

Department of Mechanical Engineering Klesse College of Engineering and Integrated Design

SPRING 2023 NEWSLETTER





CHAIR'S Message

Ender Finol, Ph.D.

Dear ME Colleagues, Students, Alumni and Friends-

I am delighted to share some of the accomplishments of the Department of Mechanical Engineering (ME) in the Klesse College of Engineering and Integrated Design at the University of Texas at San Antonio (UTSA), in our inaugural department newsletter for Spring 2023.

Our department continues to grow and 2022-2023 was no exception, as we added six new faculty members. In Fall 2022, Drs. <u>Omar Abbaas, Morteza Seidi</u>, and <u>Tanveer Bhuiyan</u> were appointed Assistant Professors while Mr. <u>Hardev Singh</u> joined as <u>Assistant Professor of Practice. In Spring 2023, Dr. <u>Guillermo Araya</u> joined the department as Associate Professor with Tenure and Dr. <u>Cody Gonzalez</u> as Assistant Professor. With such strategic hiring, the department expanded its research expertise in smart supply chain, injury biomechanics, data-driven optimization and big data analytics, high-resolution simulation of turbulent flows, and energy harvest optimization.</u>

During the current academic year, our faculty received many awards and recognitions. Amongst these, Dr. <u>Krystel Castillo</u> is a Fulbright U.S. Scholar hosted by the Universidad de las Américas Puebla in San Andrés Cholula, Puebla, Mexico. She is working on a joint research project based on the protection of critical infrastructure. Dr. <u>Brendy Rincón</u> received the Early Career Excellence Award by the Association for Materials Protection and Performance. This award recognizes individuals who work in academia, research, industry or government who provide excellent contributions and promise in materials protection and performance. Dr. <u>David Restrepo</u> was awarded the prestigious NSF CAREER award for his research entitled "Nudging and leveraging the onset of buckling in architected materials for performance gains". Dr. <u>Christopher Combs</u> was also granted an NSF CAREER award for his research entitled "Experimental investigation into the impact of incoming boundary layer state on the unsteady dynamics of a transverse jet in a hypersonic crossflow". Dr. <u>Guillermo Araya</u> extended his NSF CAREER award at UTSA with his research entitled "High fidelity numerical simulations of turbulent flow separation at high Reynolds numbers with passive scalar transport". This is the first time in the history of the department there are three active NSF CAREER awardees. Research expenditures were at an all-time high (\$6.6M) in 2021-2022 and the upward trend has continued in 2022-2023.

Our students excel academically in our ABET-accredited B.S. program in mechanical engineering. The 4-year graduation rates continued to improve in 2022-2023 while 91.3% of our graduates are either employed or enrolled in a full-time graduate program within 6 months of graduation. AMAS Engineering, a team of four ME seniors (Matthew Juarez, Adalicia Scimia, Alan Guerra, and Sarah Sultan) took 1st place at the Fall 2022 Tech Symposium for their prototype of especially designed pants to help prevent blood clots in the lower extremities. Print & Click, an interdisciplinary team led by ME senior Esteban Mejia and BME seniors John Dejillo, Keahra Etuk, Josiah Lozano, Charles Otte, and Ben Torres, won 1st place at the Spring 2023 Tech Symposium for their novel bioprinting system that improves cell uniformity in a bioprinter. In this edition of the newsletter, we highlight the work of Dr. Eugene Hoffman, a recent PhD graduate mentored by Dr. <u>Christopher Combs</u>, who is now employed by Southwest Research Institute.

I invite you to take a deeper look at our programs, research, and faculty in our department's website.

Sincerely,

Ender A. Finol, Ph.D. Department Chair of Mechanical Engineering Professor and Zachry Endowed Chair <u>ender.finol@utsa.edu</u>

UTSA MECHANICAL ENGINEERING

Faculty and Staff

Omar Abbaas	Assistant Professor	Lyle Hood	Assistant Professor
Adel Alaeddini	Associate Professor	Amir Karimi	Professor
Juan Guillermo Araya	Associate Professor	Randy Manteufel	Associate Professor
Keith Axler	Associate Professor of Practice	Harry Millwater	Professor
Kiran Bhaganagar	Professor	Ashok Nedungadi	Professor of Instruction
Tanveer Bhuiyan	Assistant Professor	Daniel Pineda	Assistant Professor
Krystel Castillo	Professor	David Restrepo	Assistant Professor
Christopher Combs	Assistant Professor	Brendy Rincon	Assistant Professor
F. Frank Chen	Professor	Morteza Seidi	Assistant Professor
Alifer Crom	Senior Lecturer	Hardev Singh	Assistant Professor of Practice
Zhigang Feng	Associate Professor	Hung-Da Wan	Associate Professor
Ender Finol	Professor & Chair	Xiaodu Wang	Professor
Cody Gonzalez	Assistant Professor	Xiaowei Zeng	Associate Professor
Madhavrao Govindaraju	Associate Professor of Instruction	Ben Campos	Administrative Manager
Hai-Chao Han	Professor	Cayla Jimenez	Program Coordinator
Francisco Herbert	Associate Professor of Instruction		

Degree Programs

Research Concentration Areas

- B.S. in Mechanical Engineering

 https://klesse.utsa.edu/_documents/mechnical/me-certificate-programs1.pdf
 M.S. in Mechanical Engineering
 M.S. in Aerospace Engineering

 https://future.utsa.edu/programs/graduate-certificate/aerospace-engineering/
 M.S. in Advanced Manufacturing & Enterprise
 M.S. in Advanced Manufacturing & Enterprise
 Mechanics & Materials
 Mechanics & Materials
 Mechanics & Materials
 Manufacturing Engineering
 Robotics & Controls
- Ph.D. in Mechanical Engineering

NEW FACULTY HIRES FOR 2022-2023



Dr. Omar Abbaas joined the Department of Mechanical Engineering as of Fall 2022. He came to UTSA from the Pennsylvania University where he earned his Ph.D. in Industrial Engineering. His areas of interests include Smart Supply Chain, Network Optimization, Transportation and Applied Operations Research & Mathematical Modeling.

Dr. Juan Guillermo Araya has recently joined the Department of Mechanical Engineering in Spring 2023. He received his Ph.D. in Aeronautical Engineering and came to UTSA from the University of Puerto Rico-Mayaguez. His areas of interests include High-Resolution Simulation of Turbulent Flows, Scientific Visualization in Fluid Dynamics and Transport Phenomena in Hypersonic Boundary Layers.





Dr. Tanveer Bhuiyan joined the Department of Mechanical Engineering in Fall 2022 after being emmployed at Idaho National Laboratory as a Research Postdoctoral Associate. He received his Ph.D. in Industrial Engineering and is focused on Data-Driven Optimization & Big Data Analytics, Electrified & Sustainable Transportation Networks and Security of Cyber-Physical Systems.

NEW FACULTY HIRES FOR 2022-2023

Dr. Cody Gonzalez joined the Department of Mechanical Engineering in Spring 2023. He received his Ph.D. in Mechanical Engineering from The Pennsylvania State University and has research interests in Energy Harvest Optimization and Design Fabrication of Soft Robotic Batteries.





Dr. Morteza Seidi joined the Department of Mechanical Engineering in Fall 2022. He earned his Ph.D. in Mechanical Engineering from the University of Maine with a focus on Biomechanics. His research interests include Injury Biomechanics, Traumatic Brain Injury and Injury Prevention Technologies.

Mr. Hardev Singh, M.S. Mechanical Engineering and UTSA alumn who came back to the University in Fall 2022 as an Assistant Professor of Practice. His teaching interests include Design & New Product Development, Machine Element Design, Mechanics of Solids and Finite Element Analysis.



Dr. Krystel Castillo awarded as Fulbright U.S. Scholar



UTSA_®



Krystel Castillo, who is the Lutcher Brown Chair in the Margie and Bill Klesse College of Engineering and Integrated Design; director of the Texas Sustainable Energy Research Institute (TSERI) at UTSA; and vice president of energy efficiency at the Cybersecurity Manufacturing Innovation Institute (CyManII). Castillo will be going to the Universidad de las Américas Puebla (UDLAP) in Cholula, Mexico, the oldest city in Latin America. Her priority will be executing a joint research project focused on protecting critical infrastructure.

As Mexico and Texas are very interconnected neighbors, some critical infrastructure such as the electric grid is shared by both nations. However, Texas is not integrated to the rest of the national grid in the U.S., as the general public now knows after the last winter storm Uri in 2021. Additionally, several supply chain networks, such the production of auto parts, agricultural and food networks, are binational in nature, and there are overlaps and connectivity between the two countries

Castillo found the design of resilient supply chain networks in Mexico a very challenging problem yet a meaningful effort to tackle. This was Castillo's primary motivation in selecting her host country, while also choosing the city as they too experienced the recent earthquakes which caused considerable destruction and damage to critical infrastructure.

The Fulbright U.S. Scholar Program offers awards to College and University faculty, artists and professionals to teach, conduct research and carry out professional projects around the world.

NSF CAREER Award 2023 recipient – Dr. David Restrepo



UTSA



Nudging and Leveraging the Onset of Buckling in Architected Materials for Performance Gains

David Restrepo, an Assistant Professor and Endowed Faculty Fellow in Mechanical Engineering at UTSA's Margie and Bill Klesse College of Engineering and Integrated Design (Klesse College), has been awarded a prestigious Faculty Early Career Development (CAREER) award from the National Science Foundation (NSF) for his groundbreaking work on elastic micro-buckling in periodic architected materials. As a result of this award, Restrepo will receive \$641,398 in funding over the next five years.

Architected materials (AMs) are an emerging area of research that leverage unit cell designs to achieve unique material properties and functionalities. Restrepo's project aims to investigate micro-buckling instabilities in AMs to create a pathway for fine-tuning these properties and functionalities. The project has the potential to revolutionize various fields by providing advanced materials for applications in medicine, transportation, chemical processing, aerospace, construction, and military and civilian protection.

Beyond the research itself, Restrepo's project also seeks to boost the participation of Latinx and Hispanic students in STEM research. The grant will provide support for recruiting, mentoring, and training of undergraduate and graduate students from underrepresented groups in STEM.

"It is so important to explore new and innovative ways to use materials and functionalities in the engineering world," said JoAnn Browning, dean of Klesse College. "Dr. Restrepo's work helps us to advance our thinking as we explore possibilities beyond what is currently being done and it provides opportunities to test how to introduce new materials to existing concepts. We are so proud of this accomplishment and the education and training that it provides for our students."

"The Department of Mechanical Engineering is proud of Dr. David Restrepo's impressive accomplishment in winning this NSF CAREER award. The proposed research and educational program for this award will build on his expertise in experimental and computational mechanics, multi-scale analysis, and the design of materials," said Ender Finol, Department Chair. "Since joining the department, Dr. Restrepo has demonstrated outstanding potential as a brilliant researcher and educator. I am confident Dr. Restrepo is on the right path to developing a highly successful academic career.

Restrepo's research on elastic micro-buckling in periodic architected materials is at the forefront of the field of mechanics of materials. The project has the potential to create significant advancements in numerous areas and to inspire future generations of researchers and engineers. With the support of the NSF CAREER award, Restrepo and his team will have the resources and the platform to push the boundaries of mechanics of materials and material's design to make a lasting impact.

NSF CAREER Award 2023 recipient – Dr. Christopher Combs



UTSA



Experimental Investigation into the Impact of Incoming Boundary Layer State on the Unsteady Dynamics of a Transverse Jet in a Hypersonic Crossflow

Since 2019, Chris Combs has been working on a research project that involves jets, engines and endless possibilities in air and space travel. In his quest to explore hypersonic flight systems, Combs has created a research initiative that has recently been approved as a National Science Foundation (NSF) CAREER Project Award and will benefit his work as an Assistant Professor of Mechanical Engineering at UTSA.

Through collaborative efforts between Combs, several PhD students, and current (and future) students in the Klesse College of Engineering and Integrated Design at UTSA, this project will provide valuable insights into how aircrafts operate at hypersonic speeds and how aircraft control is impacted at such high speeds. Essentially, traditional aerodynamic control surfaces seen on aircrafts like flaps and fins are ineffective at certain speeds and high altitudes owing primarily to the low pressures and densities in the Earth's upper atmosphere. This necessitates the use of alternative means of vehicle control for hypersonic systems, which generally takes the form of control jets. An improved understanding of the physics of these interactions will also help improve high-speed engine efficiency and reduce their carbon footprint.

This research initiative will be accomplished in three phases and will have an impact on hypersonic aerodynamic research and educational outreach with the potential to revolutionize commercial air transport, space access, and national defense. As a result of this award, Combs will receive \$617,941 of funding over the next five years.

"We are proud and pleased to see the excellence found in Dr. Combs' work recognized by this prestigious research award," said JoAnn Browning, Dean of Klesse College. "The research itself is critically important, and the students who will benefit from working with Chris will be able to take these experiences all the way through life."

"With this NSF CAREER award, Prof. Chris Combs will leverage his impressive Mach 7 wind tunnel to investigate the effect of incoming boundary layer state and Mach number on hypersonic flow. The research he will perform with this award will add to his already diverse research portfolio and improve UTSA's position as an important academic hub for aerospace engineering research," said Ender Finol, Chair of Mechanical Engineering at UTSA. "As the NASA CAMEE Director and Aerospace Engineering program director, Dr. Combs is positioning himself as the lead principal investigator for aerospace engineering at UTSA."

NSF CAREER Award recipient – Dr. Guillermo Araya



UTSA



Guillermo Araya uses his prestigious Faculty Early Career Development (CAREER) award from the National Science Foundation (NSF) for groundbreaking work around the issue of turbulence

Guillermo Araya, an Associate Professor and the Wayne and Julie Fagan Endowed Professor in Mechanical Engineering at UTSA's Margie and Bill Klesse College of Engineering and Integrated Design (Klesse College), uses his prestigious Faculty Early Career Development (CAREER) award from the National Science Foundation (NSF) for groundbreaking work around the issue of turbulence. His research will provide foundational knowledge on an issue in fluid dynamics in regard to flow separation and its association with heat and contaminant transport.

Araya studies flow separation, an occurrence that happens when fluid flows past an object (ex: the wing of an aircraft) and detaches from the surface. Wakes (or vortices) are swirling motions that are formed when this happens and it results in reduced performance of devices like aircraft or turbines. Araya is studying why this happens and what can be done to prevent it.

The flipped classroom concept will be used to introduce this research to undergraduate and graduate students and will include lessons on high performance computing, computational thinking and modeling. Summer programs for K-12 students and teachers will also benefit from a computing and visualization facility that can be used for research, learning and outreach.

"This award recognizes Dr. Araya's excellence in research and education. His extensive research in turbulent flow will guide improvements in the design and performance of aircraft, and his educational activities will impact students at UTSA and in our community," said Dr. Eric Brey, Interim Dean of Klesse College. "The NSF CAREER Award is one of the most prestigious awards for junior faculty. Dr. Araya is the third CAREER awardee in the Mechanical Engineering Department this year and becomes the ninth active NSF CAREER awardee in our college."

"The creative and state-of-the-art research and educational activities proposed by Dr. Araya in the extension of his CAREER award are highly aligned with the Department of Mechanical Engineering's and UTSA's initiatives," said Dr. Ender Finol, Chair of Mechanical Engineering at Klesse College. "This award will enhance our thermal-fluids knowledge, integrating it into our mechanical engineering curriculum, and enrich our nascent aerospace engineering program. The Department of Mechanical Engineering is strongly committed to fostering Dr. Araya's research and educational plan, as well as his professional development."

The NSF CAREER award is one of the most prestigious awards for early-career faculty members in STEM fields. The award recognizes early career faculty members who demonstrate exceptional promise in both research and teaching, and who have the potential to become academic leaders in their respective fields. Faculty members may apply for the award to recognize research activities that set a firm foundation for a lifetime of leadership in their academic discipline.

Dr. Brendy Rincon Troconis receives Early Career Excellence Award by the Association for Materials Protection and Performance (AMPP)



This award recognizes individuals who work in academia, research, industry or government while providing excellent contributions and promise in materials protection and performance. Dr. Rincon is being recognized for her commitment to the advancement of materials protection and corrosion control research and for establishing herself as an inspiring educator and outstanding research leader in corrosion at a minority-serving university.

Dr. Rincon has established herself as a leading educator and researcher in material science and corrosion engineering. Her work has been significantly impactful in the growth and development of students dedicated to understanding the principles and practices of materials and corrosion engineering and through her many significant research accomplishments.

ign TECH SYMPOSIUM

AMAS Engineering takes top prize at Fall 2022 Tech Symposium



The team especially designed pants to help prevent dangerous blood clots by providing compression to a person's legs and promoting blood flow. Additionally, the innovation has the potential to catch a blood clot in its early stages by monitoring the temperature of the lower body. The group of Mechanical Engineering seniors collaborated with Dr. Jeffrey Ebin, founder and director of the Innovation Ebcore, to develop Ebin's idea of athrombic pants.

The team includes Matthew Juarez, Adalicia Scimia, Alan Guerra and Sarah Sultan

Print & Click earns best at Spring 2023 Tech Symposium



The team includes Esteban Mejia, John Dejillo, Keahra Etuk, Josiah Lozano, Charles Otte & Ben Torres.

Fluidic Mixing Bioprinting System & Incubation Enclosure. Over 160,000 skin grafts are performed in U.S. hospitals annually, with 1 in 3 burn hospitalizations requiring a skin graft. Current skin graft methods involve using skin from a donor site on the patient, skin from another person/animal, or a synthetic substitute. Recent advances in bioprinting have shown a promising future where bioprinters can be used to create patientspecific skin grafts, other tissues, and even artificial organs. However, current bioprinters are incapable of printing high-quality viable tissue samples due to improper cell distribution and a lack of an enclosure system to protect the cells during printing. Our proposed bioprinting system will include a novel mixing system to improve cell uniformity and will be housed in an enclosure capable of maintaining the optimal conditions for the printed cells.

PI/Co PI	Shared Credit (%)	Project Title	Sponsor	Total Funding
D. Restrepo	100	STTR: Metal 3D Printing & Recycling System in Space	Elevate Systems	\$75,000
H. Millwater	12	CONNECT- the CONsortium on Nuclear sECurity Technologies	Department of Energy - DOE	\$4,999,989
D. Pineda K. Bhaganagar	20/20	An Air Quality Monitoring Station to Expand NASA's Pandora Network to South Texas	National Aeronautic and Space Administration - NASA	\$590,017
C. Combs	100	Validation Quality Experimental Data and Workforce Development for Hypersonic Systems	UT-Battelle LLC	\$400,000
D. Restrepo R. Hood	50/50	Suction: Combat Ready Advanced Multimodal Machine	EmergenceMed, LLC	\$525,000
H. Millwater	100	Determining equivalent initial defect size for additively manufactured Ti specimens	Ohio State University Research Foundation	\$194,000
R. Hood	100	NSF I-CORPS: Next Generation Airway Management	National Science Foundation - NSF	\$50,000

PI/Co PI	Shared Credit (%)	Project Title	Sponsor	Total Funding
D. Pineda	100	Fighting Fire Toxicity: Improving Safety and Health via Novel Optical Sensors	University of California Los Angeles	\$274,922
K. Bhaganagar	100	Project Orpheus: The University of Texas at San Antonio Rowdy Rocket Rovers	National Aeronautic and Space Administration - NASA	\$1,200
D. Restrepo	100	CAREER: Integrated Research and Education Program on Mechanical Behavior of Architected Materials	National Science Foundation - NSF	\$641,398
D. Pineda	100	Keeping the Fire Burning: Fostering a Sustainable Community in the Combustion Sciences	National Science Foundation- NSF	\$31,580
J. Araya	100	CAREER: High fidelity numerical simulations of turbulent flow separation at high Reynolds numbers with passive scalar transport	National Science Foundation - NSF	\$250,000
A. Alaedinni K. Castillo	50/25	The 5W's of NASS Data: A Concept for Discovering Data Usefulness	New York University	\$40,000
M. Seidi	50	Sex variations in the brain tissue responses to head kinematic exposures in sports	UTSA Office of Vice President Research, Economic Development, and Knowledge Enterprise Office	\$10,000

PI/Co PI	Shared Credit (%)	Project Title	Sponsor	Total Funding
T. Bhuyian	100	Optimizing Mixed-fleet of Drones and Ground Vehicles for Efficient Delivery of Time-Sensitive Products	Battelle Energy Alliance, LLC (Idaho National Laboratory)	\$79,326
B. Rincon	40	Assessing the Temporal Succession of Microfouling Communities on Copper-Nickel and Titanium Metals Deployed in Marine Environments	Office of Naval Research - Science and Technology	\$480,000
A. Alaeddini	50	Student-Athletes' Road to Success in College Life: Factors Influencing Well-being, Athletic, and Academic Performance	American Athletic Conference	\$15,000
B. Rincon	100	Systematic Study of the Effect of Surface Preparation and Electrodeposition Process Parameters on the Corrosion Resistance of Zramic Coated Steel.	TWIN HAWKS LLC - TH	\$96,577
C. Combs	100	CAREER: Experimental Investigation into the Impact of Incoming Boundary Layer State on the Unsteady Dynamics of a Transverse Jet in a Hypersonic Crossflow	National Science Foundation - NSF	\$617,941
J. Araya	100	Coherent structure assessment in high-speed crossflow jets	US Department of Defense	\$97,097
C. Combs	100	UCAH UGRA Supplement	Texas Engineering Experimentation Station	\$29,924

PI/Co PI	Shared Credit (%)	Project Title	Sponsor	Total Funding
B. Rincon D. Restrepo H. Millwater	40/35/25	In-Situ Spatially Resolved Characterization of Stress- Affected Corrosion Kinetics	Office of Naval Research	\$352,134
D. Restrepo H. Millwater	70/30	Fast and effective Sensitivity and Uncertainty Quantification in Morphable Architected Materials	The Ohio State University	\$249,913
C. Combs	100	Novel Non-Intrusive Velocimetry Approaches with Minimized Seeding Impacts	The Ohio State University	\$183,186
D. Restrepo J. Araya C. Combs H. Millwater	100	Novel Architected Materials for Drag Reduction and Flow Control in Hypersonic Vehicles	US Department of Defense	\$799,993
K. Castillo	50	Cyber-Informed Engineering (UTSA)	Battelle Energy Alliance, LLC (Idaho National Laboratory)	\$250,000
B. Rincon	100	Developing an Accelerated Procedure to Evaluate Magnesium Oxychloride Based Panels	DuPont Specialty Products USA LLC	\$270,320

DOCTORAL STUDENT SPOTLIGHT



UTSA. Eugene Hoffman, Ph.D.

MECHANICAL ENGINEERING '23

Hoffman received his Bachelor's degree in Mechanical Engineering from the University of Evansville and joined the Doctoral program back in 2018 under the mentorship of Dr. Christopher Combs.

During his time at UTSA, Hoffman's studies were to understand the impact of surface roughness on a phenomenon known as shockwave boundary layer interaction (SWBLI). SWBLI occurs whenever a shockwave from a change in geometry of an airframe impinges on the boundary layer found on the vehicle surface. This interaction can be found at several locations on hypersonic vehicles and can be catastrophic when not accounted for in the vehicle's design. "Eugene was an absolutely phenomenal student. He took a chance on a brand new assistant professor and I'm so lucky he did. Eugene is largely responsible for the construction of our Mach 7 wind tunnel which is a unique, world-class facility", Combs said about his graduate student. He also added, "I look forward to following his career where I am sure he will continue to do great things. With him being here at Southwest Research Institute (SwRI), hopefully we can find some opportunities to continue working together moving forward!"

GRADUATE DEGREES AWARDED

2022-2023 Mechanical Engineering Graduates



Student: Ishan Bhattarai

Advisor: Dr. Kiran Bhaganagar & Dr. Hung-Da Wan Thesis Title: Numerical Analysis of Turbulent Density Current Over Rough Surfaces Using Large Eddy Simulation

Student: Shahzaib Chaudry

Advisor: Dr. Hung-Da Wan Special Project Title: The Implementation of Lean to the UTSA Fostering Futures Program to Help Improve Customer and Employee Experience

Student: Valeria Delgado Elizondo

Advisor: Dr. Christopher Combs Thesis Title: High-Speed Pressure-Sensitive Paint Measurements of a Hypersonic Vehicle

Student: Brandon Donald

Advisor: Dr. Christopher Combs Thesis Title: Detonation Cell Size Estimation via Chemiluminescence Imaging in an Optically-Accessible Linear Detonation Tube

Student: Kyle Fetter

Advisor: Dr. Daniel Pineda Thesis Title: High-speed laser absorption measurements of carbon oxides in linear detonation channels

Student: Jose Gonzalez

Advisor: Dr. Lyle Hood Thesis Title: Viscosity Performance Testing of a Redesigned, Portable, Nonelectronic Versatile Oxygenating Perfusion System

Student: Colin HIII

Advisor: Dr. Hung-Da Wan Special Project Title: Optimizing System Performance with Purposeful Job Assignments: A Model to Reduce the Eighth Type of Operational Waste

GRADUATE DEGREES AWARDED

2022-2023 Mechanical Engineering Graduates



Student: Zechariah Knowlton

Advisor: Dr. Daniel Pineda Special Project Title: The Design and Implementation of Gas Delivery Systems

Student: Carolina Ramirez-Tamayo

Advisor: Dr. Adel Alaeddini Thesis Title: A Data-Driven Approach to Improve the Quality of Radiologist's Chest X-Ray Scanning

Student: Colten Rodriguez

Advisor: Dr. David Restrepo Special Project Title: A Method for Determining Pickup Trucks' Front Bumper Deformation Threshold for Stiffness Coefficients

Student: Billy Sallie

Advisor: Dr. Daniel Pineda Special Project Title: High heat fluxes on additively manufactured materials for propulsion applications

Student: Ray Soujoudi

Advisor: Dr. Randal Manteufel Dissertation Title: Thermoeconomic and Environmental Advantages of Ammonia Precooled Mixed Refrigerant in Liquefied Natural Gas Cycle

Student: Thanh Tran

Advisor: Dr. Kiran Bhaganagar Thesis Title: PYPLUME: PYTHON LIBRARY FOR ANALYSIS OF WRF-bPLUME: Computation Turbulent Plume Visualization and Analyses

Student: Pengwei Xiao

Advisor: Dr. Xiaodu Wang Dissertation Title: Medical Image-Based AI Techniques in Prediction of Trabecular Bone Microarchitecture and Mechanical Properties

Student: Kolton Keith

Advisor: Dr. Krystel Castillo Doctoral Dissertation Title: Mixed Integer Programming Modelling Approaches for Clean Energy Systems and Cybersecure Manufacturing

GRADUATE DEGREES AWARDED

2022-2023 Mechanical Engineering Graduates



Student: Eugene Hoffman

Advisor: Dr. Christopher Combs Doctoral Dissertation Title: Effects of Surface Roughness on Shock-wave/boundary-layer Interactions at Mach 7.2

Student: Monica Elbjorn

Advisor: Dr. R. Lyle Hood Thesis Title: Development and Characterization of a Polymer-Based Device for Precise and Targeted Drug Delivery in Cervical Cancer Treatment

Student: Rolando Gonzalez

Advisor: Dr. Hung-Da Wan Special Project Title: Implementation of Six Sigma Principles to Reduce Loss of Inventory and ncrease Efficiency at Corza Medical

Student: Sergio Molina

Advisor: Dr. Zhigang Feng Thesis Title: Implementing Multi-Layered Neural Networks to Estimate Coefficients of Drag, Lift, and Torques in Spherocylinder Particles

Student: Ryan Beckmann

Co-Advisors: Dr. Kiran Bhaganagar & Dr. Zhigang Feng Thesis Title: Implementing Multi-Layered Neural Networks to Estimate Coefficients of Drag, Lift, and Torques in Spherocylinder Particles

Student: Drishya Dahal

Co-Advisors: Dr. Brendy Rincon Troconis & Dr. David Restrepo Thesis Title: Computationally Informed Adhesion Measurement Using the Blister Test

Student: Vivian Reyna

Advisor: Dr. Ender Finol Thesis Title: A Finite Element Modeling Study of Abdominal Aortic Aneurysm Biomechanics Based on the Relative Effects of Wall and Intraluminal Thrombus Constitutive Material Properties

In Memoriam



Yusheng Feng, PhD

Yusheng Feng was a graduate of the Class of 1977 at Tsinghua University, majoring in solid mechanics from the Department of Engineering Mechanics. After moving to the USA, Yusheng finished his master's degree in Mechanical Engineering and master's degree in Applied Mathematics at the University of Oklahoma. He earned his Ph.D. in Computational Mechanics at the University of Texas at Austin.

Yusheng was a respected and accomplished professor at the University of Texas at San Antonio for more than fifteen years. His field of study includes computational mechanics, computational biomedicine, bioengineering and much more.



Hyman Norman Abramson, PhD

Norm Abramson received his B.S. in Mechanical Engineering in 1950 at Stanford University; M.S. in Engineering Mechanics, 1952; Ph.D. at University of Texas, Austin, 1956. Dr. Abramson was well known in the field of theoretical and applied mechanics, particularly in aeronautics and astronautics. He was internationally known in the field of ship structural analysis and dynamics, as well as an authority in hydroelasticity. Dr. Abramson was a member of U.S. National Academy of Engineering and many other similar publications. Norman's accomplishments have led to many honors, including the ASME Medal, ASME Centennial Silver Medal, first recipient of the ASME Applied Mechanics Division Award, along with other numerous scientific awards. As Executive Vice President, Norman transformed Southwest Research Institute's international research program to a vital role in maintaining the Institute's position as one of the leading non-profit contract R&D organizations in the world.

Thank you for your service and until we meet again!







Photos by Deborah Silliman

