

MOMENTUM

Fall 2020 • Alumni Newsletter

T MECHANICAL, AEROSPACE &
BIOMEDICAL ENGINEERING

MABE Alumni Help NASA/SpaceX Take Off

In this Issue:

- ★ I Want to be an Astronaut
- ★ UT Recycles Wind Turbine Blades
- ★ Pionke Retires
- ★ Jim Conklin's Lifelong Pursuit





3



4



8



16

Contents

- 2 UT, Kennesaw State Program to Offer Research Experience to ROTC Students
- 3 UT Receives Funding to Recycle Wind Turbine Blades
- 4 MABE Alumni Help NASA/SpaceX Take Off for Historic Collaboration
- 8 I Want to be an Astronaut
- 10 Sanjaya Takes Flight with Aerospace Inspiration
- 14 Department and College Honor MABE Faculty and Staff
- 16 Pionke Retires with a Solid Legacy of Educating Engineers
- 18 Spencer Wins NSF Graduate Fellowship
- 19 Leftwich and Wilt Receive Fulbright Awards
- 22 Curiouser and Curiouser, Jim Conklin's Lifelong Pursuit
- 23 Andes Mountain Top to Tennessee Valley

Departments

- 12 Faculty News
- 15 New Faculty
- 20 Student News
- 24 Alumni Memories

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On the cover: A SpaceX Falcon 9 rocket carrying the company's crew takes off from Launch Complex 39A on the NASA SpaceX Demo-2 test flight to the International Space Station. Photo by NASA/Joel Kowsky.

Thanks for reading the fall 2020 issue of our alumni magazine. I hope you enjoy it!

This past year has been interesting to say the least. I am grateful to be back in MABE as department head after serving as the interim vice chancellor for research from December through July. In that job I had the honor of serving on Chancellor Plowman's cabinet, and seeing the entire university operation firsthand. While my role was to lead the research infrastructure of the Knoxville campus, the nature of the COVID-19 crisis allowed me to see nearly every aspect of the university operation in crisis mode. I can tell all of you, with certitude, that the university leadership is quite impressive. The entire cabinet, lead by Chancellor Plowman, is an all-star team and you should feel proud to have them at the helm during these challenging times. It was a tremendous honor to be asked to fill that temporary role, but I am happy to be back home in MABE, and extremely grateful for the tremendous job that Interim Department Head Kivanc Ekici and Acting Graduate Programs Director Jeff Reinbolt did in my absence. The department finished the academic year strong, with another record year in expenditures and class size. We will continue to press forward to be not only bigger, but better, more inclusive, more diverse, and with greater impact on the community, state, and nation. We were fortunate to make five outstanding hires. All of these faculty come to us with an impressive track record, and we are excited to have them. You can read more about them on page 15.

I am particularly excited with this issue as it contains several very interesting stories. One of our senior level hires from last year, Professor Tony Schmitz, has already brought several new large-scale programs including the latest one described on page 2 (along with MABE Assistant Professor Brett Compton and Kennesaw State) that focuses on research experiences for ROTC students. On page 10, you'll read about Assistant Aerospace Engineering Professor Devina Sanjaya who came to us from Stanford (MS) and Michigan (PhD), and has revamped our AE introduction course as well as upgraded our computational research portfolio. Also included is a great story on the collective work of UT MABE alumni at NASA for a recent launch. If you have not heard the news, UTSI alumnus Barry "Butch" Wilmore will be heading back to space in 2021, continuing the UT tradition of alumni in space.

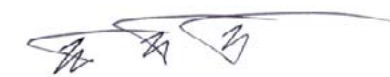


From the
Department Head

As our faculty and research programs have grown at the UTSI and UT Knoxville locations, the investments have transformed our undergraduate facilities as well. This fall, after a COVID-19 delay, we will begin work on a new modern manufacturing training facility in the basement of Dougherty, greatly expanding the existing advanced and conventional machine shops. We are also installing an advanced high-enthalpy wind tunnel lab in new space obtained by the department that will also grow to include a large format educational wind tunnel being relocated to make space for the new manufacturing facility.

None of this is possible without your help. The generosity of our alumni and friends have empowered this transformation, and included over \$10 million in direct monetary gifts and pledges since 2016 alone. The impact of this generosity will be felt for generations to come, and I want to again thank everyone who has contributed. All gifts, small and large, have made a difference in our ability to shape the education and experiences of our students, and provide our faculty with the facilities and resources they need to be internationally recognized in their fields.

Finally, please keep sending pictures and stories of your time on Rocky Top. We love sharing your memories with the entire MABE family! This issue has some great photos from homecoming 1968. I look forward to hearing from you and invite you to get in touch and stay connected.



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UT, Kennesaw State Program to Offer Research Experience to ROTC Students

By David Goddard.

For many generations, ROTC programs have provided students a means to pay for higher education and a path toward a military career once students are commissioned as officers upon graduation.

Now, ROTC students have another chance to prepare for their careers thanks to a new program being launched by UT and Kennesaw State University, in conjunction with the Office of Naval Research.



Brett Compton and Tony Schmitz

The new offering, “Cybersecurity, data analytics, and advanced manufacturing for the modern soldier: An integrated ROTC research and training program,” will help officer candidates get a more in-depth approach to and experience with STEM-related fields, benefitting both the students and US national security.

“We will be training future soldiers to have a broader understanding of cybersecurity, data analytics, and manufacturing processes,” said Professor Tony Schmitz, who is co-leading the program at UT with Assistant Professor Brett Compton. “We anticipate this will increase their effectiveness as they proceed in their military careers.”

While the funding is coming from the Navy, the program is open to ROTC students of all military branches, with the goal of eventually having 15 students at each institution taking part.

At UT, the focus will be on cybersecurity as it relates to advanced manufacturing and advanced materials, while Kennesaw State will offer training and education in data science, cybersecurity, and research methods. Students at each university will have the chance to work remotely on coursework at the other partner institution as well as tour the state-of-the-art facilities at Oak Ridge National Laboratory’s Manufacturing Demonstration Facility.

While Schmitz and Compton lead the UT component, Executive Director of the Analytics and Data Science Institute Jennifer Priestley and Executive Director of the Center for Information Security Education Mike Whitman are the leads at Kennesaw State.

“This is a fantastic opportunity for two of our region’s leading cybersecurity and data science institutions to join together in an effort that not only generates a more well-rounded ROTC graduate, but also impacts our nation’s security and that of our manufacturing industry,” Priestley said. “I very much look forward to our future collaborations and successes to be had.”

Once classes begin, initial work and training will be completed online at the student’s own pacing. Follow-up time in the lab will give them a better understanding of material properties and designs, setting them up for future design and modelling opportunities.

Priestley and Schmitz had previously collaborated on a separate proposal, and were

connected after UT-ORNL Governor’s Chair for Advanced Manufacturing Professor Suresh Babu visited Priestley at Kennesaw State.

UT’s Air Force ROTC Commander Lieutenant Colonel Matthew Castillo said the advantages of the program were clear.

“Within the current and expected national security environment, I believe all future officers—regardless of specific specialties—can benefit from an increased understanding of cyber, data analytics, and advanced manufacturing, all areas included in this program,” said Castillo. “This is an incredible opportunity to receive structured training, practical hands-on experience, and to participate in research on real issues that impact our national defense and war-fighting capabilities. I highly recommend this program to those cadets able to add this on top of their academic progression and believe the experience will provide a foundation from which they will rely upon in the future.”

Schmitz acknowledged UT Associate Vice Chancellor for Strategic Research Initiatives Bruce LaMattina for helping the project, calling him a “champion for veterans and ROTC” and crediting him for getting the ball rolling on the idea.

UT Receives Funding to Recycle Wind Turbine Blades

By Kathy Williams.

Wind energy is one of America’s largest domestic sources of renewable energy. It’s clean, economical, and readily available, but it has a problem: what to do with those gigantic blades once they need replacing.

Manufacturers of the blades rely on advanced polymer composites to be able to withstand the elements of nature. Although eventual wear and tear is inevitable, sending them to the landfill doesn’t have to be.

“As the wind industry grows and waste blade levels climb into the tens, hundreds of thousands of tons and beyond, a better end of life solution is needed rather than simply piling them at the dump,” said Ryan Ginder, MABE research assistant professor.

A team of UT researchers led by Ginder is now developing a new technology for the large-scale handling and recycling of these wind turbine blades. The technology recovers the glass fiber from reinforced polymer composites while limiting mechanical degradation of the fiber during the reclamation process. This in turn allows the recycled fiber to be reused in new composite applications such as vehicle lightweighting, other renewable energy systems components, and performance sports equipment.

While the US wind industry has made substantial contributions to America’s renewable energy portfolio, as highlighted by American Wind Week 2020, work is ongoing to convert the industry to a more circular economy paradigm.

“Rather than simply downcycling the blades into worthless aggregates, we are able to not only convert the blades’ organic components into useful petrochemicals for energy production, but also able to extract the glass fiber reinforcement and use it to make higher value recycled composites,” said Ginder.

UT has partnered with Carbon Rivers LLC, a start-up company located in Knoxville and owned by UT alumnus Bowie Benson (BS/MSE ’17) to further develop and commercialize this novel technology. The project has been awarded \$1.1 million in funding from the Department of Energy’s Small Business Technology Transfer program and Wind Energy Technologies Office.

“Having the opportunity to collaborate with the bright minds at UT, like Dr. Ginder, and catalyze new solutions for our country’s plastics waste problem, is a Volunteer’s dream come true,” said Benson. “2020 has been a challenging year all around for our community, but I remain hopeful for the future as long as we keep working together to take on the tough challenges, like making American energy more sustainable. I am especially optimistic for our project’s next phase, and its potential to transformatively improve the wind industry’s environmental footprint while creating new, much-needed jobs in East Tennessee.”

Over the next two years, the UT-Carbon Rivers team will be collaborating with Berkshire Hathaway Energy’s MidAmerican Energy Company and PacifiCorp Utilities to develop a pilot-scale glass fiber composite recycling system that will serve as the basis for eventual deployment of a full-scale commercial wind blade waste processing plant.



Recovered glass fiber.



Recovered shredded material.



Recovered pyrolyzed material.



By Randall Brown.

MABE Alumni Help NASA/SpaceX Take Off for Historic Collaboration



An illustration by SpaceX of the SpaceX Crew Dragon and Falcon 9 rocket during the company's uncrewed In-Flight Abort Test for NASA's Commercial Crew Program.

NASA astronauts launched from American soil for the first time in nine years on May 30. The mission, known as NASA SpaceX Demo-2, was also the first US launch of a human crew in a commercially built and operated spacecraft on its way to the International Space Station. Astronauts Robert Behnken and Douglas Hurley were carried aloft on a SpaceX Crew Dragon spacecraft from Kennedy Space Center in Florida.

It was the last major test before NASA's Commercial Crew Program (CCP) certifies Crew Dragon for operational, long-duration missions to the space station. Numerous MABE alumni work at NASA, and have important roles in support of developing safe, reliable, cost-effective crew transportation systems for low-Earth orbit destinations, including the launch of this latest stage of the NASA/SpaceX mission, as well as literally launching the craft itself.

One of the challenges was in navigating the progress of the collaborative effort while ensuring that Dragon safely met its demanding schedule.

"The team came through with flying colors, producing a flawless launch and extraordinary performance on orbit at the International Space Station (ISS)," said Scott Coloredo, MABE alumnus and deputy engineering director at Kennedy Space Center.

We asked MABE alumni at NASA to let us know about their roles and how their UT engineering backgrounds helped prepare them for making history.



Scott Colloredo (BS/ME '89)
Deputy Engineering Director, Kennedy Space Center



"I help manage approximately 600 NASA employees and some contractors who provide engineering support to a wide variety of NASA programs, including the CCP," said Colloredo, who logged many hours toward the Demo-2 launch. "Prior to launch, for about four years, my role was to help manage the NASA team that worked with SpaceX's team to perform structural, aerodynamics, fluids, and other

critical work needed to ensure performance and safety of the system," he said. "During launch countdown, my role was to monitor systems and data being sent by the vehicle—but more importantly, to ensure that our engineers on the launch team were prepared, rested, and ready to support time-critical launch countdown operations."

He puts to use technical and engineering skills developed while studying at UT, and also feels like the hospitality of Tennessee culture enhanced his ability to work well in teams.

"I work with several other Tennessee Volunteers at NASA, and I feel that our personal teamwork capabilities are a common denominator that our alumni have," said Colloredo. "The ability to get along with people and help them work well together is critical to make sure problems are identified, data is presented, and decisions are made in a methodical and cordial environment."

Steve Gaddis (BS/ME '88)
Deputy Manager, Launch Vehicle System Office
Program Lead for NASA's Commercial Crew
Program, Marshall Space Flight Center



"My responsibility is to focus on SpaceX as a commercial provider, and the propulsion elements since that is the primary responsibility of the MSFC workforce," said Gaddis, who has also previously supported shuttle launches. "This one was unique because it was the first crewed launch from US soil since the space shuttle program was retired in 2011. It was a big deal for us and the nation."

Gaddis has many positive memories of great times at UT—and challenges. His mechanical engineering degree provided him a broad background to tackle and understand many issues.

"The professors pushed us pretty hard but it was all worth it," said Gaddis. "I have always enjoyed the hands-on experience and the real hardware side of things. It helped me to transition very well into system engineering and integration. I remember some hands-on manufacturing experiences that greatly helped with review manufacturing processes and techniques conducted by our partners and suppliers."

Tony Fiorucci (BS/ES '88)
Propulsion Structures and Design Branch,
Marshall Space Flight Center



Fiorucci assesses high-speed vibration data from test and flight data for the engines that are utilized on the SpaceX Falcon rocket. "It is my job, along with our industry partner, to ensure that all engines are acceptable for manned flight operations from a vibration standpoint," he said. "I was integral in performing that analyses for the flight engines for DM-2 and accepting them for flight use."

He has worked on assessing SpaceX engine testing and flights for more than six years, including the DM-1 launch that helped pave the way for this summer's crewed flight. Fiorucci helped resolve issues to ensure that the engines were the safest possible.

"It was truly exciting to launch our astronauts on an American rocket from American soil again," he said.

When Fiorucci attended UT, Engineering Science and Mechanics (ESM) was still a separate department from what we now call MABE. He transferred from mechanical to ESM after his sophomore year when he started a co-op position at MSFC—and, as he puts it, "found my calling in vibration work."

"ESM afforded me the opportunity to focus on more specific vibration classes and it was a great advantage to me once I graduated and returned to MSFC," he said. A class taught by Jack Wasserman on data had a major impact on his career.

"The class was so unique that Dr. Wasserman had to write his own textbook and materials for it," said Fiorucci. "I'm proud to say that it became the foundation of the work I do and have done for the past 34-plus years. And it's still very specialized work even after all this time."

Howard Flynn (BS/AE '93)
NASA System Manager



"I am responsible for certification of the SpaceX Dragon capsule in-space propulsion system," said Flynn. "My team was responsible for watching and evaluating the propulsion system telemetry from pre-launch through post-landing."

The capsule propulsion system worked like a charm. Flynn kept a watch on it all with the skills he first learned in UT classes on thermodynamics and their

application to propulsion system design and operation.

The NASA team on the whole kept a watch on the skies for other issues that could have affected the flight.

"The most challenging part of the launch was the uncertainty associated with the weather at the Kennedy Space Center and availability of team members to support the launch from there, given Tropical Storm Isaias," said Flynn.

Lee Allen (MS/ME '08)
EM41 Assistant Branch Chief,
Marshall Space Flight Center



Allen assisted the Thermal Protection System (TPS) Subsystem Lead in assessing readiness for the DM-1 and DM-2 missions—ostensibly identical launches, but with much more at stake the second time around.

"Even though we strive to 'test like you fly,' there's no comparing an unmanned flight test and putting a crew on the rocket," he said. "Having a successful Demo-1 flight test behind us made us feel better about a lot of things, but you approach it differently when astronauts are involved."

Part of Allen's role was in bridging NASA requirements with SpaceX innovations.

"The challenge here was as much philosophical as it was technical," he said. "The group I work in is very focused on TPS risks. The Falcon 9 rockets are much newer to us, and SpaceX is using some innovative materials that we had to learn a lot about—and learn how to speak the same language as their engineers."

Allen says his time as a graduate research assistant at the UT Space Institute prepared him for NASA in ways he didn't realize at the time.

"Our research team was very similar to how I work now, with schedules to maintain, tests to conduct, data to assess and report," he said. "We were exploring production of pitch-based carbon fibers, which translated very well to working in ceramic matrix composites at Marshall Space Flight Center."

Katherine Van Hooser (BS/AE '91)
Chief Engineer, Marshall Space Flight Center



Van Hooser is responsible for ensuring the appropriate amount of technical rigor is applied to all programs at Marshall. For the SpaceX launch, she was involved in

helping the team resolve technical differences and issues as the design matured, and in management reviews leading up to launch.

In past roles, Van Hooser was deputy chief engineer and then chief engineer for Space Shuttle Main Engine for the last 21 flights of the shuttle program. She participated actively in the launch process from the firing room for those launches, while she served in a more managerial capacity for the Demo-2 launch. For any role, she applies valuable lessons in approaching and solving complex problems that she learned as an aerospace engineering major at UT.

"We've got world-class experts in liquid rocket engine design at NASA," said Van Hooser. "I was well-prepared by UT to help that super-talented group develop hardware and solve complicated issues so we could successfully launch people and valuable experiments into space."



John Posey (BS/AE '04)
NASA Crew Dragon Lead Engineer

Posey, also a veteran of the space shuttle program and other NASA launches, engages directly with SpaceX engineering on the design, development, and operation of the Crew Dragon spacecraft in his role, working with the CCP Spacecraft Engineering team of over 100 talented NASA engineers, primarily from Johnson Space Center, Kennedy Space Center, and Marshall Space Flight Center.

"We work for the CCP chief engineer to achieve and maintain certification of the system while identifying and resolving technical risks," said Posey. "My team and I supported the Dragonship Endeavour and the crew—astronauts Hurley and Behnken—throughout Demo-2 from the Mission Control Center in Houston and the Launch Control Center in Florida."

The team assessed vehicle performance in real-time and provided their "GO" recommendations for launch, docking to ISS, and return.

Posey had many classes as an AE major at UT that introduced him to aerodynamics, compressible flow, orbital mechanics, and propulsion systems—elements of his daily life now.

"One of the things that stuck with me the most was the focus on applying critical thinking skills to problems based on our knowledge of engineering fundamentals," he said. "Breaking a problem down into parts and applying what you know from previous experience goes a long way towards solving problems that may be daunting at first glance."

By the time of publication, we were unable to reach alumni Andrew Heaton (BS/AE '90) and Stewart Whaley (BS/AE '19), who were also involved in the launch. Did we miss you? If you are an alumnus who contributed to the recent space launch, let us know—email williamk@utk.edu.

I WANT TO BE AN ASTRONAUT

By Camille Bergin (BS/AE '19)



(l-r): Camille Bergin, Kate Stiles, and Gillian McGlothlin

My first memory is of me tugging on my parents saying, “I want to be an astronaut.” I was five and we were standing on top of a parking garage in St. Petersburg, Florida, watching the Space Shuttle Endeavor blast off into outer space. From that moment on, I was captivated by the intrigue of traveling to a far-away planet. My parents did everything possible to encourage that passion; however, the constant nagging from the kids at school who thought liking math and science was for nerds (which is a not a nice word when you’re 10 years old) shoved that dream into a box of unwanted childhood toys.

By high school, I had forgotten about being an astronaut. Instead, I chose to attend an arts boarding school, the UNC School of the Arts. I played trumpet many hours every day, and even competed (and won) at regional and national competitions. No matter how much I perfected my music, though, I was never truly fulfilled.

That’s when I decided to pursue engineering in college in addition to music. I’ve always had a love for math, science, and music, and I knew that I would not be complete without all three of them. When I toured the University of Tennessee, I fell in love. Not just because of the orange. Not just because UT has great science and music programs. But, also because the college of engineering intentionally builds a community for women in STEM, instilling in them the belief that they are capable of anything.

I met my two best friends on move-in day freshman year. We were nervous, anxious, and honestly had no idea what to expect. We’d been taught our entire lives that we would have to work a lot harder than our male counterparts, we might get paid significantly less, and we might never feel like we belonged in the engineering field. That’s a lot to face as an 18-year-old; it’s a lot to face even now as a 23-year-old. However, TCE took great care in ensuring we did not face those stigmas, we would have communities in which we belonged, and we would build the skills necessary to break down those barriers long after graduation.

The Dream Job

My first “big girl job” in the space industry was working for Lockheed Martin Space on the Orion program. One of the coolest things I got to do on that program was travel to Kennedy Space Center and work on the Artemis-2 vehicle. I was working in mechanical integration, which meant I was interfacing with the mechanical design engineers and the assembly, test, and launch operations (ATLO) engineers to ensure what we designed and built actually fit into the final assembly. When we traveled to Kennedy, I was able to work with ATLO to solve some volume constraint issues we ran into when designing the life support system for Artemis-2 by using one of Lockheed’s virtual reality technologies. I was also fortunate enough to sit in the Artemis-1 vehicle that will launch in 2021.

After Orion, I had the opportunity to work on a satellite program supporting mission operations. Satellites are a completely different ballgame and I’m glad I was able to see both human and non-human spaceflight. I’m now moving to capture management, which will enable me to combine my technical skills with my business/social acumen to ensure the company has the tools we need to be successful in our business endeavors.



(l-r): Gillian McGlothlin, Kate Stiles, and Camille Bergin

As college progressed, my best friend and I became the only two women in our aerospace engineering class. Because of the support from the college and the skills they helped us develop, we were not deterred or intimidated. By graduation, we had interned every summer of college, held leadership positions in multiple engineering organizations, landed our dream jobs/graduate programs, and graduated top of our class.

The females I had the honor of graduating with from UT are successful because of the community we built within the walls of Morrill, Perkins, and Dougherty. We are successful because TCE focuses on ensuring women have every resource they need to flourish. Whenever people ask me where I went to college, I proudly say the University of Tennessee because I would not be where I am today without Rocky Top.

THE GALACTIC GAL

Follow Camille’s adventures on social at @TheGalacticGal and through her science-focused site, thegalacticgal.com, where she shares her passion for space, science education, and making space for everyone.



Bergin standing outside the astronaut exit at the Operations & Checkout building at the Kennedy Space Center at Cape Canaveral.

Sanjaya Takes Flight with Aerospace Inspiration

By Randall Brown.
Photography by Taylor-Roman.



“

Even as a four-year-old, I knew that aerospace engineering wasn't easy. Not many could do it, for sure. I liked that idea, and I really wanted to be among the few who could do something unique.”

—Devina Sanjaya

Assistant Professor Devina Sanjaya first felt inspired by aerospace engineering when she was just four years old. She had the opportunity to visit an airplane cockpit, where the pilot explained how the altitude indicator worked. The complex array of the airplane's instruments made a deep impression on her, and her imagination was sparked by the challenge of learning more.

“Even as a four-year-old, I knew that aerospace engineering wasn't easy,” said Sanjaya. “Not many could do it, for sure. I liked that idea, and I really wanted to be among the few who could do something unique.”

She didn't wait long to set out on her desired path. After completing grade 11 in her home town of Jakarta, Indonesia, she moved to Auburn, Washington, as an international student in the High School Completion program at Green River College. From there, she crossed the country back and forth to earn her bachelor's at the University of Michigan, her master's at Stanford University in California, and then back to Michigan for her doctorate. Her most recent move was to join MABE at UT last fall.

“The MABE department gave me a unique, valuable opportunity to make my career goal come true without taking a post-doctoral position,” said Sanjaya, whose expertise is in computational fluid dynamics (CFD). So far at UT, she has taught undergraduate aerospace seminar, a professional topics class, and will teach an engineering analysis class in the spring.

“I love the interactions with students,” she said. “It's always satisfying when I see my vision for the course come to life. It's always the icing on the cake when the majority of the students enjoy the course and learn from it. I had many great mentors along my study, and I want to be like them now that I have the opportunity.”

Her mentors nurtured Sanjaya's love of math and encouraged her love of engineer's challenges, rewards, and discoveries. Her enjoyment of research can make it feel like a hobby.

“It's a game that I play with myself to create something new or to come up with an elegant solution to a problem,” said Sanjaya. “Researchers know research isn't always fun. It sometimes drives us crazy because we hit too many roadblocks. However, the euphoria when I make something work always keeps me going.”

The impact of her research could improve the capability and reliability of aircraft design and performance analysis via CFD software.

“While CFD is well known for decreasing the number of required wind tunnel tests during the aircraft design process, CFD itself isn't a mature field,” she said, noting that software results often don't agree closely enough with practical testing results. “On top of trying to improve the robustness, accuracy, and efficiency, my research also tries to introduce more automation. That way, it would take the load off engineers' 'busy' work and let them be more focused on the analysis part.”

Sanjaya finds inspiration for new ideas while enjoying activities away from the computational lab. She rotates between running, golfing, and weight lifting, while also walking her Goldendoodle puppy. She also plays piano and violin, enjoys baking and cooking, building with Legos, and photography.

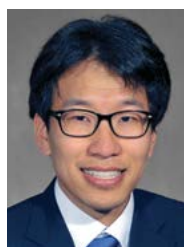
“I feel that having interests outside engineering and exercising help with creativity and relaxation,” she said. “It's funny how, at times, good research ideas or new solutions often emerge while I am not sitting at my desk.”

Sanjaya carries with her the same inspiration that she experienced in her youth, exemplifying the Volunteer Spirit by sharing it with her students and colleagues.

Promotion and Tenure



Stephanie TerMaath has been promoted to associate professor with tenure. TerMaath joined MABE as an assistant professor in 2014 and was named the inaugural Jessie Rogers Zeanah Faculty Fellow in 2017 for her outstanding performance. She teaches mechanical and aerospace engineering courses and currently has a research project in biomedical engineering. Her research interests include high performance computing, structural and fracture mechanics, and material science.



Seugha Shin has been promoted to associate professor with tenure. Shin joined MABE as an assistant professor in 2014 and directs the Nanoscale Heat Transfer Laboratory. His research aims at providing better understanding and solutions to various energy transport and conversion challenges involving thermal energy, based on a fundamental examination of the roles of these four principal carriers.

Sarles Named James Conklin Fellow

Associate Professor **Andy Sarles**, has received the prestigious Dr. James C. Conklin Endowed Faculty Fellowship for Mechanical Engineering in recognition of



his performance as an outstanding scholar. The five-year award began in August and during this time Sarles will be recognized as the James Conklin Fellow.

“Andy Sarles has been an all-star since the day he came to UT,” said Department Head Matthew Mench. “Not only has his research been high-impact, but the quality of education and mentoring he provides his students as well as his contributions to service have been outstanding. I am very grateful to the Conklins for providing the resources to give this to such a deserving member of our department and community.”

“I am sincerely honored to be selected for the James Conklin Faculty Fellowship,” Sarles said. “The Conklin’s generosity will be instrumental in helping my group grow and diversify in our research.”

MABE alumnus, former adjunct professor, and long-time supporter Jim Conklin (PhD/ME '89) created the award this year as a way to give back to the department. Read his story on Page 24.

Mench Named 2020 Chancellor’s Professor

Department Head **Matthew Mench** is among the 2020 class of Chancellor’s Professors.

He joins TCE’s Min H. Kao Professor of Electrical Engineering and Computer Science Leon Tolbert and three other exceptional scholars, researchers, and professors from across UT to represent the best of what the university has to offer. With expertise spanning the humanities, forensic sciences, engineering, and geography, they represent UT with distinction and are doing work that improves lives and our understanding of the world.

Mench and Tolbert are both known as leaders with distinguished histories of service to UT.

“They are people with excellent insight and judgement. The chancellor couldn’t have made better choices,” said Associate Dean for Faculty Affairs Paul Frymier. “TCE can be extraordinarily proud to have both of our nominees selected.”

Mench most recently served as interim vice chancellor for research and engagement, helping lead the university through its initial response to the COVID-19 pandemic before returning to the department in August.

His research focuses on electrochemical power conversion and storage, including polymer electrolyte fuel cells, flow battery systems, and biological energy systems. He has also studied computational simulation of electrochemical power conversion and storage systems.

Mench is a fellow of the American Society of Mechanical Engineers and has held multiple leadership positions within the society. He earned his bachelor’s, master’s, and doctorate at Pennsylvania State University and has been awarded numerous honors and recognitions over the years.

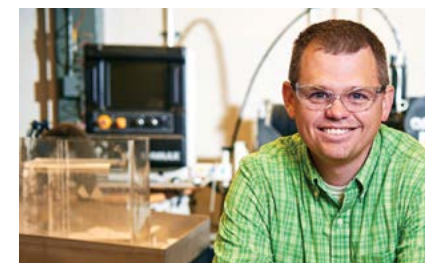
Schmitz Receives Best Associate Editor Award at CIRP Conference

Professor **Tony Schmitz** received the Best Associate Editor Award at the 53rd CIRP Conference on Manufacturing Systems (CMS). The conference, hosted by Northwestern University, was held virtually July 1–3.

Schmitz also presented his paper, “Cutting force and stability for inserted cutters using structured light metrology”, which was co-authored by PhD students Tim No and Michael Gomez, and Scott Smith (ORNL).

The conference provided an international forum for researchers to share and discuss visions and state-of-the-art innovations in the field and generate a significant impact on the future of manufacturing systems.

Young Chosen as Faculty Fellow for Technology-Enhanced Teaching



Rosenberg Associate Professor of Practice **Matthew Young** was one of four engineering faculty members selected to join the inaugural cohort of UT faculty fellows for

technology-enhanced teaching. UT Teaching and Learning Innovation (TLI) and the Office of the Provost launched this program to help prepare UT educators for teaching this fall.

The fellows will work through October to consult, host group sessions, and develop web-based and asynchronous resources with TLI and IT staff.

Young sees the program as a way to be on the front lines of adjusting to the shifting challenges of the COVID-19 pandemic, such as ensuring the ability to do practical, hands-on instruction in engineering disciplines.

“I am finding that this disruption has been a catalyst to force me to reevaluate my methods and outcomes,” said Young. “My hope is that my teaching becomes more impactful for students’ success, and that the lessons I am learning can be shared with other faculty as we move forward.”

Zhao Receives One UT Collaboration and Innovation Grant

Professor **Xiaopeng Zhao** was one of four engineering faculty members to receive a One UT Collaboration and Innovation Grant from the UT System in May. This new grant program promotes UT’s mission in three priority areas—to educate, discover, and connect—by supporting innovative ideas, creating collaborative opportunities, and advancing student success, research, and outreach and engagement.

Zhao is collaborating with colleagues at UT Chattanooga on two grants. The first, “Detection, Care, and Treatment of Alzheimer’s Disease,” is in the “discover” category and seeks to enhance research with the ultimate goal of easing the burden of Alzheimer’s dementia.

“This project will integrate innovative technologies from neuroimaging, cognitive science, dementia caregiving, machine learning, and robotics to advance technologies that can Comprehend, Assist, Relieve, and Evaluate (CARE) patients with dementia,” said Zhao.

The second project, “Girls Achieving in Mathematics, Engineering, Science (GAMES),” is in the “educate” category and aims to establish a program at UT to promote young women’s interest and self-efficacy in STEM.

“The GAMES project aims to integrate strategy games and education programs to close the gender gap in STEM,” said Zhao.



Babu Nominated to National Science Board

Suresh Babu, the UT-ORNL Governor’s Chair for Advanced Manufacturing, was nominated this spring by President Trump to serve a six-year term on the National Science Board.

“I am very flattered, honored, and humbled to have been chosen for this nomination,” Babu said. “I am looking forward to helping the board in any way I can and to help set the course for science, technology, and engineering in the US.”

Babu, one of the world’s leading experts in developing advanced materials, serves on several multi-university and multi-partner projects, including IACMI—The Composites Institute, and on projects for the US government that include research for the Navy.

He is an example of the many ways that UT and ORNL work together, holding faculty appointments in MABE and the Department of Materials Science and Engineering as well as in the Energy and Environmental Sciences Directorate and the Manufacturing Demonstration Facility at ORNL.

Babu also serves as director of the Bredesen Center for Interdisciplinary Research and Graduate Education and works through the Joint Institute for Advanced Materials, both of which are joint UT-ORNL ventures.

“Now more than ever, science and technology play such a crucial role in America,” said Kelvin K. Droegemeier, director of the White House Office of Science and Technology Policy. “This robust and expanding group of leaders will best position the nation’s research and development enterprise to meet the challenges of today and the incredible opportunities of tomorrow.”

The board was created to serve along with Droegemeier in shaping policy and research for the National Science Foundation, including the pursuit of national policies for the promotion of research and education in science and engineering, and the funding and support that go with them. The board also advises the president and Congress on scientific matters and occasionally issues press releases and papers.



Department and College Honor Faculty and Staff

Departmental Awards

Each spring, MABE honors their most outstanding faculty and staff with awards. The recipients are chosen based on their accomplishments in service, research, leadership, or teaching during the past year.

This year's award winners are:

Doug Aaron

J.A.M. Boulet Outstanding Faculty Service Award

Dustin Crouch

Louis and Ann Hoffman Endowed Excellence in Research Award

Bill Hamel

Outstanding Faculty Initiative and Leadership Award

Caleb Rucker

Pi Tau Sigma Excellence in Teaching Award

John Schmisser

B. Ray Thompson Endowed Excellence in Research Award

Uday Vaidya

Thomas Stewart McCorkle Family Endowed Faculty Award
Volunteer Spirit Award

Ryan Wilhite

J.A.M. Boulet Outstanding Staff Service Award

Tickle College of Engineering Awards

Academic and administrative colleagues of the Tickle College of Engineering show appreciation for each other every day as a matter of course. Each spring, the college makes the highest of these acknowledgements official at the annual Faculty and Staff Awards Banquet. Due to the pandemic, this year's banquet was postponed, with winners notified by email.

MABE award winners included:

Ruthann Moyers

Sidekick Salute Award

In recognition of an outstanding co-worker who has gone the extra mile in helping the team on a project, is always looking to make sure the team has everything they need, or has performed a special act of kindness or service that has had a positive impact on the team/department.

Elizabeth Barker

Leon & Nancy Cole Teaching Award

In recognition of superior teaching in the college.

Andy Sarles

Moses E. & Mayme Brooks Award

In recognition of an outstanding engineering faculty member who have achieved distinction in engineering practice, along with effective teaching.

Dustin Crouch

Translational Research Award

In recognition of a faculty member whose research has achieved societal benefit through the development of intellectual property via licensing agreements, patents, and/or business startups.



Ragini Acharya

Ragini Acharya joined the department this fall as an associate professor of aerospace engineering and is located at the UT Space Institute in Tullahoma. Acharya was previously a hypersonic propulsion lead senior principal engineer at Raytheon Missiles and Defense, USA. Her research interests include hypersonic and advanced propulsion, hypersonic signatures, and uncertainty quantification.



Bryan Good

Bryan Good joined the department this fall as an assistant professor of biomedical engineering. Good was previously an American Heart Association Postdoctoral Fellow at Penn State University and the Hershey Neuroscience Institute. His research interests include cardiovascular biomechanics, biorheology, computational fluid dynamics and fluid-structure interaction modeling, biocompatibility, acute ischemic stroke, congenital heart disease, and thrombosis.



Mark Gragston

Mark Gragston joined the department this fall as an assistant professor of mechanical engineering and is located at the UT Space Institute in Tullahoma. Gragston previously worked as a research professor for the HORIZON Center at the Space Institute. He received his PhD in mechanical engineering from UT in 2018. His research interests include the development and application of laser- and optical-based techniques for studying high-speed aerothermodynamics and measurements of combustion phenomena and plasma dynamics. He is also developing high-enthalpy testing capabilities to better understand aerodynamic heating and real gas effects in hypersonic flows.



Bradley Jared

Bradley Jared joined the department this fall as an associate professor of mechanical engineering. Jared was previously a principal member of the technical staff at Sandia National Laboratories where he led advanced manufacturing research and development in the Material, Physical, and Chemical Sciences Center. He has over 25 years of experience in mechanical design and advanced manufacturing process development. His research interests include additive manufacturing, precision engineering, design of precision electro-mechanical systems and mechanisms, and machine learning for manufacturing processes.



Wei Wang

Wei Wang joined the department this fall as an assistant professor of mechanical engineering. Wang was previously a postdoctoral research scholar at North Carolina State University. His research interests include developing novel functional surfaces to address some of the key challenges in the areas of membrane separation, droplet manipulation, icephobicity, hemocompatibility, and microfluidics. His particular areas of interest include liquid-repellent surfaces, omniphobic membranes, patterned surfaces, stimuli-responsive surfaces, and anti/de-icing coatings.

Pionke Retires

WITH A SOLID LEGACY OF EDUCATING ENGINEERS



Pionke and his wife Cindy visited the locker room during Faculty Day at Neyland Stadium.

By Randall Brown.

Associate Professor Chris Pionke retired July 31, shifting focus to a new chapter in his long and fruitful career of educating Engineering Vols. He played a key role in the college over the last few decades, notably as part of the team that established the Stoneking *engage* Engineering Fundamentals program, the signature first-year experience for UT engineering students.

“I have been a part of UT since 1976 as an undergraduate student, resident assistant, grad student, teaching assistant, research assistant, adjunct professor, assistant professor, and associate professor,” said Pionke. “I guess you can say that I have been, and continue to be, a Vol For Life.”

Pionke’s journey from student to teacher launched in 1982 when he was a fifth-year senior. No less a Vol engineering icon than Professor Bill Snyder, his advisor and department head, offered Pionke a teaching assistant position to instruct Engineering Graphics.

“This opportunity is what ignited my passion for teaching and education and altered my career path towards academia,” said Pionke. In the mid-1990s, then-Dean Jerry Stoneking offered him the opportunity to be part of the Basic Engineering Renovation Team (BERT), challenged to redevelop the college’s first year curriculum in a way that would focus on student success.

“I jumped at the chance,” he said, noting that it was a cutting-edge move at a time when only a few schools were developing engineering education programs. “It was exciting to be part of something new, innovative, bold, and to be quite honest, a bit risky.”

Pionke is proud of the curriculum he helped build, as well as the development of the honors sequence that in 2017 became the Cook Grand Challenge Honors Program.

“Teaching and constructively challenging these very highly talented and motivated students has been enjoyable and inspiring,” he said. “I told many students over the years that I thought I had the best job at UT.”

Pionke gives solid nods to colleagues like Roger Parsons and Kevin Kit for the success of the first-year and honors programs.

“All were team efforts and I truly believe that their success was in large part because of this team approach,” he said.

Another team effort that stands out for him was the establishment of an Engineering Ethics course developed and taught in conjunction with philosophy Professor Glenn Graber in 2002.

“The course focused on the human and social implications of technology and technology development, intended to help students think about their role in society and how their specialized talents, engineering education, and their work, both current and future, may affect individuals and society both positively and negatively,” said Pionke. “It was truly a lot of fun engaging in dialog with both the students and Graber about issues that are still very much current today—like privacy, safety, intellectual property rights, etc.”

Pionke looks to enjoy more time now to visit other college campuses and towns with his wife, Cindy.

“If there are historic homes and/or museums nearby, so much the better,” he said. “We have visited over 50 campuses so far from as far south as Auburn, Alabama, to as far north as West Point, New York, and as far west as Vancouver, British Columbia.”

They look forward to visiting more, including a number of SEC schools still on their list.

“I would also like to get more involved with some volunteer work as well—no pun intended,” said Pionke. “Unfortunately, this and the travel may have to wait until the current COVID-19 situation is better. So, in the meantime, I am going to look for a new stay-at-home hobby or two. Cindy just wants me to find something that will keep me happy and out of her hair.”

Pionke will continue to watch the continued growth and success of the first-year and honors programs, and is happy to continue to be a presence.

“Going forward, if I can be of any help in the development of that program and department, or in the advancement of my home department, MABE, I would surely do what I can,” he said. “That may involve serving on a committee, teaching a course, working with student design teams, etc., or it just may be being a true Vol For Life and cheering them on from the sideline.”

“

I am so excited by the renewed interest in US manufacturing at all levels, from the federal government to educational institutions. I see my participation as a national service opportunity! I am a Volunteer due to ORNL’s commitment to advanced manufacturing through the Manufacturing Demonstration Facility (MDF) and the new machining and machine tools focus, in particular. My joint faculty appointment provides unrivaled research and education opportunities for me and my students through combined support and resources from MABE and the MDF.”

—Tony Schmitz,
MABE Professor and ORNL Joint Faculty



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Spencer Wins NSF Graduate Fellowship

By Kathy Williams.

Recent graduate Spencer McDonald (BS/AE '20) was one of four seniors selected for the prestigious National Science Foundation Graduate Research Fellowship program (GRFP) award.

This fall, McDonald will begin his graduate studies at the Massachusetts Institute of Technology (MIT) where he'll be investigating autonomous and secure aerial platforms using adaptation and machine learning.

"We're very proud of our students and the work that they do," said Dean Janis Terpenney. "These selections reflect well upon them, their faculty mentors, and the many long hours they work together toward educational success and on important research. The diversity of disciplines represented in this year's winners also underscores the commitment our entire college has toward student success."

McDonald said he appreciated the recognition, but was quick to praise those at UT who had helped him get to this point.

"This selection will give me the flexibility to explore topics I find most intriguing and impactful as I begin my graduate career at MIT next year," McDonald said. "I would like to give special thanks to my research advisor, Assistant Professor Zhenbo Wang. Without his direction and support, many of my recent accomplishments would not have been possible. I would also like to thank Eric Wade (former MABE faculty) for giving me my first research position and the Office of National Scholarships and Fellowships at UT for helping review my application materials."

In addition to providing a great education and having supportive professors, the engagement opportunities and connections at UT helped prepare McDonald for graduate school and his future engineering career.

"The number of different clubs and avenues available at UT was overwhelming, and all the activities I participated in helped prepare me and shape my future endeavors," McDonald said. "I also met people through various networking events who were able to help me secure opportunities that, otherwise, I may never have had."

McDonald, a Knoxville native, has always had a love for aviation. Some proof of this includes beginning flight lessons at age 13, soloing a plane on his 16th birthday, and earning his private pilot's license at age 17.

His goal in life is to earn every type of flying certificate there is. He earned his seaplane pilot's license last year and this summer plans to obtain his instrument rating.

While interning at Boeing last summer, McDonald took his love for aviation to a new level when he went wing walking.

"The experience was simultaneously the coolest and scariest thing I have ever done in my whole life," McDonald said.

After completing graduate school, he plans to enter the aerospace industry so he can accomplish his three lifelong goals.

"I want to ensure that future autonomous systems are designed safely, become a political and social advocate for aerospace technologies across the globe, and inspire youth with the wonders of aerospace to perpetuate innovative momentum," McDonald said. "My dream job is to become a CTO of a major aerospace company so I can make impactful decisions that would determine the future of the aerospace industry."

In addition to McDonald, Zachary Jerome (civil), Yaw Mensah (electrical), and Alec Yen (electrical) also received GRFP awards, which come with a \$34,000 annual stipend for three years, \$12,000 toward tuition and fees, and increased chances to take part in international research as well as other benefits as they begin their graduate studies in the fall. Jackson Wilt (aerospace) received an Honorable Mention from the program.

During selection, each student's individual work is reviewed to determine if their ideas can advance society, secure the nation, or improve lives. It is extremely important

for program applicants to have had measurable research experience at the undergraduate level—something the college and its faculty considers vital for graduate school preparation.

"Our faculty take active interest in having undergraduate students in their research groups, and it's something they take pride in being able to do," said Terpenney. "They want their students to succeed, not just as reflection of their success as a mentor, but because they are acutely aware of how important it is to help our students find their life's passion, and as an engineer, make a difference in the world."

GRFP began in 1952, making it the oldest fellowship program in the nation devoted to supporting outstanding graduate students in STEM disciplines. Participants have gone on to become Nobel Laureates, government leaders, or titans of industry, including Google co-founder Sergey Brin.



Last year, while interning at Boeing in Seattle, McDonald went wing walking for the first time.

Leftwich and Wilt Receive Fulbright Awards

By Kathy Williams.

Spring graduates Brooks Leftwich and Jackson Wilt received Fulbright Awards and will be spending a year abroad teaching and doing research once COVID-19 travel restrictions are lifted. The Fulbright program is administered by the Bureau of Educational and Cultural Affairs of the US Department of State and is the most widely recognized and prestigious international program in the world, offering 470 teaching and research awards in over 125 countries. About 1,200 US scholars receive awards each year.



Brooks Leftwich

Leftwich, of Lewisburg, Tennessee, was selected for the Fulbright English Teaching Assistantship to Taiwan, where he'll spend the year collaborating with educators in the classroom to facilitate English language lessons.

He graduated Summa Cum Laude in May with a bachelor's degree in mechanical engineering with honors and minor in reliability and

maintainability engineering.

"I feel very blessed and thankful to be selected for this position and I am excited to bring my experiences from the University of Tennessee with me," Leftwich said.

Leftwich was part of the Cook Grand Challenge Honors and Chancellor's Honors programs and was awarded the Extraordinary Academic Achievement graduation citation by UT in the spring. Past awards he has received include the Henry C. Goodrich Cooperative Engineering Award and the Christopher Dowdle Memorial Scholarship.

During his time at UT, Leftwich served as an ambassador for the college's Office of Engineering Professional Practice, a member of the Student Code of Conduct Review Committee, a UT student ambassador, an Ignite Team Leader, a Delta Tau Delta officer, and a mentor at several Knoxville area elementary schools.

Leftwich's research project, "Montgomery 1960: Using Technology to Teach Empathy and Perspective Taking," was accepted to the American Historical Association 2020 Annual Conference, the Association of Student Conduct Administrators 2020 Annual Conference, and the Association of Student Personnel Administrators 2020 Annual Conference.

In the summer of 2017, he studied abroad in England, studying "The Quest for Meaning," which inspired him to live intentionally in every moment and take advantage of each second. He also completed a year-long co-op assignment as a process engineer at the Nissan Smyrna Vehicle Assembly Plant, where he worked on the front-end assembly of the Altima and Leaf.

After completing the Fulbright assistantship, Leftwich hopes to gain industry experience and then pursue a graduate degree in engineering education.

"UT has opened countless doors and provided outstanding opportunities to grow and challenge myself every step of

the way," Leftwich said. "I would not be where I am today without the education I received in the MABE department. I have gained invaluable experience that has prepared me for whatever the future holds."



Jackson Wilt

Wilt, of Goodlettsville, Tennessee, was selected for the Fulbright Open Study/Research Fellowship in Amsterdam where he'll be conducting research at the University of Amsterdam.

He graduated Magna Cum Laude in May with a bachelor's degree in mechanical engineering with honors.

Wilt's research in Amsterdam will focus on 3D-printing soft pneumatic devices for medical purposes, specifically for artificial hearts. He also plans to implement machine learning to better understand the control of hyperplastic materials in the devices.

"The Fulbright will give me the opportunity to participate in this global health project that will require scientific cooperation across international lines," Wilt said. "I will be able to bring my experiences gathered at UC Berkeley, UT, and ORNL to contribute to the project. I also hope to represent an ambassador exemplifying and demonstrating American ideals abroad."

At UT, Wilt's hard work resulted in several awards including the ASME Sylvia W. Farny Scholarship, a Merit Research Award at the 24th Annual Exhibition of Undergraduate Research and Creative Achievement, and an NSF Graduate Research Fellowship Award honorable mention.

Wilt worked in Assistant Professor Brett Compton's research group and was a very active member and treasurer of the Engineering Mentor program and American Society of Mechanical Engineers. He interned at ORNL through the DoE's Student Undergraduate Laboratory Internship program, and spent last summer as a student researcher at UC Berkeley. He also participated in the SLOPE program by demonstrating 3D-printing technology to children to improve understanding of basic science and engineering principles, a concept he plans to continue at the NEMO Science Museum, community centers, and children's hospitals in Amsterdam.

After completing the Fulbright appointment, Wilt plans to pursue his doctorate degree in mechanical engineering at Carnegie Mellon University and continue working on advanced manufacturing techniques for creating multifunctional soft robotic systems. He is preparing to have a career in academia, but will ultimately choose a career path that will have the most benefit to human condition.

"I want to thank my friends, family, and mentors who have been integral to my learning and development throughout my time at UT," Wilt said. "I also feel it is imperative to acknowledge my privilege and express my admiration for marginalized groups who have done more with much less."

Students Receive Chancellor's Awards



(l-r: Alex Arbogast, Zane Chapman, Lauren Jennings, Ryan Kelly, Brooks Leftwich, and Parker Trulove.

Six MABE students were among those recognized during the Chancellor's Honors Banquet, which is held each spring to recognize students, faculty, staff, and friends of the university for their extraordinary achievements. This year's banquet was held virtually due to COVID-19.

Top Collegiate Scholar Award

Alex Arbogast
Zane Chapman
Lauren Jennings
Parker Trulove

Extraordinary Academic Achievement Award

Lauren Jennings
Ryan Kelly
Brooks Leftwich
Parker Trulove

Grad Students Win GSS Awards

During Graduate and Professional Student Appreciation Week this spring, UT's Graduate Student Senate recognized students across campus for their accomplishments.

Doctoral student **Nader Naghavi** (ME) received the Excellence in Graduate Research Award, presented to students who have received national and/or international recognition in their field and show promise in their area of research and/or creative achievement.

Doctoral student **Jenny Patel** (BME) received the Excellence in Service Award, presented to students who are extraordinary campus leaders and provide service leadership to their discipline through professional organizations. Patel designed and implemented the first mentoring program for female students in STEM at UT.

1794 Scholars Awards

AE Students **Nick Crowder** and **Daniel Waggoner** received awards at the 1794 Scholars Program Showcase in April.

The two-year honors enrichment program focuses on the Volunteer experience, while the showcase has participants present their final capstone projects on one of the program's four pillars: academic engagement, the Volunteer Spirit, campus involvement, or global and cultural awareness.

Crowder presented about his experience as the treasurer of the Student Space Technology Association and won first place in the Campus Involvement category. He was advised by Assistant Professor Devina Sanjaya.

Waggoner presented about his community service experience with Remote Area Medical and won second place in the Volunteer Spirit category. He was advised by Engineering Professional Practice Coordinator Suzanne Sawicki.

Co-op Leads to Career Path in Medical Device Research and Development



Nidhi Menon (BME, senior), completed a co-op with Fresenius in Knoxville this spring in their Global Research and Development Department (GRD). There, she assisted in writing protocols for upcoming studies and conducted notebook studies. One big project she took part

in was an environmental extremes study, which required her and her coworkers to come up with a plan to present to company leadership, write the protocol for it, and execute the study. The study itself would help GRD see if a specific product of theirs could withstand extreme temperature excursions and still be safe for patients to use.

"The most valuable benefit I received is the experience of industry," said Menon. Being able to work for an entire semester and network with so many people gives you so much opportunity for the future. By working with Fresenius, I know I want to go into the medical device industry. I now know how I will adjust my current degree plan to meet my career expectations. I also know that I have the connections from my coworkers to support me in my future career. Overall, accepting this internship has opened up many doors for me, for which I am extremely thankful."

MABE Awards Celebration Goes Virtual

On April 20, the department held its first-ever virtual awards celebration for its top students. Although it was disappointing not to recognize and celebrate these students in person at the annual MABE Awards Banquet, which was canceled due to COVID-19, celebrating virtually still allowed everyone to come together. Parents, grandparents, and spouses were also invited to attend.

"I want to congratulate these students who have worked tirelessly and excelled in their studies this past year," said then-Interim Department Head Kivanc Ekici. "I have no doubt these students will continue to do great things and have a bright future ahead of them. We are fortunate to have such wonderful students in MABE."

Award winners:

Samuel Pankratz, Andrew Wilcox, and Andrew You
Outstanding Junior in Aerospace Engineering Award

Luke Stanley, Carson Helton, and Veronica Jeon
Outstanding Junior in Biomedical Engineering Award

Connor Shelander, Jeremy Hensley, Sebastian Sanchez, Micah Shirran, Rebecca Laughon, Preston Young, Konnor Porter, and Eilish Stanek
Outstanding Junior in Mechanical Engineering Award

Christopher Busic, Jonathan Dixon, Spencer McDonald, and Ethan Cerrito
Outstanding Senior in Aerospace Engineering Award

Benjamin Savitz, Bradley Moore, and Lauren Jennings
Outstanding Senior in Biomedical Engineering Award

Alexandra Defilippis, William Davis, William Botts, Justin Wilcox, Alex Arbogast, Parker Trulove, and Zane Chapman
Outstanding Senior in Mechanical Engineering Award

Sam Golter
Student Leadership Award

Jiaqi Wang, Cary Smith, and Soheil Borhani
Outstanding Graduate Student Award

Buckley and Wilt Win at EURēCA

This year, EURēCA was held virtually in April. **Michael Buckley** (BS/ME '20) received the Office of Undergraduate Research's Silver Award and college's Second Place Research Award for his project, entitled "Finite Element Analysis of Laser-Cut, Tubular Robots for Surgical Applications." He was mentored by Associate Professor Caleb Rucker.

Jackson Wilt (BS/ME '20) received an Award of Merit in Research from the college for his "Rotating Nozzle for Additive Manufacturing Fiber Composites" project. He was mentored by Assistant Professor Brett Compton.

Alum Receives Prestigious Henry Granjon Award

Mohan Subramanian (PhD/ES '19) is the recipient of the 2020 Henry Granjon Category C (Design and Structural Integrity) Award from the International Institute of Welding (IIW) for his paper, "Heterogeneous creep deformation behavior of functionally Graded Transition (GTJs)."

The award is given annually in four categories to an author of a paper devoted to research in welding technology or a related subject with the hope of stimulating interest in welding and allied processes among young people.

While at UT, Subramanian was advised by UT-ORNL Governor's Chair Suresh Babu.

"I am so elated to receive this honor," Subramanian said. "Starting as a graduate student back in the fall of 2014, I never imagined I would be able to accomplish something as big as this. Suresh, my co-advisors, and fellow graduate students at UT and ORNL were instrumental in shaping me into a capable researcher."

Since last November, Subramanian has been working as a research engineer at AK Steel Research and Innovation Center in Ohio.

Alumnus Delivers Full-Steam for Campus

Weems Engineering fabricated and delivered a new steam condensate tank for the UT steam plant earlier this summer, bringing the story of some Engineering Vols around full circle. Owner Matt Weems (BS/ME '10) and partners founded the industrial metal work company in 2012.

"We started with three guys and now have roughly 85 employees," said Weems, whose main project engineers at Weems are TCE alumni Michael Borkowski (BS/ME '09) and Jordan Allen (BS/ME '06). "We are definitely a beacon of orange in the north Georgia area."

While at UT, Weems enjoyed participating in a co-op with Shaw Industries one summer.

"They ended up offering me a job which I accepted shortly after I graduated," he said. "I moved down to Dalton, Georgia, where Shaw has their corporate headquarters."

Weems worked for Shaw for two years and then moved on to establish his own company, also based in Dalton. He was born and raised in Knoxville in an All-Vol family: His mother and sister both went to UT as well.

Curiouser and Curiouser, Jim Conklin's Lifelong Pursuit

By Laura Tenpenny.

Arctic and Antarctic swimmer, Air Force veteran, first generation college student, expert in thermodynamics and heat transfer—the many lives of Jim Conklin (PhD/ME '89) unite in an insatiable interest in the world and how it works. Curiosity became his guide.



Conklin took the polar plunge from Palmer Station in Antarctica.

"I'm the first in my extended family to attend college and the only college graduate in my immediate family," said Conklin. "I had no mentor in engineering, but I did have an innate curiosity about how physics and math can describe real-world performance and help improve that performance."

This curiosity led to a bachelor's in mechanical engineering from the University of Connecticut and a master's in nuclear engineering from MIT. He put his education to use in the Air Force at Cape Canaveral as a propulsion engineer helping launch military satellites on the Titan IIIC launch vehicle.

There, he met Carol, a personnel officer and his future wife. They retired from service to East Tennessee where they could enjoy the outdoors and Conklin could appease his love of learning as an engineer at ORNL.

"At ORNL, I worked on many interesting and worthwhile projects using my expertise in thermodynamics and heat transfer, but I particularly enjoyed a dissociating fluid turbomachinery project because of its novelty and challenges," said Conklin.

This project led to one of two patents, just a couple of achievements in Conklin's impressive career of 36 years at the national laboratory.

"Many of my coworkers who had attended UT were better prepared than I for ORNL's advanced research," Conklin said. "I decided to pursue a PhD from UT. The qualifying exam was the hardest and longest day of my life, but I was ecstatic when I passed."

His professional success has led him to give back to his doctoral alma mater. Conklin served eight years as an adjunct professor in MABE and recently established a faculty fellowship as well as planned gifts to support future scholarships and a professorship.

Conklin's generosity also

extends to UT Veterinary Medical Center. The couple have owned over 20 dogs. Carol spent her non-military career in the pet industry, eventually owning a pet-grooming business.

Apart from caring for their many animals, Conklin and his wife travel regularly, a wanderlust born of his desire to learn.

"It's awe-inspiring to see how people and animals live in different climates," said Conklin. "I've seen a flock of an estimated 200,000 flamingos in flight over the Ngorogoro crater, swam with sea lions in the Galapagos, and witnessed over 100,000 king penguins on South Georgia Island."

He has set foot on all seven continents, even completing polar plunges in the Arctic and Antarctic.

"I did it for bragging rights and as a personal challenge, but also to see what the explorers of over 100 years ago endured to explore the unknown," said Conklin.

He went to the ends of the earth to find answers, and UT is proud to have been part of Conklin's pursuit of knowledge and his professional success.

Andes Mountain Top to Tennessee Valley

By Laura Tenpenny.

One week you're climbing up to Machu Picchu. The next, you can barely climb out of bed. This was Jim Froula's experience with COVID-19.

Froula (BS/ME '67, MS/ME '68), age 74, woke up to a near-constant cough. He and his partner, Mary Coffey, had just returned on March 16 from Peru and Ecuador. They were exploring the Galapagos when their travel company informed their group of 30 that Ecuador, now facing Coronavirus concerns, would close its borders within 24 hours. The day after a harried journey home, Froula's cough was quickly succeeded by fever, severe lethargy, and shortness of breath—all tell-tale signs of the virus.

"Each morning I crawled out of bed, my head was basically in a puddle of sweat," Froula said.

His fever routinely reached 101 degrees and he lost 10 pounds in 10 days.

"I'm a UT engineer, so in my head I'm plotting my weight on a graph," Froula explained. "With each day charted on the x-axis and my weight on the y, I'm watching this curve drop a pound a day."

After several days of steady symptoms, he received an official letter informing him two people from their tour group had tested positive for COVID-19. That was the tipping point. He immediately made an appointment at UT Medical Center. After tests for flu and other likely suspects returned negative, he was directed to the hospital's COVID-19 mobile testing site and swabbed via his driver's side window.

"They told me to stay home and rest, drink plenty of fluids, and call if there were any problems," said Froula.

After more than a week of no improvement, Froula was prescribed vitamin C and hydroxychloroquine, an anti-malaria medication, which has had anecdotal success in treatment.

"Since I served with the 101st Airborne in Vietnam and hiked Mt. Kilimanjaro, I'm familiar with anti-malaria pills. They gave me some trippy dreams," Froula said. "I didn't notice anything like that this time."

Froula's fever finally broke on March 27. The following day, he received a positive test result for COVID-19. The Knox County Health Department called him each day to check



his symptoms and ensure that he and Coffey remained at home. Two weeks to the day since initial symptoms, Froula was released from quarantine on March 31.

Froula acknowledges his network of support for seeing him through, from family and neighbors who mowed the lawn and brought over food to Mary, his dedicated partner, who remains virus-free.

"She cared for me every hour," Froula said. "Travelling really took it out of both of us, so apart from looking after me, she was resting as much as possible."

During quarantine the couch was their constant companion, but that's

far from normal. Froula boasts medals from the 2019 Senior Olympics in the 100-meter freestyle and a 900-mile badge for walking all the trails in the Great Smoky Mountains National Park.

He started gaining weight almost immediately after his fever broke and soon began walking regularly again. Froula has never been one to sit still.

"I learned a lot from outside activities," Froula said of his time at UT. "I was business manager for the yearbook, chairman of Carnicus, and president of the Tau Beta Pi student chapter to name a few."

His high extracurricular activity led to a Torchbearer award, the highest UT student honor. Following his time at UT and a stint in the army, Froula worked for IBM as a development engineer and then as executive director of Tau Beta Pi, the engineering honor society he served as a student. Now, Froula spends his abundant energy sharing his experience and the gravity of COVID-19.

"It's like when you're driving. You don't know who's texting and who isn't, so it's best to stay off the roads right now," Froula said. "It needs to be taken seriously. This is a good time to let the number of cases go down and stay home."

Although released from quarantine, Froula and Coffey continue to stay home. Some might be antsy to be free of their four walls, but Froula is just happy to be free of the virus.

ALUMNI MEMORIES

MABE alumnus George (Andy) Herndon (BS/ME, '69) sent in a collection of photos he found of UT from the late summer and fall of 1968, including football games against UCLA and Ole Miss.



Balloons are released during the Pride of the Southland Marching Band's pregame show ahead of the 1968 UT-UCLA game. Tennessee installed artificial turf before the season, with the surface becoming known as "Doug's Rug" in homage to then-coach Doug Dickey. Oddly, the artificial turf was removed before the 1994 season, when the athletic director at UT was...Doug Dickey.



UT's Pride of the Southland Marching Band opens the "T" as the team runs through prior to the 1968 UCLA game. The tradition began in 1965 when Dickey and then-band director WJ Julian came up with the idea as a way for the team to get from its locker room—at the time located under the east stands—to its spot on the opposite sideline without running through the opposing team.



UT cheerleaders rally the crowd during the Vols' 1968 game against Ole Miss, a 31-0 Tennessee victory. Of particular note, that was the first season as a starter for a young Rebels quarterback named Archie Manning.



The iconic "Vols" sign in the south end zone of Neyland Stadium is seen during UT's 1968 game with Ole Miss. The sign remained on top of the stadium even after the addition of upper deck seats, only being removed when the stadium's first JumboTron was installed in 1999.



A wooden archway featuring UT-stylized versions of Mickey and Minnie Mouse welcomes visitors to The Hill during the week of homecoming, 1968.



The crowd in the south endzone comes to its feet as UCLA quarterback Bill Bolden looks over the Tennessee defense, with the Bruins driving inside the 10-yard-line.



Tennessee prepares to receive the kickoff from UCLA during the 1968 homecoming game. The No. 5 Vols defeated the Bruins 42-18. Neyland Stadium was expanded that year by the addition of an upper deck on the east side of the stadium, bringing its capacity to 64,429.



People soak up the sun at the Student Aquatic Center in 1968. The smokestack from the old steam plant and portions of Fraternity Row can be seen in the background. The Student Recreational and Fitness Center (TRECS) and RecSports Field now adjoin the site.



A pair of divers prepare to go off the springboards at the Student Aquatic Center in 1968. The Fleet Management Building—still in use today—can be seen in the background, its appearance remaining largely unchanged 52 years later.



Send Us Your Photos

Do you have any photographs from your time as a student at UT? If so, we'd love for you to share them with us. MABE is collecting old photos of research projects, lab and classroom space, students, faculty, staff, and campus. **Please send digital copies to williamk@utk.edu.** We look forward to rediscovering our past with your help!




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SpaceX's Crew Dragon,
carrying NASA
astronauts Robert
Behnken and Douglas
Hurley, splashes
down in the Gulf of
Mexico off the coast of
Pensacola, Florida.
Page 4.

