Society this year for his

presentation titled "Characterizing the Adhesive Behavior of Polymeric Photo-Switchable Adhesives": 1) The Peebles award which supported his presentation; 2) The Alan Gent first place award after he presented his work at the society's annual meeting.

Siddarth Kaki (ASE Ph.D. student) won the 2023 Breakwell Student Paper Award for his paper titled, "Kinematic Batch Filter Formulation for Angular Velocity Estimation with Covariance Bounds."

Jacob Levy and **Zee McLaughlin** (both ASE Ph.D. students) are recipients of the **NASA Space Technology Graduate Research Opportunities Fellowship** which selects highly-qualified recipients who have demonstrated their capability to create innovative new space technologies for the nation's science, exploration and economic future. Levy's research focuses on developing reinforcement learning techniques to enable efficient training of robotic systems operating in uncertain and hazardous environments. McLaughlin's work seeks to aid the orbit determination, navigation, and long-term orbital rendezvous of objects in cislunar space by offering an alternative algorithm to estimate the objects' states more consistently. ■

BLAST **FROM THE PAST**

ALUMNI GET-TOGETHER (FALL 2023)
A group of ASE/EM alumni from the classes of 1991 and 1992 reunited to reminisce about their time together at The University of Texas. The weekend included social events as well as a tour of the new ASE, EER, GLT and AHG buildings and renovations. It was great to see how the ASE/EM department and the Cockrell School of Engineering are evolving to meet the changing needs of students and industry. ***Hook 'em!***

Pictured from L to R: Neil Erian, Brian Radovich, Trang Le, Todd Colangelo (via Zoom), George Gafka, Eric Leaseburg, Tammy Long, Rudi Chakrabarty, Juan Padron, Rolando Nanez, Jon Graf, Dean Melendrez, Medha Date, Dan Rich, Kathy Davis, TJ Hinkel, Manny Duarte, Scott Messec. Not pictured: Clara Enriquez, Jim Ruhnke, Lee Wiesehuegel

RHEA BHAT, B.S. COE 2022, is a software engineer for Dell Technologies in Austin, TX.

STEFANO BONILLA, B.S. ASE 2023, is a structure engineer for spacecraft at Firefly Aerospace in Cedar Park, TX.

KELIN CHEN, PH.D. EM 2019, an associate professor of mechanical engineering at Dalian University of Technology, in China.

GREG HOLT, B.S. ASE 2000, M.S. ASE 2002, PH.D. ASE 2006, is leading the navigation for NASA's Orion Flight to the Moon. Read the Q&A to learn more about his experience preparing for the Artemis I flight. ***bit.ly/Orion-Nav***

GARY GENE TALLEY, B.S. ASE 1972, is the executive vice president for Terradyne Group, LLC, a leader in providing erosion control and creek stabilization services to the Texas construction industry protecting USA waterways.

ISABELA GUERRERO, B.S. COE 2023, is a cybersecurity analyst at Deloitte.

CAMERON LANE, B.S. ASE 2022, is an aerospace engineer at the Naval Air Warfare Center in the Aircraft Division.

CHRISTOPHER MILLER, B.S. ASE 2000, is an Attorney at Law at the Law Office of Christopher L. Miller PLLC in Weatherford, TX.

EESHA NAYAK, B.S. COE 2023, is a data science consultant at the Boston Consulting Group in Houston, TX.

HAILEY NICHOLS, M.S. ASE 2022, the founder of Locus Lock, was named to the Austin Business Journal's Austin Inno 25 Under 25 List.

Melissa Sells

MELISSA SELLS, B.S. ASE 2023, is a systems engineer for the Boeing Company in Houston, TX. ■

‘THERE IS ENOUGH SUCCESS TO GO AROUND’: BLACK ALUMNI SHARE CAREER FAILURES AND TRIUMPHS

This spring the Cockrell School of Engineering hosted its third annual Black Alumni Panel titled *Celebrating Black Excellence*. Panelists included ASE alumnus Michael Timmons and ChE alumna Angela Archon. Both alumni, who are now working in Information Technology, discussed how they ended up in different careers than they had planned as students, as well as discrimination and adversity they’ve faced in their careers, impactful moments and learning from failure.

> “YOU HAVE TO TAKE THE OPPORTUNITIES WHERE THEY COME AND REALIZE THAT SOMETIMES THE PATH YOU TAKE IS NOT WHAT YOU EXPECTED AS AN 18-YEAR-OLD WALKING ON CAMPUS FOR THE FIRST TIME,” SAID TIMMONS.

WATCH THE FULL PANEL ON YOUTUBE:
bit.ly/Black-Alumni

ANDREAS MOGENSEN
PILOTS SPACEX CREW-7 TO ISS

In late August, alumnus Andreas Mogensen (Ph.D. ASE 2007) took to the stars, flying his second trip to the International Space Station (ISS). He serves as the mission pilot and space station crew commander for the Huginn Mission, a six-month trip that includes astronauts from NASA, the European Space Agency (ESA), Japan Aerospace Exploration Agency and Russia’s Roscosmos. Mogensen will conduct more than 30 experiments for the ESA during the mission divided into three pillars: climate, health and space for Earth. He will also collaborate with team members on experiments for other space agencies.

One experiment that Mogensen considers particularly groundbreaking is testing the abilities of 3D printers to print metal components in space. Currently, if a mechanical or electrical part breaks down during a mission, the space station relies on spare parts being launched from Earth. These launches are expensive and happen constantly due to the wear and tear the space station receives.

“For the future, going back to the Moon or maybe onwards to Mars, we have to be much more independent,” Mogensen said.

If 3D printers can be used to reliably create these necessary spare parts, it would be a great leap toward sustainability and self-sufficiency for the ISS. Mogensen is also looking forward to continuing an experiment he began on his first mission, Iriss, in 2015 – photographing giant lightning strikes, or blue jets, in the upper atmosphere from the space station’s Cupola (a small, windowed observation module).

At six months long, the Huginn Mission is more than 18 times longer than Mogensen’s previous mission.

“I’ll have more time to gather my thoughts and to really enjoy the time up there,” Mogensen said.

The Cockrell School of Engineering is planning an in-flight call between Mogensen and students during the Huginn Mission. **Stay tuned for more details.**

ASE/EM ACADEMY OF

CLASS OF
2023
INDUCTEES


BAKER


CHESLEY


CRAIN


D'SOUZA

FRENCH


INABA


LUMMUS


POWELL


SAGIS


THOMAS

DISTINGUISHED ALUMNI

Congratulations to 10 Texas Engineering alumni of the Department of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin who were elected to the 2023 class of the ASE/EM Academy of Distinguished Alumni. New members were inducted into the academy at a ceremonial banquet on April 14 on the UT Austin campus.

Members of the academy are recognized and honored for leading distinguished careers that include outstanding technical contributions, excellence in leadership and dedication to improving communities. This year's class includes a former astronaut, entrepreneurs, space tech leaders in government and industry, researchers, professors and more. Learn more about the academy at *ae.utexas.edu/alumni/ada*.

THE ASE/EM ACADEMY OF DISTINGUISHED ALUMNI MEMBERS ELECTED TO THE CLASS OF 2023 ARE:

MICHAEL BAKER
Former NASA Astronaut; Captain, United States Navy (retired); Advisor to Rhodium Scientific LLC.; Inspirational Speaker

BRUCE CHESLEY
Senior Associate, Teaching Science and Technology Inc.

TIMOTHY PRICE CRAIN II
Chief Technology Officer, Intuitive Machines

CHRISTOPHER D'SOUZA
Navigation Technical Lead for Human Spaceflight, GNC Autonomous Flight Systems Branch, NASA Johnson Space Center

LARRY A. FRENCH
Chief Executive Officer and Chief Technical Officer, Griffon Aerospace, Inc.

HIROSHI INABA
Professor Emeritus, Tokyo Denki University

JAMES ROYCE LUMMUS, JR.
Director, Lockheed Martin Aerospace (retired); Adjunct Professor UT Arlington; President, Consulting Services International

G. EDWARD POWELL, JR.
Chief Executive Officer, TensorX, Inc.

KEVIN SAGIS
Chief Engineer and Senior Vice President, Reliable Robotics

PAUL "RUSTY" THOMAS
Senior Vice President/General Manager, Space Applications and Chief Technology Officer, Sierra Space

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TEXAS AERIAL ROBOTICS TAKES 2ND PLACE AT RAYTHEON DRONE INNOVATION SHOWCASE

Our Texas Aerial Robotics (TAR) undergraduate student team took second place in this year's Raytheon Drone Innovation Showcase hosted at UT Arlington in April. TAR competed against nine other university teams who were tasked with designing, building and coding an Unmanned Ground Vehicle (UGV) and Unmanned Aerial Vehicle (UAV). Teams were then required to fly their UAV autonomously around a football field and differentiate between their UGV and the other competing UGVs. This year's team included four graduating ASE and COE majors: Ishani Narwankar, Harrison Jin, John Sherar and Mauricio Cantu Garza, as well as Nick Franken, John Sherar and Anneris Rodriguez. The team was presented with a second place trophy and automatic acceptance to compete in next year's competition.

STAY CONNECTED @UTAEROSPACE