

UNT | COLLEGE OF
ENGINEERING

A YEAR IN REVIEW
A YEAR IN REVIEW

A Message



from the Dean

Dear Friends of the College of Engineering,

UNT College of Engineering is a young and dynamic college in a Carnegie R1 doctoral university. Since opening its doors to students in January 2004, the college has become a powerhouse of research and education with about 100 full-time faculty members – two of which are members of the National Academy of Engineering – and about 4,000 students. Carrying this momentum, the college is in its next phase of major growth in size and excellence, and I am proud to update you on what has happened in this college during the past year.

In this year in review, you'll read about our new Additive Manufacturing Lab and our Center for Agile and Adaptive Additive Manufacturing, both made possible by a \$10 million boost from the 86th Texas Legislature. You'll also learn about how one of our faculty members is tackling food insecurity by working on innovations at the nexus of food, energy and water systems.

You'll be able to dive deeper into the exciting research our students and faculty are doing with NASA, get an inside look at how one student team won first place for their CubeSat design at the international Consortium for the Advancement of Shape Memory Alloy Research and Technology (CAS MART) design challenge, and learn more about how we're engaging with the Office of Naval Research to fill future Naval jobs in STEM. And, of course, you'll learn more about the legacy our founding dean, Oscar Garcia, created as he moves on to retirement.

There are many more stories spanning our six departments throughout this publication. It's been quite a year, and I've enjoyed learning about all that our students, faculty and staff have accomplished. I can't wait to see what the coming months and years will bring as we continue to grow and build upon our excellence.

Hanchen Huang
Dean and Lupe Murchison Foundation Professor

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“UNT’s New 3D
Printing Lab Could
Manufacture Lasting
Change For Industry”
Texas Standard
Reach
40,000
Ad Value
\$1,603

“Shape memory alloy
technology leads
to energy-efficient
CubeSat”
Phys.org
Reach
3,600,00
Ad Value
\$33,585

“UNT Engineering Team
Is Finalist in NASA
Suits Competition”
NBC DFW
Dallas Morning News
+ 12 additional stories
Reach
3,600,00
Ad Value
\$33,585

21

Graduate and undergraduate programs
offered at the College of Engineering

1,440+

First-generation students enrolled
in the College of Engineering

6,000+

First-generation students enrolled
in the College of Engineering

TOP **100**

Among public universities for
engineering grad programs

#45

Among public grad programs for
materials science and engineering



Degrees

10 7 4

BACHELOR'S MASTER'S DOCTORAL

Facts & Figures

WATER

UNT Regents Professor Miguel Acevedo

FOR A

receives \$2.5M from National Science Foundation

BETTER

to improve agricultural soil and irrigation water

WORLD

Miguel Acevedo has a huge task on his plate.

The UNT College of Engineering Regents Professor and member of the Advanced Environmental Research Institute just received a \$2.5 million grant from the National Science Foundation to tackle a (rather salty) problem that affects food production in western regions of the United States.

Acevedo, along with collaborators from New Mexico State University and Colorado State University, seeks to contribute solutions to the high amount of salt found in agricultural soil and irrigation water in U.S. regions where water is limited or where traditional fertilizer and irrigation management have impaired water and soil. It's a problem that affects crops in those areas, leading to a decrease in crop yield and overall food production, as well as degradation of soil and water quality.

"I've been a proponent of using interdisciplinary research to find ways to increase food security all while preserving environmental quality. The main feature of this research is its integrative approach to food, energy and water systems, which combines interactions among these systems, and is of great interest to NSF and other funding agencies," said Acevedo. "Our goal for this project is to increase crop yield in these areas by improving irrigation water quality and restoring soil fertility by using its microbes, thereby reducing fertilizer applications

and trapping carbon in the soil instead of releasing it to the atmosphere. Ultimately, this leads to a combined increase in food production and a reduction of global warming. These effects will be evaluated by using advanced monitoring technology, simulation modeling, and socio-economic analysis."

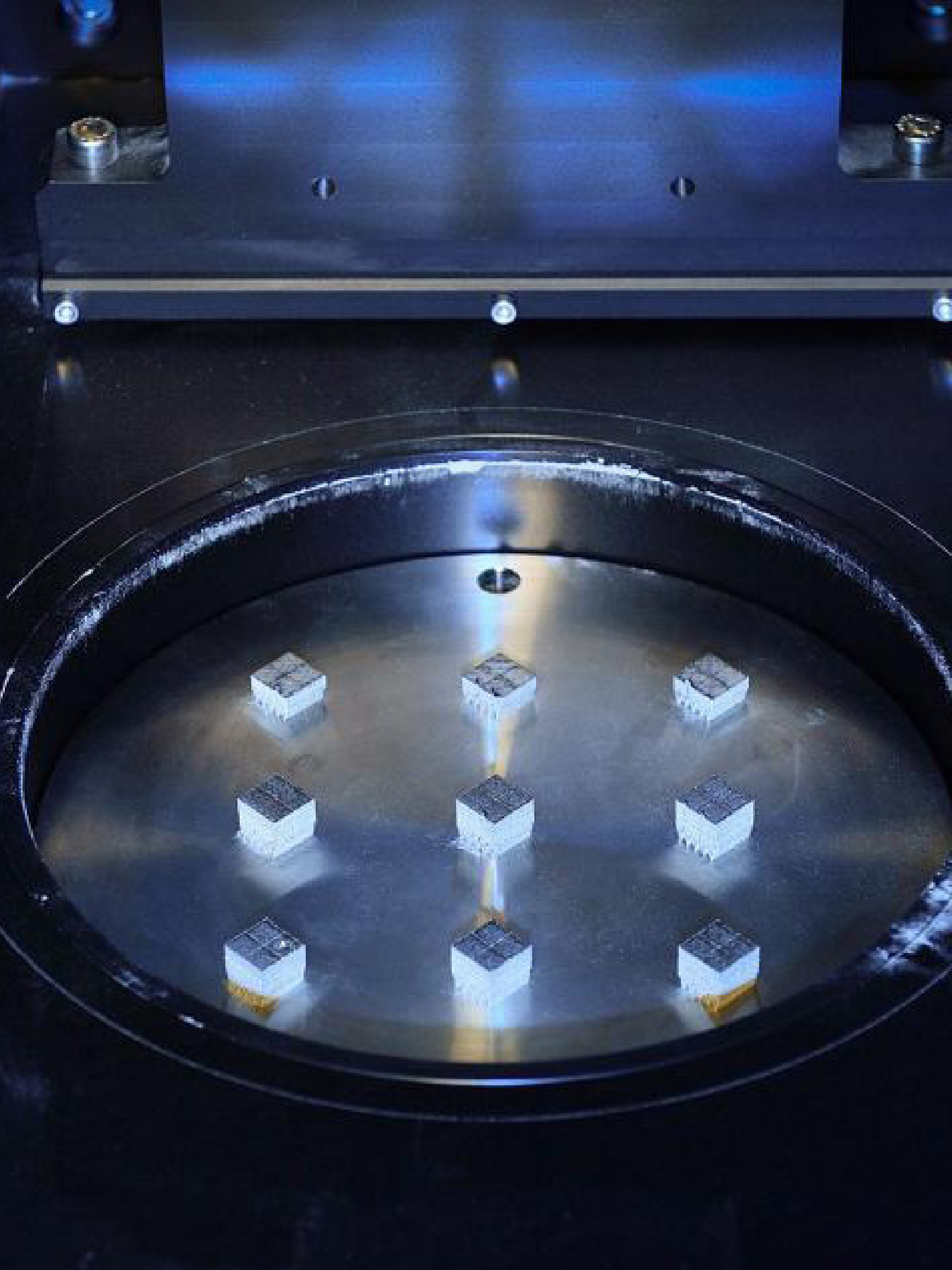
"The main feature of this research is its integrative approach to food, energy and water systems."

The UNT team, including electrical engineering staff researchers Breana Smithers and Keith Mallory and Ph.D. student Sanjaya Gurung plan to use a method to pull the salt from brackish groundwater, which is an intermediate between seawater and freshwater, powered by renewable energy. This off-the-grid system is a process that the team is using at the Brackish Groundwater National Desalination Research Facility in New Mexico to produce quality irrigation water.

"For this project, we're going to run experiments in two areas: the Tularosa basin in southeastern New Mexico, where the water is limited to brackish groundwater, and the Lower Arkansas River Valley in Southeastern Colorado, which is affected by increasing soil and water salinization problems and an associated reduction in crop yield," said Acevedo.

The project began Aug. 1 and is expected to last five years.

 Kayla Green



Adding on to Additive Manufacturing

The Fourth Industrial Revolution – the fusion of manufacturing design, process and production into one comprehensive whole – has spurred new technology for additive manufacturing, a process that builds 3D objects through the successive layering of metals, ceramic and metal-ceramic alloys.

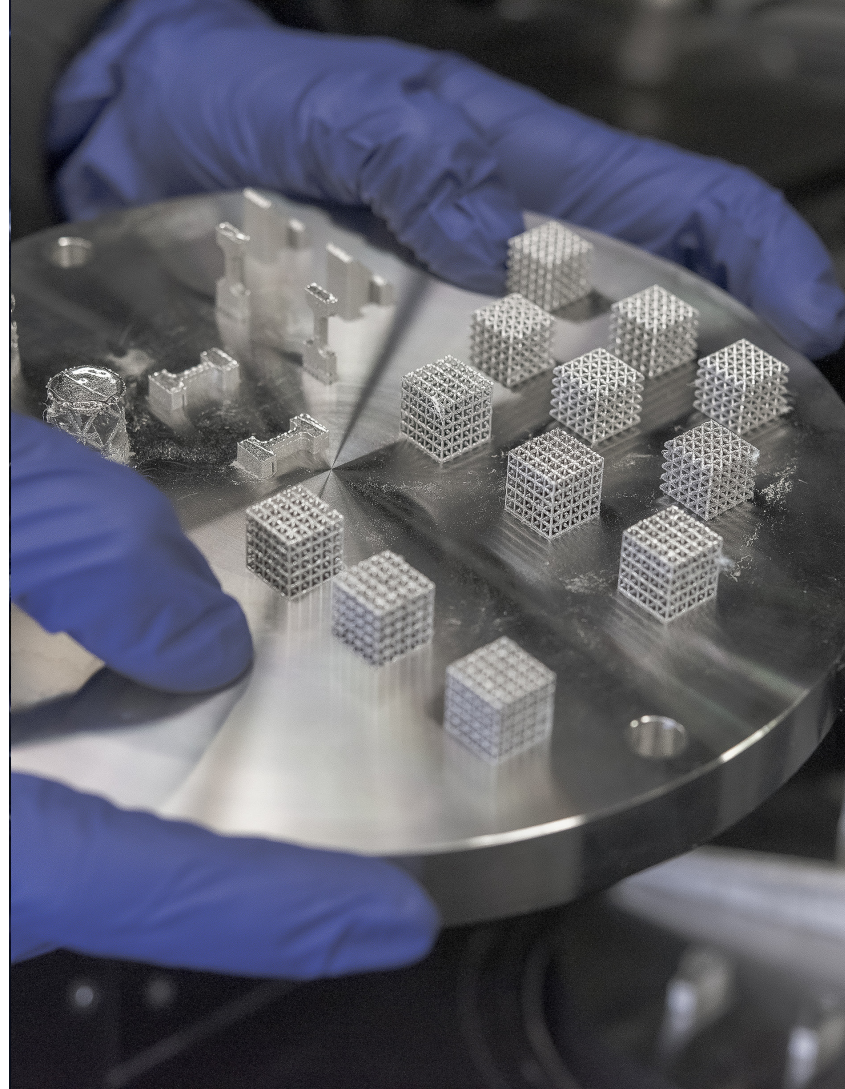
Here's the inside scoop on how...

The University of North Texas's new state-of-art Additive Manufacturing Laboratory located within the university's centralized Materials Research Facility is helping to pave the way to this new future of manufacturing.

Additive manufacturing is capable of producing higher-strength and more energy-efficient materials while reducing the actual amount of materials needed, wear and tear on parts and use of natural resources.

"This type of technology enables our students and faculty to dive deeper into additive manufacturing and conduct hands-on and solutions-based research," says Yan Huang, College of Engineering associate dean for research and graduate studies. "They will be able to expand their research largely within many areas including aerospace and biomedical fields as well as the oil and gas industries."

UNT is going beyond metallic 3D printing by developing methods to determine how the process affects the advanced materials. A state-of-the-art Additive Manufacturing Laboratory (AML) under the overall umbrella of the university's existing



materials research facility (MRF) and sponsorship of the Offices of Vice President of Research and Innovation and the Dean of Engineering has been established with the dual purpose of research and education. UNT is the only university in the nation with this configuration, which allows for cooperation across fields to better advance the science and application of additive manufacturing.

"Many universities are involved in 3D printing, but we want to go deeper. We want to understand what is fundamentally different about the same metallic material made using 3D printing technology versus the manufacturing technologies in subtractive manufacturing," says Rajarshi Banerjee, Regents Professor and director of the MRF. "What is the difference? Is it good, or is it bad?"

Researchers and students are using the equipment to create components such as prototypes of medical implants, which

were on display at the event. Banerjee explains that the tools in the adjacent Materials Research Facility provide the capability to understand how components built by the 3D printing equipment will function in a real manufacturing system. Knowing how the process is affecting the materials is key to applying additive manufacturing in the manufacturing industry.

"The work conducted in the Additive Manufacturing Laboratory has the potential to have broad impacts on our society," Narendra Dahotre, interim vice president of research and innovation and Distinguished Research Professor of materials science and engineering, said during Wednesday's event. "And UNT faculty and student research have the opportunity to shape this emerging field – and that is part of what makes this opening so exciting."

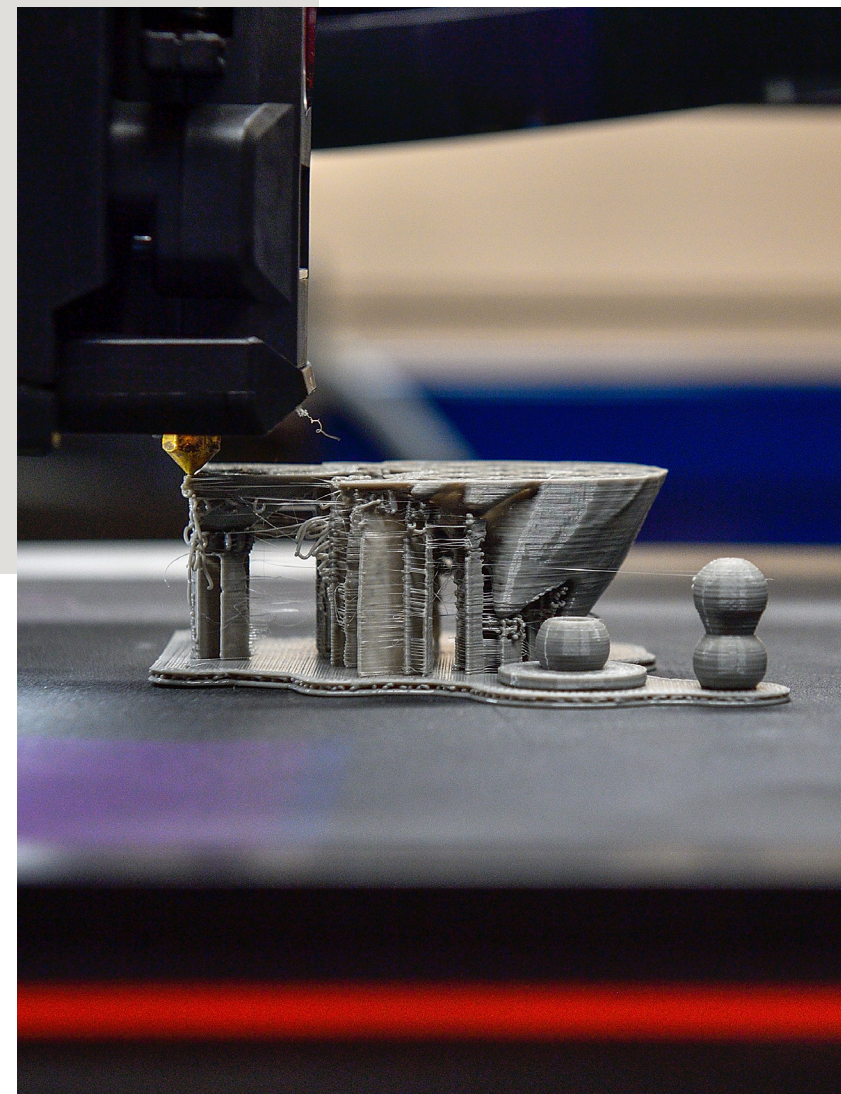
Dahotre, is the internationally known expert in laser-based material processing that remains the basis of present additive

manufacturing technology. In fact, Dahotre has been working on laser-based advanced materials manufacturing for the past three decades, even before the additive manufacturing term was coined. Dahotre, in collaboration with three College of Engineering professors Rajarshi Banerjee, Rajiv Mishra and Andrey Voevodin, conceived the concept of the AML and led the efforts to bring it into existence.

The Additive Manufacturing Laboratory is a comprehensive and centralized facility, bringing together both types of additive manufacturing – laser powder bed fusion (LENS 750), also referred to as selective laser melting, and laser-based directed energy deposition (Aconity MIDI) – along with several pre- and post-process equipment for fundamental and applied research on additive manufacturing. The lab will foster UNT's interdisciplinary research in the area of advanced manufacturing.

"It's facilities like these this that help put us on the map," President Neal Smatresk said. "Here in Texas, the industry is a little behind, and this laboratory is key to helping us advance this area now. Investing in our infrastructure is key as we work toward building our reputation as a nationally prominent research university."

Amy Brundeen



Making a CAREER

Out of Negation

Eduardo Blanco, an assistant professor with the Department of Computer Science and Engineering, received a \$500,000 National Science Foundation Faculty Early Career Development Program (CAREER) award to teach computers the intricacies of negation.

“To a computer trying to understand human language, the word never can be perplexing. What computers don’t seem to understand is that never doesn’t always mean no,” Blanco said. “A good example of this involves a sentence with conditions. The sentence, ‘Joe never leaves the house in the morning without a coffee in his hand,’ is understood by humans to mean that Joe does leave the house in the morning and that he always does so with a coffee in his hand. Currently, intelligent systems would have trouble understanding that Joe leaves his house.”

The five-year grant allows Blanco to build novel resources and algorithms to enable intelligent systems to understand the numerous positive interpretations hidden in sentences containing negation.

“The first part of this project develops an extensive collection of negations and their positive interpretations,” Blanco said. “Fortunately, I won’t be doing this alone. The NSF grant allows me to bring in both graduate and undergraduate students to help.”

After compiling the negations and interpretations, Blanco’s team will develop computational algorithms to automatically recognize negation, generate positive interpretations and do so in context. The work could help smart devices and computers carry on more natural conversations with humans, provide better language translations and benefit any application that requires language understanding.

 Jim Rogers



Jobs on lock *at Lockheed*

Mechanical and energy engineering students, Christina Rapert, Yousef Akil and Stephanie Lopez will kick off their bright careers in engineering with one of the world’s foremost defense companies: Lockheed Martin.

The three are among about a dozen students who’ve received offers from the company, with positions starting this summer in either Fort Worth or Grand Prairie.

Rapert will be at Lockheed working with F35 weapons integration. It’s a fitting job for a plane enthusiast who’d already completed two other internships with the company.

“In my previous internships, I worked on the C-130 in Georgia and on the F-35 in Fort Worth. In this position, I’ll be looking into how we put missiles and other hardware onto the planes,” she said. “I didn’t know I’d end up here, but I’m happy that I did!”

During her time at the university, Rapert also majored in mathematics at TWU through the UNT-TWU dual degree program.

“I’d started at UNT in the mechanical and energy engineering program, then applied to TWU for their mathematics and Honors programs,” said Rapert, an Honors student at both universities. “I loved that the mechanical engineering was broad and that you can do so much with math. At the time, it sounded a little hard, but it was doable.”

Akil, who’s also at the Fort Worth site, will work as a quality engineer, ensuring there aren’t any design or mechanical issues with the F35 jets.

“Basically, if anything in the engine fails, you have to run an analysis and see how to fix it,” he said. “You have to be able

to think quickly and solve problems. Senior Design at UNT really helped me with that; it made me think so openly about engineering – it changed the way I think about problems.”

Akil, an officer in the student chapter of the American Society of Mechanical Engineers, first heard about the job at a meeting in January.

“It was just before school started back up, and we were meeting at a Starbucks in Denton, which was a bit of a drive from where I live, but I decided to go anyway,” he said. “Towards the end of the meeting, another student mentioned Lockheed had a hiring fair in a couple days, which I hadn’t known at the time, so I rushed home and started fixing my resume and preparing.”

“I got really lucky. It doesn’t happen with a lot of people,” he said. “I’m so thankful for this.”

Unlike Rapert and Akil, Lopez will work at Lockheed’s Grand Prairie site as a manufacturing engineer.

“I’m going to be working in the missiles facility making sure the parts and things designed are actually able to be made,” she said. It’s a job, she says, her internship with the Naval Sea Systems Command (NAVSEA) helped prepare her for.

“I interned last year with the Navy and worked under a Six Sigma Black Belt, working to streamline and make our processes as efficient as possible,” she said.

Lopez, like Rapert, also is a dual UNT-TWU graduate. The two will receive a B.S. in mechanical and energy engineering from UNT and a B.S. in mathematics from TWU.

“I loved that the mechanical engineering was broad and that you can do so much with math.”

 Kayla Green



[Cultivating] Women in STEM

UNT Engineering received a \$30,000 grant from the Texas Women's Foundation to put towards multiple initiatives, including UNT STEM@thePark, DEE-UNTAApp Camp, a train-the-trainer online program and Latina STEM teacher-led after school programs – all of which are aimed at increasing the number of women in computer science and engineering.

"There are a lot of very interesting challenges out there, and we're not going to be able to solve them unless we have more diversity," said Stephanie Ludi, a computer science and engineering professor. "Part of that diversity is getting young women involved and seeing not only what their potential is through their technical skills but also seeing what they can bring to the challenge through their creativity and initiative."

UNTSTEM@thePark engages K-12 students in engineering design experiences, and DEE-UNTAApp Camp is a camp focused on computational thinking, programming and the engineering process for developing mobile apps.

"The idea behind DEE-UNTAApp Camp is to teach students how to create, design and engineer apps," said Ludi. "The camp really shows the students how to integrate creativity into engineering and problem solve issues that

may arise in the process of designing, coding and testing something they've created."

The online training modules take on a train-the-trainer model for UNT Engineering students, K-12 teachers and parents. Students use the modules to brush up on the concepts and help educate K-12 students who attend the DEE-UNTAApp Camp. Teachers are able to bring the learned skills back to their classrooms to lead after school STEM programs, and parents involved in organizations like the Girl Scouts are able to provide the material to their respective organizations.

"By offering the online training modules, we're able to make engineering more accessible to a larger number of girls in North Texas," said Nandika D'Souza, associate dean for undergraduate studies. "The training engages teachers and parents in STEM, and also provides a leadership development opportunity for our undergraduate and graduate students who participate in the program. Overall, the training modules help us further the efforts we're already doing in person with our camps."

 Kayla Green

New Navy funding helps STEM careers

UNT Engineering will receive \$750,000 from the Office of Naval Research over the next three years to fund educational and research initiatives in materials, manufacturing and electronics.

This initiative will focus on highlighting the benefits of miniaturized systems, such as sensors and actuators, that are at the heart of micro-electro-mechanical systems and nanotechnology, particularly for radio frequency applications. Additive manufacturing along with microfabrication technology will be used to create flexible, light-weight sensors using nanomaterials, where some of these structures will also be used to transmit and receive radio frequency signals.

Students involved in this program will have the opportunity to learn more about Naval STEM careers and develop interdisciplinary skills to help fulfill a tremendous national need for highly trained engineers and scientists in the Navy.

Anupama Kaul, the PACCAR endowed professor of engineering, is the principal investigator of the grant

and works in the Department of Materials Science and Engineering and Department of Electrical Engineering. She also serves as director of the PACCAR Technology Institute and is founder of the Nanoscale Materials and Devices Laboratory at UNT. Ifana Mahbub, assistant professor in electrical engineering, is a co-principal investigator on the grant and is director of the Integrated Biomedical Circuits and Systems Laboratory. Other team members UNT include Angus McColl, senior director of development, and Kathryn Beasley, assistant director of recruitment in the College of Engineering.

"Under this grant, we will collaborate with our partners at NAVAIR, the Naval Research Labs and other Naval facilities, along with other faculty affiliated with UNT's PACCAR Technology Institute," said Kaul. "Together, we intend to provide an integrated education, training and research experience for undergraduate and graduate students including outreach initiatives to North Texas middle and high school students in STEM."

 Jim Rogers

"Together, we intend to provide an integrated education, training and research experience for undergraduate and graduate students"

SPACE

Launch into how students and faculty at the UNT College of Engineering are collaborating with NASA and pushing the boundaries into space

1 DESIGNING FUTURE SPACESUITS

Department of Computer Science and Engineering juniors David Woodward, Tim Stern and Juan Ruiz are reaching for the stars with an augmented reality program that could change the way astronauts communicate in space.

Their work is part of the NASA Spacesuit User Interface Technologies (SUITS) Design Challenge, which tasked students to develop a system to provide real-time visual communication via an astronaut's helmet visor.

"Currently during a spacewalk, astronauts communicate with mission control via radio transmission. Voice communication is delayed and can sometimes be disrupted as it travels between Earth and the astronaut," said Stern. "What we have done, using our AR goggles, is develop a system through which astronauts receive real time visual information. This information can be anything from the astronaut's suit status, biometrics, checklists, detailed instructions and even pictures."

The augmented reality display does not interfere with the astronaut's view of the real world. Ruiz said that unlike virtual

reality, the augmented reality user will still see the outside world. The AR data will be semitransparent and overlay the user's actual view.

"We didn't really have any experience with AR," Stern said. "We heard about the NASA SUITS Challenge and thought it would be a cool project. We used our engineering experience and trained ourselves to do the programming for the AR goggles. Imagine our surprise when we were one of 16 teams to be selected to go the Johnson Space Center along with teams from Virginia Tech and Harvard."

"This project has been particularly exciting for me," said Woodward "Part of the competition involved creating a curriculum for K-12 students. It has been one of the best parts of the project to visit classrooms and share our project with students. When I was a kid, I remember a visitor coming to class to talk about science. That talk really changed things for me. It was then I decided to pursue my passion for STEM. Now, as part of this project, I get to be the visitor that goes to schools and gets a kid excited about the future."

 Jim Rogers





A UNT College of Engineering team was one of 11 teams selected nationwide for a new NASA X-Hab challenge aimed at improving life support for astronauts in space.

Engineering Technology Associate Professor Huseyin Bostanci and his undergraduate team's challenge will be to design, build, and characterize a functional prototype of a microgravity gas-liquid separator for an air revitalization system. In other words, the team is looking at ways to better remove carbon dioxide from manned space vehicles and habitats, ultimately ensuring the availability of oxygen. The project will build upon a number of existing carbon dioxide removal systems but will replace gravity-dependent tanks used for the gas-liquid separation and storage with vortex style separators, allowing the new design to be non-gravity-dependent.

"Space applications are very unique and sometimes they're ahead of terrestrial applications in terms of the technology involved," said Bostanci. "This project will give one of our

upcoming senior design teams the chance to work on a funded project that is not only innovative, but is also for a national agency."


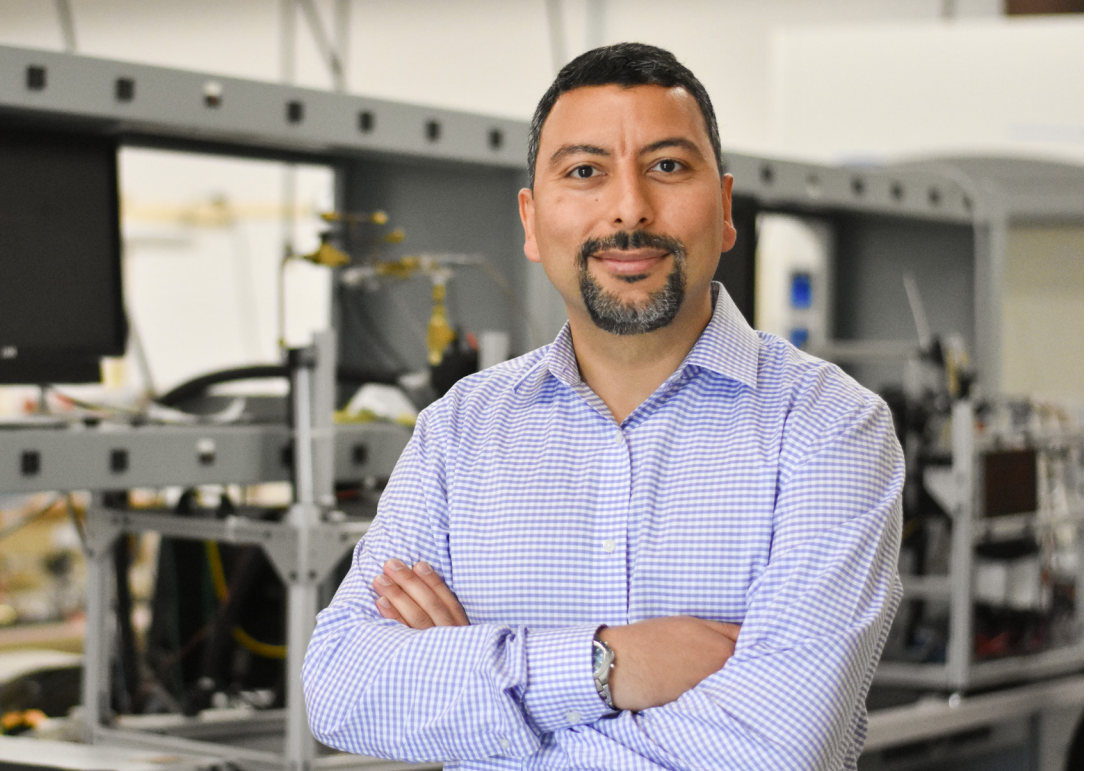
The team will collaborate with two other experts from Texas A&M and Johnson Space Center, and use the \$30,000 funding from the National Space Grant Foundation to develop their prototype during the 2019-2020 academic year. They also will complete engineering design reviews and provide three project status briefings to NASA.

"The process gives students a real-life look into how NASA works by requiring the university teams follow their regular review and deadline cycles," said Bostanci. "It helps the students shift their mindset from an academic calendar to one more reflective of the industry."

The team will present their final X-Hab challenge prototype for evaluation in May 2020.

 Kayla Green

A NEED FOR O₂

The process gives students a real-life look into how NASA works



3



NASA OR BUST

UNT junior Morgan Novak
doesn't want to go to space.
She wants her work to go to space.

“Whether it’s a printed circuit board that I designed or a giant project like a new robot for the International Space Station, or maybe even a Mars rover I touched in some way,” Novak, an electrical engineering major, says, “I want to see my projects travel to space.”

So far, Novak has completed three internships with NASA and, before graduating from UNT, plans to finish three more. This year, she is spending the spring and summer semesters learning more about engineering at NASA’s Johnson Space Center in Houston as a member of the agency’s co-op program.

Even two years later, she still remembers the shock of receiving her first internship.

“I landed my first NASA internship offer via email while on spring break. It was for the summer of 2017 and, at first, I thought it was a fake. I dropped my computer and ran to tell my parents,” said Novak, who first became involved with NASA as a high school student in Hamshire and member of the Texas High School Aerospace Scholars program, through which she was invited to spend a week at the Johnson Space Center. “I knew I was going to take it. It was NASA.”

Novak’s high school experience at the Johnson Space Center is what initially led her to apply for the NASA internship. It was at Johnson where she was able to network with engineers, scientists and computer technicians who told her about internships and co-ops for students. Though she was just a freshman when she received word of her acceptance into the 2017 program at NASA’s Katherine Johnson Independent Verification and Validation Facility — created in response to

the 1984 Challenger explosion — she felt prepared for the role thanks to her engineering classes at UNT and the support from those at NASA.

“Up to this point I had taken two C++ programming language classes at UNT and felt that prepared me for the challenge,” said Novak, whose primary responsibility during her internship was to review computer code. “The NASA employees were very nice, and my mentor there was always around to answer my questions.”

Upon her return, she buried herself in her sophomore coursework, including a circuit analysis class with Miguel Acevedo, Regents Professor of electrical engineering, and a class where she learned about the hardware description language VHDL that helped with future NASA internships. Novak completed her second internship in spring 2018 with the Active Response Gravity Offload System at Johnson Space Center, and her third in summer 2018 at the Kennedy Space Center in Florida, where she witnessed the launches of two SpaceX Falcon 9s.

“It was amazing — it was really early in the morning, so my mentors got to the base early and escorted me and about 15 other interns in front of the Vehicle Assembly Building to watch,” said Novak, whose

role at the Kennedy Space Center involved writing code for Command and Control Launch Systems. “We could see the launch pad clearly and the colors were so vibrant.”

Novak said the internships have been a wonderful opportunity to get hands-on experience that reinforce her studies.

“I’ve been able to see how the things we learn about in class work in reality instead of in theory,” she said.

Those experiences helped Novak pinpoint her interests. After learning about the details of the Active Response Gravity Offload System project during her 2018 internship at the Johnson Space Center, she realized it was the type of work she wanted to spend the rest of her life doing.

“The system is designed to simulate low-gravity environments,” said Novak, whose determination — which she honed as a UNT student — helped her problem solve during the

project, like when she figured out a faulty gear box was the culprit behind a malfunctioning motor. “Getting to work on it was a big deal for me. I was able to get my hands dirty making motors spin. It was fun.”

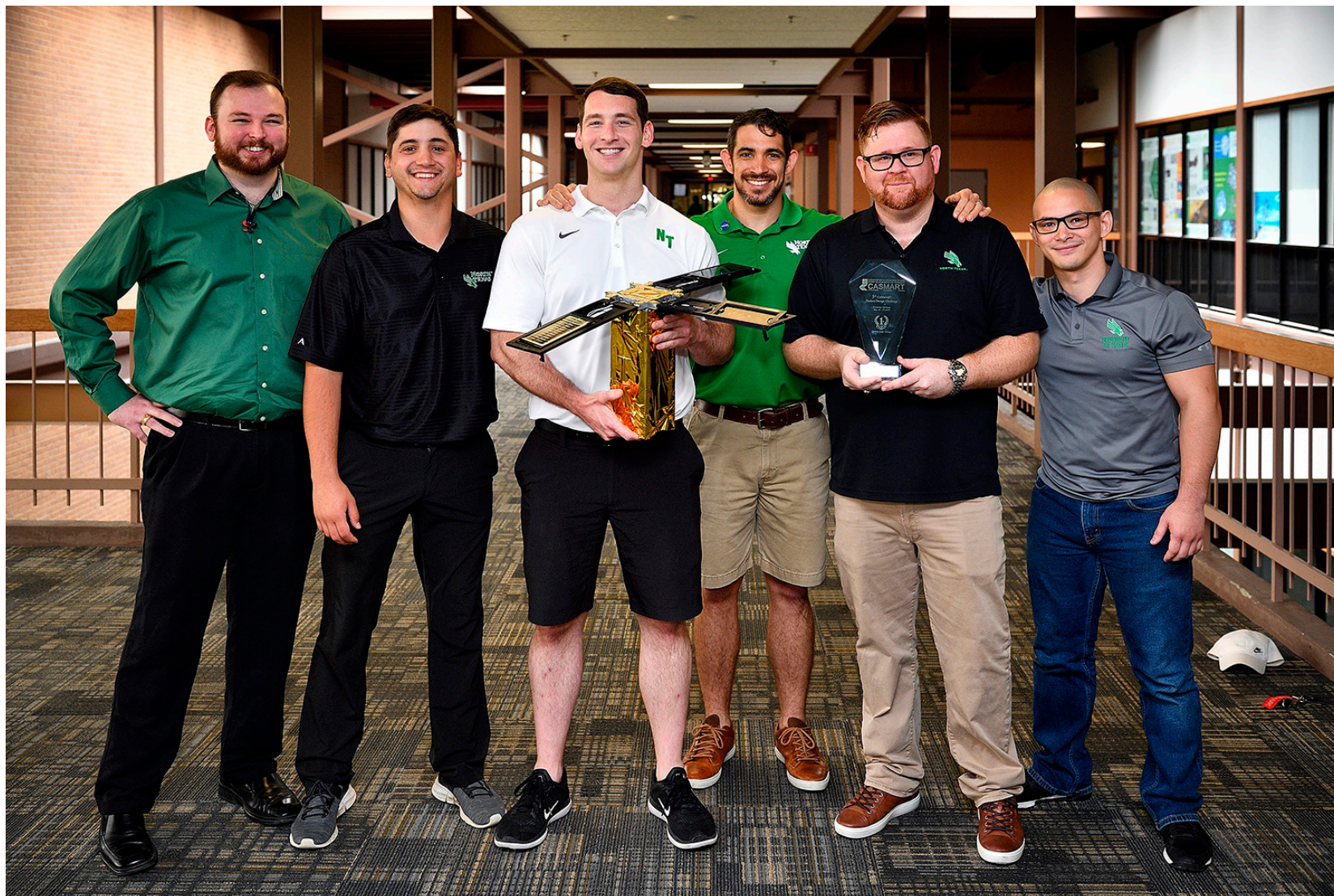
Novak returned to UNT for the fall 2018 semester, taking 18 credit hours to stay on track to graduate in December 2020. Much of her success, she said, is due to the support she’s received from the College of Engineering, which helped her balance internships and coursework.

“I wouldn’t have been able to do all of this if it wasn’t for my UNT mentor Gayatri Mehta in electrical engineering,” she said. “She helped me learn how to earn credit for my internships. I am well on my way to my NASA dream job thanks in large part to the College of Engineering and my UNT family.”

 Jim Rogers

Cue the Applause:

Cubesat takes 1st at international competition



A team of UNT Engineering seniors have created an energy efficient system for controlling solar panels on CubeSats using a nickel-titanium shape memory alloy.

Their design beat out teams from nine other universities to take first place at the CASMART 3rd Student Design Challenge in Germany. The international engineering competition for undergrad and graduate students asked teams to create innovative technologies using shape memory alloy.

CubeSats, sometimes called micro-satellites, can be as small as a 4-inch cube. They often use off-the-shelf parts and are inexpensive to launch into low-earth orbit. CubeSats can be used for everything from general research to communications and Earth observation.

Shape memory alloys have the ability to alter their shape in response to temperature changes. These changes can be used to push, pull and rotate a CubeSat's solar panels without the need for sophisticated moving parts and heavy power usage. The alloy takes up less space than hydraulic or pneumatic systems and by eliminating pumps, gears, fluids and seals, there are fewer parts to fail.

"The amount of power available in CubeSats prior to solar panel deployment is very, very limited," said Michael Ayers, a mechanical and energy engineering senior. "Until it goes solar,

the CubeSat is essentially a phone with no charger. Once the battery is gone, it's over."

The system designed by Ayers, and fellow Department of Mechanical and Energy Engineering students Brittany Thurstin, Kelsa Adams, Jordan Barnes, Robert Boone and David Evers opens, closes and moves a CubeSat's solar panels in space using just 20 watts of battery power.

"For this project, we developed three separate shape memory alloy mechanisms for our CubeSat, named Penny, a retention mechanism that holds the solar panels in place during launch, a deployment mechanism that extends the solar panels into space and an actuator that moves the panels to follow the sun," said Thurstin. "Applying a minimal amount of electricity provides all the mechanical energy needed to get the satellite up and running. We actually built a CubeSat to show just how the shape memory alloy system would work."

Beyond controlling solar panels on CubeSats, the UNT teams' research has applications in industries such as aeronautics, automotive, space, bio-medical and many others.

UNT Department of Mechanical and Energy Engineering Professor Richard Zhang mentored the team's development of the design and electrical controls. Professor Marcus Young and Research Associate Robert Wheeler in the Department of Materials Science and Engineering advised the team on shape memory alloy forming and material properties.

 Jim Rogers



ENGINEERING A LEGACY

Oscar N. Garcia has always been up for a challenge.

Fired up with an interest in electrical engineering and education, the NCR endowed professor took on the feat of becoming UNT's first dean of engineering – an opportunity that would set the foundation for the college's success today and for decades to come.

Garcia's engineering story began in Cuba at the age of 17.

After graduating valedictorian from high school and enrolling at the University of Havana, the university closed due to political unrest. So, Garcia started working at an international telephone communications station where he was responsible for radio, microwave and over-the-horizon equipment maintenance and operation. This on-the-job exposure nurtured his interest in all aspects of electrical engineering, ultimately prompting him to apply to North Carolina State University to continue his studies. There, he earned both his bachelor's and master's degrees in electrical engineering in 1961 and 1964. Following a brief stint at IBM and Old Dominion University, he obtained his Ph. D. from the University of Maryland in 1969.

After receiving tenure at other universities and garnering 40 years of experience in higher education, Garcia was invited to throw his hat into the ring for the new College of Engineering

position at the University of North Texas. It was during this time that he sought advice from friend and then-dean of the College of Engineering at the University of Texas at Arlington, Bill Carroll.

"He said to me, 'Oscar, you are getting an empty shell of a building.' By this he meant that the former Texas Instruments missile research and development facility had a lot of open space and undeveloped grounds. For our use, everything would have to be built up – classrooms, labs, faculty offices and collaboration spaces," said Garcia.

Garcia accepted the challenge in 2003 and got to work. He started by organizing the existing departments of Engineering Technology, Computer Science, and Materials Science under one roof.

"I thought it was very important to build upon the foundation we already had with these departments," said Garcia. "It enabled us to provide accredited engineering education to men and women and valuable employees to North Texas and national industries."

During his tenure as dean, Garcia worked with university and state leadership to open the College of Engineering's doors at Research Park, now Discovery Park, and established the Center for Advanced Research and Technology (CART) with initial funding of \$3.1 million from the Army Research Laboratory. CART, now the Materials Research Facility, is one of the most advanced university research facilities in the nation for materials analysis.

"Oscar was very good at thinking out of the box," said Reza Mirshams, engineering technology professor and

former associate dean for academics. "As we were creating the college, we had three guiding principles: student recruitment, student retention and student and faculty research. The three R's."

Garcia also put students first and sought to improve the college's educational opportunities through re-establishing the Construction Engineering Technology program and creating two new departments: electrical engineering and mechanical and energy engineering. The Department of Electrical Engineering was created with a \$1.5 million award from the National Science Foundation. The Department of Mechanical and Energy Engineering would become the first of its kind in the nation.

"When working with Oscar, students really came first," said Bill Buckles, computer science and engineering professor. "The next trip to D.C. was not as important as working to get the bus schedule aligned with the class schedule or negotiating the use of dining service credits in the Discovery Park cafeteria. Student success was integral to the college."

Murali Varanasi, current professor and former chair of the electrical engineering department, agreed.

"I was very impressed with his vision for the newly formed college, and his emphasis on the quality of our educational and research programs," said Varanasi. "He not only worked hard at achieving the goals for the college, but also inspired us to achieve the goals for the departments. It was indeed my pleasure to work with him during his tenure as dean."

But after five years, Garcia was ready to step aside to pursue his research interests and let someone else take the helm.

With interests in the fields of computer architecture, Human-Computer Interaction and quantum computing, Garcia has developed and taught interdisciplinary courses and projects involving information theory, coding, cryptography, and more recently, quantum computing.

From fostering and establishing new departments and labs to revitalizing a former TI building to house a budding engineering college, Garcia took each new opportunity and challenge and turned it into a legacy at UNT. Now, Garcia is on to a new opportunity: retirement.

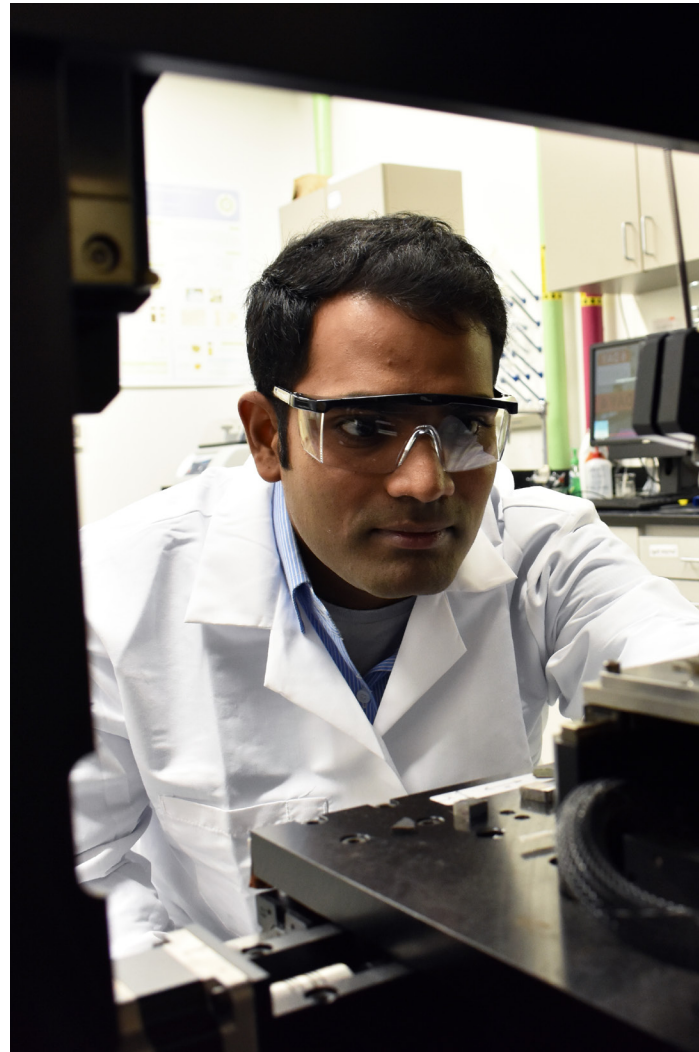
"I'm looking forward to devoting my time to helping develop the fascinating area of quantum computing," said Garcia.

 Kayla Green

"...with Oscar, students really came first."

Alumnus

gives back through scholarship



Aditya Ayyagari, a doctoral graduate from the College of Engineering and UNT Golden Eagle, recently made the decision to give back to the college as a way of not only showing appreciation for the Maswood Memorial Scholarship of Engineering he received, but also to help motivate and encourage other eagles to do so, as well.

“Like several tens of thousands of international students arriving in the U.S., I, too, have come with hope, a strong desire for education and in pursuit of happiness,” said Ayyagari. “But life at graduate school is not all rosy as it seems at the end of it, and I had my fair share of ups and downs.”

Ayyagari says that in his final year of his doctoral studies, the funding he was receiving for his research fell through.

“Consequently, graduating on time was a serious concern,” he said. “It was at this juncture that The Syed Ian Maswood Memorial Scholarship in Engineering for Academic Excellence had come to my rescue.”

Ayyagari applied and received the scholarship at the beginning of the academic year, ensuring he could continue his enrollment and finish his degree on time.

“Receiving this scholarship was humbling, and at the same time, served as an additional motivation to perform better and stand up to the repute of this scholarship,” he said.

It’s because of this scholarship that Ayyagari has decided to start a new one at the College of Engineering.

“My hope is that this will inspire and motivate others to also do their bit to support their fellow eagles,” he said. “I want to help make it possible for other students to persevere and finish their education.”

 Kayla Green

The College of Engineering thanks the following for their generous contributions. Your gift to the college is transformational - for our students, for our faculty and for our potential.

Thank you.

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