



TEXAS A&M
UNIVERSITY



2020

DEPARTMENT OF
**ENGINEERING TECHNOLOGY
& INDUSTRIAL DISTRIBUTION**

LETTER FROM THE DEPARTMENT HEAD



The Department of Engineering Technology and Industrial Distribution (ETID) is highly recognized for its state-of-the-art undergraduate and graduate programs. We are proud of this reputation and, even more so, of our graduates who strive to solve significant problems in industry, the business world and in government agencies. However, we don't rest on our past accomplishments. We strive to enhance our programs to meet the changing needs of the world through a process of continuous improvement that is itself a reflection of our commitment to excellence.

Our distance education master's programs in industrial distribution and engineering technical management are two great examples of how we do move forward to meet the needs of our constituents. Our mechatronics program is another example of meeting industry needs in the area of embedded, intelligent products that combine mechanical, electronic and software components. Our newest degree, a Master of Science in Engineering Technology, is yet another example of the department addressing industry needs for high-caliber engineering technology professionals with advanced degrees in intelligent systems

and modern manufacturing processes.

As the professions we serve evolve, we continue to make knowledge more accessible, drive innovation and promote creative solutions that address industry needs. This is the mission of ETID as it is evident in this brief brochure. Additional information about the department can be found at engineering.tamu.edu/etid.

Sincerely,

A handwritten signature in black ink that reads "Reza Langari". The signature is fluid and cursive, with a large initial "R" and a period at the end.

Reza Langari, Ph.D.

J.R. Thompson Department Head
Professor



TEXAS A&M UNIVERSITY
Department of
Engineering Technology
& Industrial Distribution

BY THE NUMBERS

Texas A&M University's Department of Engineering Technology and Industrial Distribution programs are some of the top in the nation.

TOP 10

The department is part of the Texas A&M College of Engineering, one of the top ten ranked engineering colleges in the nation.

ENROLLMENT*

(FALL 2020)

2,247 Undergraduate

246 Master's

**preliminary*

FACULTY (FALL 2020)

31 Tenured/Tenure-track

41 Academic Professionals

DEGREES AWARDED (FALL 2019-SUMMER 2020)

540 Bachelor's

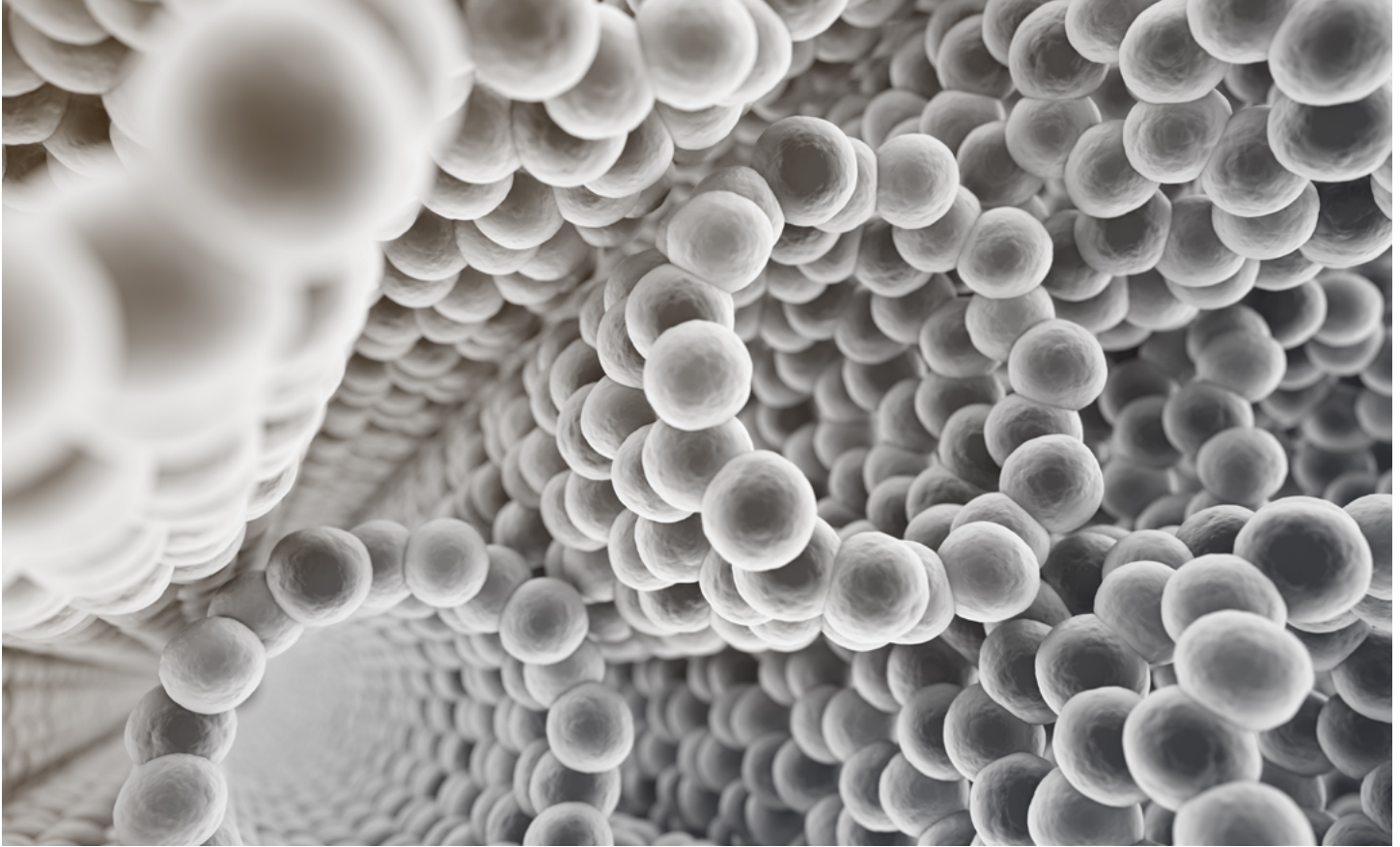
90 Master's

HANDS-ON LEARNING

75% of Student Learning is Experiential

25% of Student Learning is Traditional Classroom Lecture

STRENGTHENING POLYMER COMPOSITES



Dr. Amir Asadi and his team have developed a new manufacturing process for hybrid polymer composites — a vital component in the aerospace, automotive, marine and defense industries. This new process will produce significantly stronger composites to be used in load-bearing mechanical components in various industry sectors across the nation.

“My research is like tailoring,” Asadi said. “You put fabrics together and sew them to make something out of it with the desired properties and level of performance in your mind. These nanomaterials are the nanothreads.”

Carbon fiber reinforced polymer (CFRP) composites, the most commonly used in the aerospace industry, are able to withstand the highest load-to-weight ratio, making them highly desirable for aerospace and defense applications.

Unfortunately, current CFRPs are expensive — both in carbon production cost and time needed to manufacture them — and have reached a plateau in their strength capabilities. While studies suggest that integrating carbon nanotubes into CFRPs can overcome these strength limitations, the process

includes invasive treatment that leads to uneven distribution of the nanotubes and damaging carbon fibers that can counterproductively weaken the final product.

In response to this, Asadi and his team have established a new method of manufacturing that utilizes cellulose nanocrystals in place of chemicals and time- and cost-ineffective processes.

“The new process enables the production of nanostructured hybrid CFRP composites at a large scale with desired structure and performance with fewer processing steps,” Asadi said.

Along with reducing the time and expense associated with making these composites, the process opens the door for more customizable materials. ▀



FEATURED RESEARCHER

Dr. Amir Asadi

Assistant Professor

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STUDENT PROJECT ACTIVATED ON ISS

While orbiting 254 miles above the Earth, International Space Station flight engineer Christina Koch received a command from NASA to “activate Hermes power.” A two-year development project went online with the flip of a switch.

Students Dustin Tish, Jeremy Coffelt and Luis Orozco were on hand at the Hermes command console at NASA’s Johnson Space Center to assist the project’s scientists, engineers and project manager in developing and activating the Hermes facility. This Class-1E platform provides scientists with a unique capability for ongoing microgravity research.

The students were ecstatic as they witnessed the system begin its bootup, configuration and initial operation.

“I can’t believe we are now able to command the Hermes facility while it’s aboard the International Space Station from here at the Johnson Space Center,” said Hermes project manager Veronica Saucedo. “With the help of our three students, the system came up beautifully and appears to be completely operational. The pictures and data we are receiving truly exceed our expectations.”

The students were responsible for all facets of the command and control system within Hermes. Tish was tasked with the



mechanical aspects of the project, Orozco was responsible for real-time operating system-based code running on six different microcontrollers, and Coffelt was the software lead for management, communications and user interface code written in Python for the BeagleBone Black device.

“As one of my first projects, I couldn’t be more pleased with the system’s performance,” said Dr. Kristen John, Hermes project scientist and principal investigator. ▀



STUDENTS DEVELOP **LUNAR ROVER PROTOTYPE**

NASA has a new directive to return humans to the moon by 2024, generating a compelling need for a more comprehensive understanding of the lunar environment.

Answering the agency's call to develop a small-form-factor mobile platform to perform lunar soil analysis and characterization, as well as imaging for concurrent lunar operations, a team that included undergraduate students from the department, developed and successfully demonstrated an articulated suspension robot called LOUIE (Lunar Observation, Utility and Imaging Explorer).

Mechatronics students Shane Blozis and Daniyal Ansari were the primary hardware and software engineers on the project conducted by Texas Space Technology Applications and Research (T STAR) and ATG Mobile Electric Systems.

Lee Graham, senior project engineer within the Astromaterials Research and Exploration Science Division of the Human Exploration and Operations Mission Directorate at NASA's Johnson Space Center, said the agency found their rover to be "fully acceptable" following the team's final demonstration.

LOUIE's capabilities and adaptability have piqued NASA interests in meeting the lunar mission requirements, including regolith sample imaging. In addition, LOUIE will perform lunar trenching to support lunar roadbed preparation.

The rover's multifaceted mission while on the moon will include instrument deployment, roadbed preparation, video recording of the launch of the return vehicle and the distribution of radio-frequency identification sensors that will help NASA scientists collect information about lunar water ice and establish a geo-location infrastructure. ▀

STUDENTS SOLVE CAMPUS FLOODING PROBLEM

Maintenance rooms in many older buildings across the Texas A&M University campus have flooded over the years, resulting in significant equipment damage. These issues are currently present in Fermier Hall and Thompson Hall, home to the department.

Department head Dr. Reza Langari and facilities manager Frank Cervantez challenged students to design and implement a solution to monitor these rooms and be alerted when problems such as flooding or unauthorized entry are detected. Seniors Dustin Tish and Brandon Bowen stepped forward to develop the “Maintenance Room Internet of Things (IoT)” project.

The project resulted in a new embedded system module that uses the university’s wireless network to monitor and publish environmental data from each maintenance room to an IoT program.

The team’s dashboard allows authorized personnel to log in to the program and receive this data in a graphical format. In addition, if certain environmental parameters such as water or light levels are exceeded inside of any maintenance rooms, the IoT program immediately alerts Cervantez. Having this information anywhere internet access is available allows him to quickly address the problem and resolve the issue before costly damage occurs. ▀





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PROGRAMS OF STUDY

Undergraduate

ESET | B.S., Electronic Systems Engineering Technology
(Engineering Technology Accreditation
Commission of ABET Accredited)

IDIS | B.S., Industrial Distribution

MMET | B.S., Manufacturing and Mechanical
Engineering Technology (Engineering Technology
Accreditation Commission of ABET Accredited)

MXET | B.S., Multidisciplinary Engineering Technology

- Mechatronics Focus
- STEM Education Focus

Graduate

Distance Education

METM | Master of Engineering
Technical Management

MID | Master of Industrial Distribution

Resident

MSET | M.S., Engineering Technology