

**UTSA**<sup>®</sup>

MECHANICAL ENGINEERING

**2019-2020 REPORT**



## Mission Statement

The mission of the Mechanical Engineering Department is “to provide excellent educational and research opportunities to our under graduate and graduate students who will contribute to the technological and economic development of the community, the region and the nation.”

## Access to Excellence

The faculty of the Department of Mechanical Engineering values excellence in teaching, research, and service to the community and the profession. Our students learn to be technically competent and socially responsible, while they acquire a solid background to perform diverse engineering functions; to succeed in graduate education; and acquire life-long learning skills.



### FROM THE CHAIR

## Greetings!

It's my pleasure to share the exciting news from the Mechanical Engineering Department. It was very impressive that our faculty and students demonstrated great resilience in face of the global Covid-19 pandemics and continue thriving. Everyone puts in more efforts in the successful transition to online teaching and keep research going. Dr. Xiaodu Wang, Harry Millwater, Frank Chen, Kiran Bhaganagar and Chris Combs secured several major collaborative grants and a center grant. Dr. Chris Combs received the prestigious Young Investigator Program (YIP) award from Air Force, and we welcomed four new faculty members coming on board. Our ME graduate program's ranking by the US NEWS has risen to #105.

Please read below or visit our department website for more exciting news. We look forward to another exciting year!

HAI-CHAO HAN, PHD  
Professor and Department Chair  
Zachry Endowed Chair

## Quick facts

### PROGRAMS

- B.S. IN MECHANICAL ENGINEERING
- OIL & GAS CERTIFICATE PROGRAM
- AEROSPACE CERTIFICATE PROGRAM
- INDUSTRIAL AND MANUFACTURING CERTIFICATE PROGRAM
- M.S. IN MECHANICAL ENGINEERING;
- M.S. IN ADVANCED MANUFACTURING AND ENTERPRISE ENGINEERING
- PH.D. IN MECHANICAL ENGINEERING (JOINT EFFORT WITH SOUTHWEST RESEARCH INSTITUTE)
- UNDERGRADUATE ENROLLMENT: 1179
- GRADUATE ENROLLMENT: 78 MASTERS; 45 DOCTORAL STUDENTS
- DEGREES AWARDED IN AY2019: 200 BS, 28 MS, AND 3 PHD

### FACULTY

- 22 T/TT ASSISTANT, ASSOCIATE, AND FULL PROFESSORS
- 6 FULL-TIME SENIOR LECTURERS
- 3 ADJOINT PROFESSORS FROM SWRI AND 3 DUAL APPOINTMENT WITH OTHER DEPARTMENTS

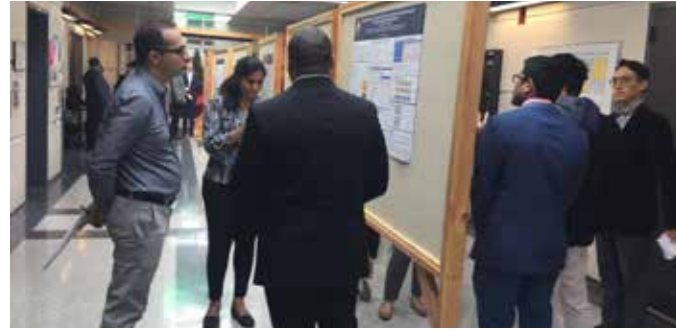
### RESEARCH

- ANNUAL RESEARCH EXPENDITURES: \$4.1 MILLION IN FY2019
- NEW GRANT SECURED: \$12.6 MILLION IN 2019 (\$7.6 MILLION SHARED CREDIT)
- 55 PEER-REVIEWED JOURNAL PAPERS AND BOOK CHAPTERS IN 2019

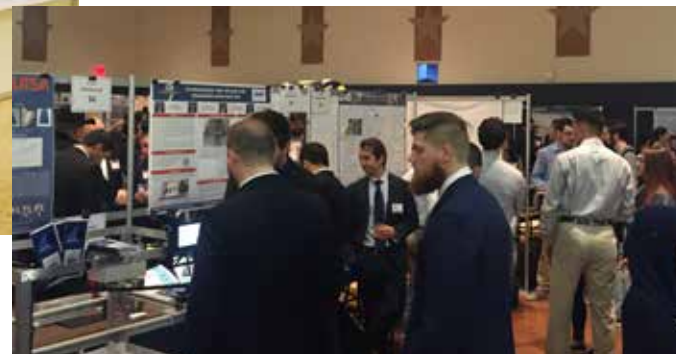
**FOR MORE INFORMATION, PLEASE VISIT OUR DEPARTMENT WEBSITE:**  
<http://engineering.utsa.edu/me>

# Awards & News

- Dr. Chris Combs received YIP award from AFOSR (10/2019).
- Dr. Xiaodu Wang received UTSA President's Distinguished Achievement Awards (4/2020).
- Dr. Ender Finol elected Fellow of American Society of Mechanical Engineers (ASME) (4/2020).
- Conferred 200 Bachelor's degrees, 28 master's degrees and 3 doctoral degrees in AY2019. We rank #4 in Texas and #43 in the nation in terms of BS-ME degree awarded.
- Our expenditure increased to \$4.1 million in AY2019 (ranked #4 among all departments in UTSA).
- Our faculty secured over \$12.6 million new research grants as PI or co-PI (including 4 multi-million large grants). ME faculty's portion is \$7.6 million.
- In the fall 2019 Tech Symposium, two senior design II teams won the 1st and 3rd place awards and 3 senior design I team swept all 3 poster awards. In spring 2018, two senior design I team won 2 out of the 3 poster awards.
- Eighteen graduate students showcased their research in the 4th Graduate Research Seminar Day in September 2019.
- Master's students Rafid Al Janahi and Alireza Zarreh received First Place in Student Paper Competition of IISE Operational Excellence Division at the Institute of Industrial and Systems Engineering (IISE) Annual Conference, May 19-21, 2019, Orlando, FL.
- PhD student Venkata Pavan Pillalamarri won the 2019 Distinguished Research Fellowship (UTSA) over the summer, effective 9/1/19.
- PhD student Stephanie Cottier (Advisor: Chris Combs) won first place at the AIAA International Student Paper Competition in January, 2020. (See photo below)



- PhD student Mohammad Sharzehee was the finalist for PhD student paper competition at the Summer Bioengineering conference 2019.
- Syed Hasib Akhter Faruqui (PhD student, Advisor: Adel Alaeddini) won the "Outstanding Graduate Student of College of Engineering".
- Doctorial student, Mohammad Maghsoudi Ganjeh (Advisor: Dr. Xiaowei Zeng), received the 2020 ME department Graduate student paper award for publishing as the first author of four peer-reviewed journal articles all 4 are JCR Q1 journals. Doctorial student Mohammadali Sharzehee (advisor Hai-Chao Han) won the best conference paper award.
- Drs. Lyle Hood and David Restrepo's research on developing new breathing tube used in ventilators to treat COVID-19 patients was featured on local new (News4SA, 5/2020)
- MS student Rafid Al Janahi, (Advisor HungDa Wan) won First Place in Best Paper Competition, at IISE Engineering Lean & Six Sigma (ELSS) Conference, September 23-25, 2019, Houston, TX
- Doctorial student Rajitha Meka was selected as the finalist of best student paper competition (among 28 submissions) for the Quality Statistics and Reliability (QSR) Division at Institute for Operations Research and the Management Sciences (INFORMS) Annual Conference in 2019 in Seattle, WA.
- PhD student Daniel Ramirez, completed a summer internship at the Pacific Northwest National Laboratory.
  - Ezra Ameperosa (MS graduated May 2019) won the Best paper award in the American Society of Mechanical Engineers International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (ASME IDETC/CIE), August 2019.



## Dr. Chris Combs Received the Prestigious YIP Award

Chris Combs, the Dee Howard Endowed Assistant Professor in UTSA's Department of Mechanical Engineering, is one of 40 young researchers who will receive a grant from the Air Force Office of Scientific Research's Young Investigator Research Program.

The three-year grant, totaling \$450,000, will support Combs as he investigates the effects of hypersonic shock waves on future U.S. Air Force flight systems in his research effort titled "Effects of ablation-induced distributed roughness on shock-wave/boundary-layer interactions." The Young Investigator Research Program fosters creative basic research in science and engineering while enhancing early career development of outstanding young researchers.

Hypersonic flight, with velocities faster than five times the speed of sound, is an emerging national priority that has the potential to be a truly disruptive technology with an impact on commercial aviation, defense and space exploration. Hypersonic speed, or Mach 5, is a velocity of roughly 4,000 miles per hour.

Sustained flight at these speeds has obvious appeal when one considers that a hypersonic trip from New York to Los Angeles would take only 30 minutes. This flight regime is also significant for military and defense applications, since rapid-response capability to hotspots and crisis points around the world is highly desirable.

Recent demonstrations of hypersonic technology by Russia and China have put pressure on the United States to develop hypersonic systems of its own; however, hypersonic flight poses many technical and engineering challenges owing to the extreme flow velocities, temperatures and pressure loads imposed on vehicle system. One of the many issues with sustained and reusable hypersonic flight is the extreme heat experienced by these vehicles, which can approach the temperature of the surface of the sun.

For this reason, most hypersonic cruise vehicles employ protective surfaces called thermal protection systems that are designed to keep the system safe. These thermal protection systems are often designed ablative, which means that a sacrificial outer surface is designed to burn and erode away as heating loads are applied to protect the primary vehicle. Previous research has shown that this ablation can generate roughness on a vehicle surface. Some thermal protection systems are also designed using woven composite materials, which naturally have a complex, textile and rough surface architecture, like a thick wool blanket. Very little previous work has been conducted to study the impact of these rough surfaces on a hypersonic flow.

The design of hypersonic systems is further complicated by the presence of shock waves on the surface of vehicle. These shock waves are generated by fins and control surfaces and can create catastrophic pressure and thermal loads leading to vehicle damage or failure.

"Moving at such high speed, if a shock wave is interacting with a vehicle surface it can quite literally burn a hole through your aircraft, so that's obviously something we'd like to avoid," said Combs. "The problem is that the underlying physics of these interactions is very complex and the necessary experiments and computations are quite challenging. So after over 50 years of research in this area we still do not have a good feel for how to control or mitigate these interactions, particularly when they occur over realistic vehicle surfaces."

To address these issues, Combs will employ real-world materials to study the effect of surface roughness of the dynamic behavior of hypersonic shock-wave interactions in UTSA's Mach 7 Ludwig Tube facility. Coupled with the deployment of a variety of laser-based experimental measurement techniques, this approach should reveal key insights into the nature of these flows that will aid in the design of the next generation of Air Force flight systems.

The hypersonic Ludwig Tube facility, which is anticipated for completion in March 2020, consists of a long section of pressurized pipe—the driver tube—which creates a hypersonic flow in the test section by exhausting through a nozzle and into a vacuum reservoir.

Ludwig tubes are classified as impulse test facilities that are characterized by a rapid release of energy in short windows (tens to hundreds of milliseconds) of test time. However, by using high-speed data acquisition these relatively short test windows still result in hundreds of thousands of data points for each wind tunnel run.

Hypersonic wind tunnels like UTSA's Mach 7 facility are rare, with approximately one dozen Mach 5+ facilities at U.S. universities. Once complete, UTSA will be operating one of only three Mach 7+ hypersonic facilities housed on an academic campus in the United States.



— Julie Paulson, UTSA Today

## Dr. Xiaodu Wang received University Research Excellence Award



Congratulations to UTSA COE's Xiaodu Wang, who each received a University Excellence Award! Dr. Wang was recognized in the Research Achievement Category: STEM Tenured. The virtual ceremony was held April 21.

From the program, which can be viewed here:

"We recognize the recipients of the President's Distinguished Achievement Awards for Research Achievement. In the category of Tenured STEM faculty, the award goes to Professor of Mechanical Engineering Xiaodu Wang in the College of Engineering. Dr. Wong's expertise in the mechanics of biological materials and structures is known through his sustained contribution to UTSA and scientific publications and research funding. Dr. Wong has published 90 high-quality peer-reviewed scientific journal papers, one book, six book chapters, one U.S. Patent, and 160 peer-reviewed conference papers. Dr. Wong's publications have been cited nearly 5,000 times. Since joining UTSA in 1999, Dr. Wong has been funded with grants totaling more than \$14 million – a real testament of the impact of his work."

– Dr. Kimberly Andrews Espy, Provost

## Dr. Xiaodu Wang Received major NIH grant to study Osteoporotic bone fracture to rethink treatment

About half of all women in the U.S. will suffer a bone fracture due to osteoporosis. For women, the incidence of this condition is greater than that of heart attack, stroke and breast cancer combined. Now, researchers at UTSA have received multimillion-dollar funding to reexamine bone mineral density, a measure of bone fracture risks, and another critical component in bone known as proteoglycans.

UTSA scientists believe that proteoglycans, which occur naturally in bones' extra-fibrillar matrix in a small amount (less than 1.0% in volume), interact with water to sustain bones' ductility, or their ability to absorb energy and resist fracture.

"If there are proteoglycans in your bones, we think you are better equipped to resist a fracture during a fall," said Xiaodu Wang, a professor in UTSA's Department of Mechanical Engineering and the principal investigator on the project, who will examine if this group of proteins indeed make bones tougher by absorbing water into the bone structure.

Data show that BMD captures only about 50% to 60% of actual bone fragility fractures. According to Wang, when bones lose proteoglycans they appear to lose their capability to resist fractures irrespective of BMD. Wang's laboratory seeks to understand the underlying mechanism and thus prevent or deter the loss of the proteins before bone brittleness develops.

As part of the study, UTSA researchers will inject the proteins into animal models and then examine what is the appropriate strategy to best maintain the proteins in the bone matrix. They will also examine whether reversing the process of proteoglycan deficiency is possible for different gender and age groups.

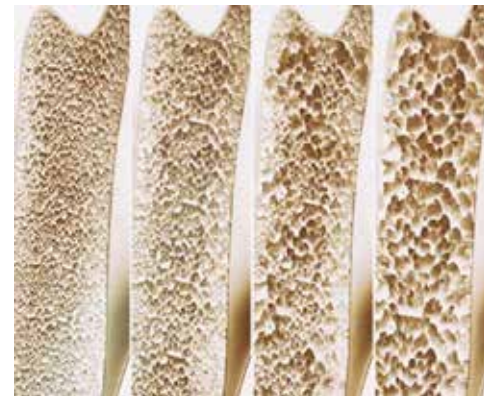
Wang had a eureka moment when he thought about articulate cartilage—the firm, whitish, flexible connective tissue found in joints. It has been well known that damage to the cartilage will result in osteoarthritis.

"Supplements like chondroitin (a type of sugar protein in proteoglycans) are taken to help with osteoarthritis," said Wang. "I then thought the same could be examined with these water-absorbing proteins [proteoglycans] in bone."

This UTSA research will ultimately seek to answer why water loss associated with proteoglycan deficiency leads to potential bone brittleness. It will also explore what happens to the bone's microstructure when it has a fracture.

Collaborating with UT Health San Antonio researcher Jean Jiang, Wang is one of very few scientists in the country studying the effect of these proteins on bone quality. He has close to a decade of experience on this particular subject. Recently the National Institutes of Health granted his laboratory \$2.3 million to embark on this field of work. It's anticipated that he will have results in five years.

Bone fragility fractures affect not only women but also all elderly as well as people with diabetes. The disease is responsible for



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an estimated 2 million broken bones per year, yet nearly 80% of older Americans who suffer bone breaks are not diagnosed or treated for osteoporosis.

"It's about building and testing a model that includes all factors, not just bone mineral density, that cause bone fragility fractures," said Wang. "My mother-in-law broke her hip. This is also personal for me."

Osteoporosis is serious, even deadly. About one in four patients over the age of 70 that suffers a hip fracture will die the following year. This project is an example of UT A's commitment to solving society's most pressing global health challenges.

—Milady Nazir, UTSA Today

## UTSA wins \$3M NASA award to launch extreme environments center

UTSA, a public university that is nationally recognized for research excellence, will receive \$3 million dollars from NASA to develop a new interdisciplinary Center for Advanced Measurements in Extreme Environments (CAMEE).

Climate change has created extreme environmental conditions such as ocean and polar warming, and sea ice reduction. Severe weather including stronger hurricanes, sweeping forest fires, destructive tornadoes, heat waves and droughts are now more common place. Recently, soaring temperature advisories were in effect for nearly 200 million people in some of the most densely populated parts of the country, including many areas not familiar with extreme heat.

To investigate these extreme conditions, NASA and UTSA will collaborate to push the boundaries of current measurement and modeling technology by conducting research in harsh and extreme environments. They will also study the challenging conditions produced when travelling at hypersonic speeds.

"It's urgent that measurement technologies be developed for these challenging settings to understand the physical nature of these extreme environments, and to improve our ability to predict their behavior through simulations," said Hongjie Xie, professor and interim chair in the UTSA Department of Geological Sciences. Xie, a remote sensing scientist, leads a team of five UTSA professors who will lend expertise to CAMEE.

The other four team members include Christopher Combs, a Dee Howard Endowed assistant professor in the Department of Mechanical Engineering, who will investigate how the extreme hypersonic flow conditions experienced during atmospheric reentry will impact the design of NASA flight vehicles. Associate Professor and Associate Fellow in the American Institute of Aeronautics and Astronautics, Kiran Bhaganagar, will provide expertise on fluid dynamics, turbulence and other computational models. The team is completed by sea ice specialist Stephen Ackley and oceanographer Alberto Mestas-Nunez, who was one of the developers of ArcCI—an open source web-based dashboard to track sea ice changes in the Arctic Ocean. As it evolves, CAMEE will also welcome UTSA collaborators from other academic disciplines.

"What we have in common are harsh environments where all these measurements are made, but it's really hard to make a measurement because the conditions are so extreme," said Combs. "Whether it's hypersonics, where everything is incredibly hot and you have plasma and disassociated air, or the polar ice caps, where everything is frozen and you have to do things remotely, we have similar challenges."



"We are measuring and studying extreme conditions in the entire earth system including the atmosphere, the ocean, and sea ice. This is one novelty of this new center," said Bhaganagar.

The UTSA center will enhance NASA's efforts to develop a diverse workforce in earth system sciences, remote sensing technologies, computational fluid dynamics, and experimental fluid mechanics in support of NASA's Science, Aeronautics, and Space Technology Mission Directorates. The UTSA team also anticipates training 64 highly skilled professionals in STEM disciplines to support NASA's mission.

CAMEE participants will enroll in summer internships at three NASA centers — the Goddard Space Flight Center, Jet Propulsion Laboratory, and Langley Research Center. Hands-on workshops will be offered to K-12

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teachers to further develop an interest in earth system science, measurement, and data analytics among the next generation. The center will also create several experiential learning opportunities for UTSA students, providing them with unique training to pursue new career opportunities.

UTSA will also collaborate with St. Philip's College, one of the Alamo Colleges District, which will provide an additional pool of students from the Colleges District to help with recruitment efforts, and the Dee Howard Foundation, which will also assist with local K-12 outreach activities.

Additionally, CAMEE will include academic partners from the University of Colorado, Boulder and University of California, Los Angeles (UCLA) who will provide expertise in atmospheric sciences to tackle large scale phenomena such as how high-velocity Santa Ana winds are generated which can lead to massive forest fires. Other research collaborations will include Southwest Research Institute, Texas Space Grant Consortium and the US National Ice Center.

"One of the end goals of the center is to add to the Nation's research capability in earth system science research and education," said sea ice specialist Ackley.

In addition to helping solve grand challenges posed by extreme environments, the UTSA researchers believe that advanced measurement techniques could lead to breakthroughs in data acquisition for the similarly extreme environments experienced by extra-terrestrial surfaces during atmospheric entry of NASA's space exploration efforts.

By leveraging recent advances in measurement technology, UTSA, NASA and the other collaborating institutional organizations will develop novel diagnostic techniques that will drive discovery and improve the ability to operate in extreme environments across a wide range of measurement scales.

— Milady Nazir, UTSA Today



**Mechanical Engineering Graduate Program at UTSA is ranked #105 by US News.**

## For COVID-19 patients, engineering researchers develop a better way to vent

UTSA mechanical engineering researchers have developed a new breathing tube designed to solve the problem of instability and tissue damage from the long-term ventilation of COVID-19 patients and emergency medicine.

COVID-19 can spread swiftly in the population and progress rapidly in individual patients. In turn, according to news reports, a patient may require emergency intubation and mechanical ventilation to survive. In order to place traditional ventilator tubes into the throat, doctors and nurses treating patients come in close contact with aerosolized SARS-CoV-2, often with inadequate personal protective equipment.

A critical COVID-19 patient may experience prolonged ventilation, which, according to the Mayo Clinic, can lead to tracheal stenosis, tissue scarring, dislocation and stricture of the arytenoid cartilages. These injuries are more likely to occur if an oversized endotracheal tube or over-pressurized cuff is used or left in position for longer than a week.

The 3D-printed device may reduce medical workers' exposure to viruses and mitigate physical side effect problems for the patients.

The potential benefits of the new breathing tube are threefold, David Restrepo, explained assistant professor in UTSA's Department of Mechanical Engineering, who is also one of the creators, "by limiting the exposure of health care providers to patient pathogens through streamlining the intubation process, reducing downstream complications (trachea injuries) and eliminating the need of multiple sizes."

Other creators of this new breathing tube include R. Lyle Hood, assistant professor in UTSA's Department of Mechanical Engineering, and military science student David Berard.

The project is a collaboration with UT Health San Antonio and the U.S. Army Institute of Surgical Research. The team filed a provisional application with the U.S. Patent and Trademark Office, which locks in the date of the invention. Once filed, the engineers have up to a year to submit a full application to the PTO for review.

"In parallel with the patent, we are free to develop technology toward clinical use," Hood said. "We are looking to deploy our technology in animal models this year and human clinical trials for the Food and Drug Administration next year."

— James Dobbins, UTSA Engineer

## New Faculty



**NORMAN ABRAMSON, PH.D.**  
Professor, NAE member  
Theoretical and Applied Mechanics



**KEITH AXLER, PH.D.**  
Senior Lecturer  
Materials and Design



**JEANETTE ORUC DeLEON, MS**  
Lecturer and Lab Manager



**DANIEL PINEDA, PH.D.**  
Assistant Professor  
Aerospace

## New Research Grants

PI NAME / ROLE  
PROJECT TITLE  
SPONSOR  
PROJECTED TOTAL FUNDING  
FUNDED DATE

**Combs, Christopher (PI: 100.00%)**  
Arnold Diagnostics Summit  
University of Tennessee, Knoxville  
\$122,068.00  
2019-01-28

PI NAME / ROLE  
PROJECT TITLE

**Dong, Bing (PI: 100.00%)**  
CAREER: Holistic Assessment of the Impacts of Connected Buildings and People on Community Energy Planning and Management  
National Science Foundation  
\$500,181.00  
2019-02-22

SPONSOR  
PROJECTED TOTAL FUNDING  
FUNDED DATE

PI NAMES / ROLES  
PROJECT TITLE  
SPONSOR  
PROJECTED TOTAL FUNDING  
START DATE / END DATE

**Restrepo, David (PI: 50.00%) Han, Hai-Chao (Co-PI: 50.00%)**  
Active Cardiac Patches for Treating Myocardial Infarction  
San Antonio Area Foundation  
\$34,969.00  
2019-03-12

PI NAMES / ROLES

**Bhounsule, Pranav (PI: 34.00%) Harmon, Belinda (Co-PI: 33.00%) Claeys, Lorena (Co-PI: 33.00%)**  
Code camp for girls to increase STEM awarness in low-income neighborhood in San Antonio  
TX Workforce Comm 320  
\$99,997.00  
2019-05-09

PROJECT TITLE  
SPONSOR  
PROJECTED TOTAL FUNDING  
FUNDED DATE

PI NAME / ROLE  
PROJECT TITLE

**Combs, Christopher (PI: 100.00%)**  
CONNECT: Non-Intrusive Measurements and Simulations of Direct-Fired sCO2 Flows for Low-Emission Renewable Energy Generation  
UTSA VPR Office  
\$50,000.00  
2019-06-26

SPONSOR  
PROJECTED TOTAL FUNDING  
FUNDED DATE

PI NAMES / ROLES  
PROJECT TITLE  
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PI NAMES / ROLES

PROJECT TITLE  
SPONSOR  
PROJECTED TOTAL FUNDING  
FUNDED DATE

**Wang, Xiaodu (PI: 90.00%) Gao, Wei (Co-PI: 6.00%) Roy, Anuradha (Co-PI: 4.00%)**  
Proteoglycans and age-related deterioration of bone toughness  
National Institute of Health  
\$2,334,480.00  
2019-06-28

**Liu, Ruijie (PI: 100.00%)**  
Collaborative Research: High-Fidelity Modeling of Poromechanics with Strong Discontinuities  
National Science Foundation  
\$100,000.00  
2019-07-10

**Xie, Hongjie (PI: 20.00%) Bhaganagar, Kiran (Co-PI: 20.00%) Mestas-Nunez, Alberto (Co-PI: 20.00%) Ackley, Stephen (Co-PI: 20.00%) Combs, Christopher (Co-PI: 20.00%)**  
NASA Center for Advanced Measurements in Extreme Environments (CAMEE)  
National Aeronautics & Space Administration  
\$2,999,998.00  
2019-07-10

**Gao, Wei (PI: 100.00%)**  
Stress Modulated Phase Transition in 2D TMDC Materials  
National Science Foundation  
\$326,162.00  
2019-08-20

**Ahn, Ethan (PI: 40.00%) Ponce Pedraza, Arturo (Co-PI: 30.00%) Gao, Wei (Co-PI: 30.00%)**  
T2: Transdisciplinary Investigation of Electromechanical Coupling-driven Properties of New 2D Materials  
UTSA VPR Office  
\$20,000.00  
2019-08-27

**Matamoros, Adolfo (PI: 20.00%) Reddick, Christopher (Co-PI: 20.00%) Sandhu, Ravinderpal (Co-PI: 20.00%) Akopian, David (Co-PI: 20.00%) Castillo Villar, Krystal (Co-PI: 20.00%)**  
Planning Grant: Engineering Research Center for Sustainable Urban Ecosystems  
National Science Foundation  
\$100,000.00  
2019-08-23

**Nash, Kelly (PI: 23.75%) Wood, Elizabeth (Co-PI: 23.75%) Millwater, Harry (Co-PI: 23.75%) Alamaniotis, Miltiadis (Co-PI: 23.75%) Fernandez, Amanda (Co-PI: 5.00%)**  
CONNECT- the CONSortium on Nuclear sECurity Technologies  
US Department of Energy  
\$2,999,995.00  
2019-09-06

**Millwater, Harry (PI: 75.00%) Montoya Rodriguez, Arturo (Co-PI: 25.00%)**  
A complex finite element method based inverse methodology to extract constitutive parameters  
Pacific Northwest National Laboratory  
\$74,833.00  
2019-10-02

**Chen, Fengshan (PI: 80.00%) Alaeddini, Adel (Co-PI: 5.00%) Bhounsule, Pranav (Co-PI: 5.00%) Jafari, Amir (Co-PI: 5.00%) Wan, Hung-Da (Co-PI: 5.00%)**  
Education, Training and Mentoring Program for National Formosa University Students in Advanced Manufacturing/Industry 4.0  
National Formosa University  
\$417,697.00  
2019-08-01

PI NAME / ROLE  
PROJECT TITLE  
SPONSOR  
PROJECTED TOTAL FUNDING  
FUNDED DATE

PI NAME / ROLE  
PROJECT TITLE  
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PROJECT TITLE  
SPONSOR  
PROJECTED TOTAL FUNDING  
FUNDED DATE

**Chen, Fengshan (PI: 100.00%)**  
UTRGV: Innovation Driven Research/education Ecosystem for Advanced Manufacturing for the Defense (I-DREAM4D)  
University of Texas – Rio Grande Valley  
\$712,499.00  
2019-11-16

**Wan, Hung-Da (PI: 50.00%) Lee, Yooneun (Co-PI: 50.00%)**  
CAMLs: Operational Excellence of Institute for Integration of Medicine and Science (IIMS) through Lean Six Sigma  
University of Texas HSC at San Antonio 745  
\$15,000.00  
2019-12-19

**Rincon Troconis, Brendy (PI: 95.00%) Montoya Rodriguez, Arturo (Co-PI: 5.00%)**  
Zramic Coating Corrosion Protection in Relevant Coating Applications  
TWIN HAWKS LLC  
\$50,000.00  
2019-02-25

**Restrepo, David (PI: 100.00%)**  
GREAT: Novel Metamaterials For Multi-Hazard Resilient Infrastructures  
UTSA VPR Office  
\$20,000.00  
2019-06-18

**Rincon Troconis, Brendy (PI: 100.00%)**  
CONNECT: Effect of Additive Manufacturing on the Hydrogen Embrittlement of Alloy 718  
UTSA VPR Office  
\$50,000.00  
2019-06-26

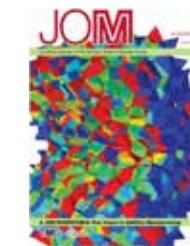
**Gao, Wei (PI: 60.00%) Cao, Yongcan (Co-PI: 40.00%)**  
Development of Autonomous Soft Robotic Solar Tracking System for Building-Integrated Photovoltaic Applications  
City Public Services  
\$231,000.00  
2019-08-13

**Combs, Christopher (PI: 50.00%) Bhaganagar, Kiran (Co-PI: 17.00%) Ahmed, Sara (Co-PI: 17.00%) Bhanot, Karan (Co-PI: 16.00%)**  
Supercritical Carbon Dioxide (sCO<sub>2</sub>) Power Generation for Renewable Energy Extraction  
City Public Services  
\$800,000.00  
2019-08-13

**Najafirad, Peyman (PI: 34.00%) Choo, Kim-Kwang (Co-PI: 33.00%) Castillo Villar, Krystal (Co-PI: 33.00%)**  
Secure, Resilient and Smart Grid Cyber-Physical Situational Understanding using Data Driven Decision-Making and AI  
City Public Services  
\$469,000.00  
2019-08-20

**Castillo Villar, Krystal (PI: 100.00%)**  
Minimizing model uncertainty through advanced multi-modal full-volume metrology.  
US Department of the Air Force  
\$697,000.00  
2019-09-23

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31. **Aguirre-Mesa AM\*, Ramirez-Tamayo D\*, Garcia MJ, Montoya A, Millwater H (2019).** A stiffness derivative local hypercomplex-variable finite element method for computing the energy release rate. *Engineering Fracture Mechanics*. 218:106581.
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47. **\*Li M, Lin L, Guo R, Bhalla A, and Zeng X (2019).** Numerical Investigation of Nanoscale Electromechanical Response in a Ferroelectric Perovskite through an Atomistic Field Theory. *Ferroelectrics*. 540: 124-137.
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53. **Martinelli M, \*Mehrbod M, Graham UM, Hu Y, Gnanamani MK, Jacobs G (2019).** "Soft x-ray characterization of sulfur poisoned cation-exchanged Pt/KL catalysts for aromatization of hexane". *Chemistry Solutions to Challenges in the Petroleum Industry*. ACS Books, Rahimi P, Koenig A. eds., Copyright, Washington, D.C. DOI: 10.1021/bk-2019-1320.ch009.
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# MS/Ph.D. Graduates

## PH.D. IN MECHANICAL ENGINEERING

STUDENT NAME	ADVISOR	SEMESTER
Jordan Nielson	Dr. Kiran Bhaganagar	Spring 2019
Mario Aboytes Ojeda	Dr. Krystel Castillo	Spring 2019
Alireza Zarreh	Dr. Hung-da Wan	Fall 2019
Ahmed Mostafa	Dr. Ruijie Liu	Spring 2020
Hamed Bouzary	Dr. F. Frank Chen	Spring 2020
Mohammad Maghsoudi Ganjeh	Dr. Xiaowei Zeng	Spring 2020
Mohammadali Sharzehee	Dr. Hai-Chao Han	Spring 2020
Santiago Manrique Bedoya	Dr. Yusheng Feng	Spring 2020
Sudheer Reddy Bhimoreddy	Dr. Kiran Bhaganagar	Spring 2020

## MS IN MECHANICAL ENGINEERING

STUDENT NAME	ADVISOR	SEMESTER
Ford Phillips	Dr. Randall Manteufel	Spring 2019
Sadam Abdelmutaal	Dr. Bing Dong	Spring 2019
Asfia Tanjim Totini	Dr. Brendy Rincon Troconis	Spring 2020
Chinonso Ovuegbe	Dr. Adel Alaeddini	Spring 2020
David Berard	Dr. R. Lyle Hood & Dr. David Restrepo	Spring 2020
Mohammed Habeeb Olufemi Mustapha	Dr. Xiaodu Wang	Spring 2020
Sagarkumar Balkrishna Patel	Dr. Wei Gao	Spring 2020
Samuel Uriel Armendáriz Hernández	Dr. Krystel Castillo	Spring 2020
Andrew Waterreus	Dr. Pranav Bhounsule	Summer 2019
Hamidreza Habibollahi Najaf Abadi	Dr. Brendy Rincon Troconis	Summer 2019
Hannah Fontenot	Dr. Bing Dong	Summer 2019
Justin Ernst	Dr. Pranav Bhounsule	Summer 2019
Moosfika Haque Treesha	Dr. Pranav Bhounsule	Summer 2019
Sarah Legette	Dr. Arturo Montoya	Summer 2019
Stephanie Cottier	Dr. Christopher Combs	Summer 2019
Vinicio Yncierte Leiva	Dr. Brendy Rincon Troconis	Summer 2019
Vishnu Prakash	Dr. Bing Dong	Summer 2019
Eakeen Haque	Dr. Adel Alaeddini	Fall 2019
Ishan Rajwade	Dr. Hung-da Wan	Fall 2019

## MS IN ADVANCED MANUFACTURING AND ENTERPRISE ENGINEERING

STUDENT NAME	DEGREE/PROGRAM	ADVISOR
Amanda Hydar	Dr. Krystel Castillo	Spring 2019
Joel Sumner	Dr. Adel Alaeddini	Spring 2019
Naveen Kumar Pasupathy	Dr. F. Frank Chen	Spring 2019
Rafid Al Janahi	Dr. Hung-da Wan	Spring 2019
Sandra Ortiz	Dr. F. Frank Chen	Spring 2019
Dana Schultz	Dr. Krystel Castillo	Fall 2019
Luvín De Leon	Dr. Krystel Castillo	Fall 2019
Payman Patel	Dr. Hung-da Wan	Fall 2019
Samer Baraz	Dr. Krystel Castillo	Fall 2019
Matthew Silvas	Dr. F. Frank Chen	Spring 2020

# Department Faculty Awards

## 2020 AWARDS

BASED ON 2019 PERFORMANCE EVALUATION

### 2019 Most Prolific Researcher of the Year

#### Dr. Harry Millwater

In recognition of his publication of 7 peer-reviewed journal papers

### 2019 Most Prolific Researcher of the Year (Assistant Professor Level)

#### Dr. David Restrepo

In recognition of his publication of 7 peer-reviewed journal papers

### 2019 Most Well-Funded Researcher of the Year

#### Dr. Krystel Castillo

In recognition of her high research expenditure (\$560k)

### 2019 Most Well-funded Researcher of the Year (Assistant Professor Level)

#### Dr. Brendy Rincon

In recognition of her high research expenditure

### 2019 Most Well-funded Researcher of the Year (Assistant Professor Level)

#### Dr. R. Lyle Hood

In recognition of his high research expenditure

### 2019 Strongest Graduate Student Supporter of the Year

#### Dr. Harry Millwater (\$104k)

### 2019 Strongest Graduate Student Supporter of the Year (Assistant Professor Level)

#### Dr. Brendy Rincon

### 2019 Most Successful Grantee of the Year

#### Dr. Xiaodu Wang

In recognition of his receiving of a large NIH grant (\$2.3 million)

### 2019 Most Successful Grantee of the Year (Assistant Professor Level)

#### Dr. Chris Combs

In recognition of his receiving of large grants (YIP from AFOSR and Co-PI in a NASA center grant)

### 2019 Appreciation of Service

#### Dr. Zhigang Feng

In recognition of his excellent Service as Assistant Department Chair.

## 2020 PROFESSORS OF THE YEAR

BASED ON STUDENT EVALUATIONS

### 2019 Best-Evaluated Graduate Course (enrollment > 10) Instructor of the Year

#### HungDa Wan (ME7993 @4.92)

David Restrepo (Assistant Professor category) (ME5453 @4.67)

Francisco Herbert (Senior Lecturer category) (EGR6013 @4.77);

Krishnan Krishnaiyer (Adjunct Professor category) (ME5503 @4.80)

### 2019 Appreciation of Teaching Classes with the Highest Enrollment

Amir Jafari (ME4543 with 123 students);

Madhavrao Govindaraju (ME1403 with 128 students)

### 2019 Best-Evaluated Undergraduate Course Instructor of the Year

#### Randy Manteufel (ME4293 @4.84)

Lyle Hood (Assistant Professor category) (ME2173 @4.72)

Francisco Herbert (Senior Lecturer category) (EGR2323 @4.71)

Michael Reyes (Adjunct Professor category) (ME4553, 4.79)

Leah Enders (Adjunct Professor category) (EGR2213 @4.83)



**UTSA**  
MECHANICAL ENGINEERING

*Report Editor: Hai-Chao Han*