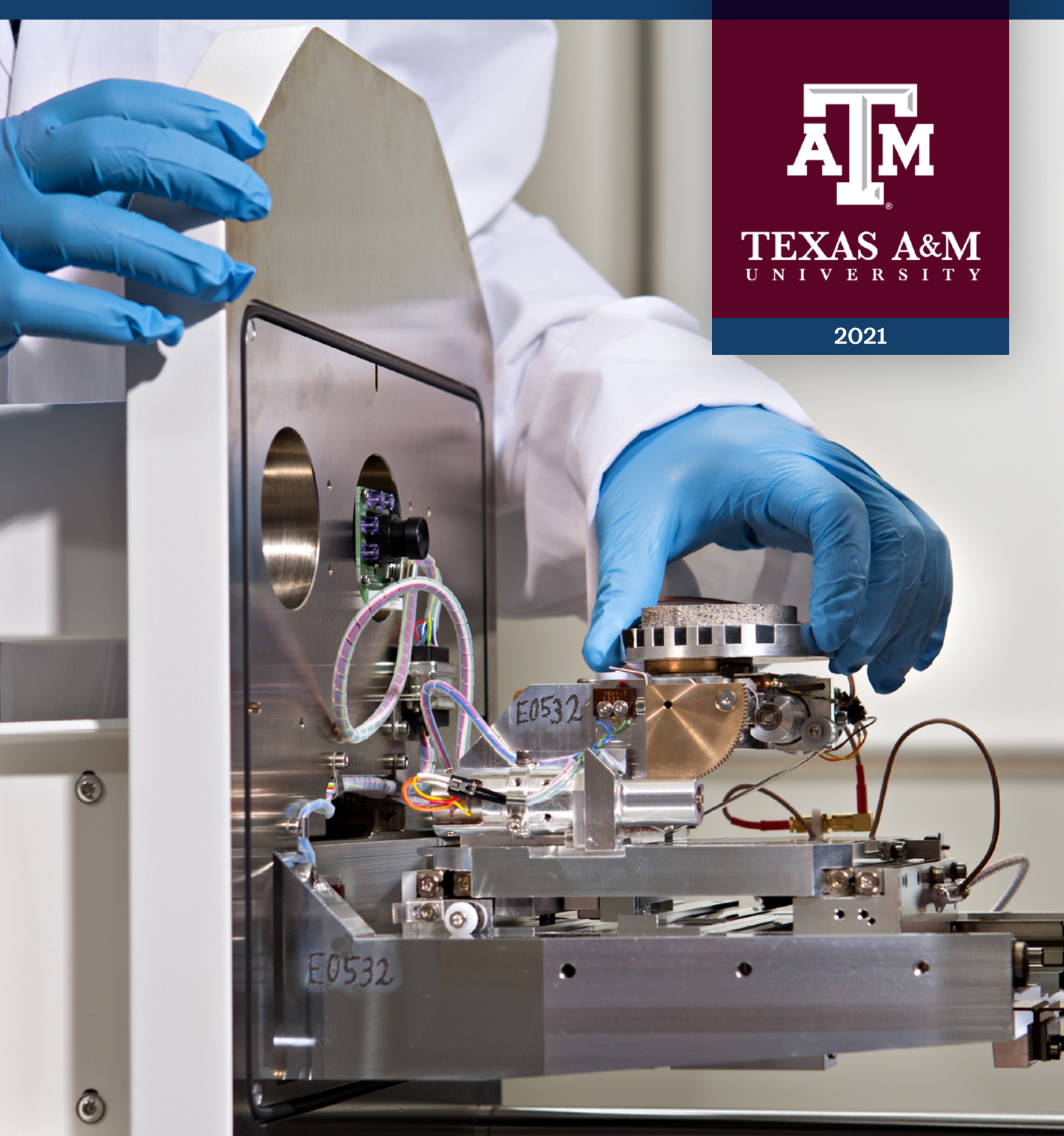




TEXAS A&M
UNIVERSITY

2021



WM MICHAEL BARNES '64 DEPARTMENT OF
INDUSTRIAL & SYSTEMS ENGINEERING

LETTER FROM THE DEPARTMENT HEAD



The Wm Michael Barnes '64 Department of Industrial and Systems Engineering has overcome many recent challenges in stride as a named department.

We are eager to welcome our students back for the fall 2021 semester and are looking forward to all of the amazing feats they will accomplish. Our students are resilient and prepared to go out into the world and lead in both industry and academia.

This year we are thankful for the generosity of each and every one of our donors. They give many of our students the opportunity to learn and prosper in industrial and systems engineering, and faculty the opportunity to honor these generous gifts.

We will be honoring Mike and Sugar Barnes at our department naming dedication on October 1. The Barnes' have given over \$10 million to Texas A&M University, including a major endowment in honor of the department's 80th anniversary. The department has been renamed in their honor.

We are proud to promote a culture of openness and collaboration that welcomes everyone to Texas A&M, both remotely and in person. For further information about our department, our degree programs, recent news items and more, we invite you to explore our website.

Sincerely,

A handwritten signature in black ink that reads "L. Ntaimo". The signature is stylized with a large, circular flourish at the beginning.

Lewis Ntaimo, Ph.D.

Professor and Department Head

Sugar and Mike Barnes Department Head Chair



TEXAS A&M UNIVERSITY
Wm Michael Barnes '64
Department of Industrial
& Systems Engineering

BY THE NUMBERS

RANKINGS (2022)

#9 Undergraduate Program
Ranked No. 9 (Public)
(U.S. News & World Report)

#8 Graduate Program
Ranked No. 8 (Public)
(U.S. News & World Report)

ENROLLMENT* (FALL 2021)

**preliminary,
5th class day*

938 Undergraduates

358 Graduates

FACULTY

43 Total
Faculty

19 Tenured
Faculty

28 Tenure-
Track

15 Academic
Professional Track

18 Society
Fellows

7 Endowed Chairs
and Professorships

DEGREES AWARDED (AY 2020-21) **preliminary*

212 B.S.

68 M.S.

37 M.E.

12 Ph.D.

DIVERSITY

26.2% Minority

28.5% Female

23% International

CELEBRATING 80 YEARS OF ACHIEVEMENT



2020 marked the 80th anniversary of the Wm Michael Barnes '64 Department of Industrial and Systems Engineering. The department's goal was to increase the number of student scholarship gifts to mark its anniversary.

"Our 80th year was a huge milestone. In that time, our department has emerged as one of the leading industrial and systems engineering departments in the world," said former department head Dr. Mark Lawley. "Our hope for this celebration was to strengthen relationships with our former students and solicit their help in raising funds for undergraduate student scholarships. I am truly humbled and grateful to all former students who attended our events and participated in helping our current and future students."

Early faculty members played an important role in developing the department by implementing extensive industry experience into the curriculum. Industry knowledge in motion and time study, production engineering, tool engineering,

plant design and personnel issues became staples that paved the way for the future of industrial engineering education.

The department grew significantly throughout the decades. Lawley developed a former student outreach program to increase gifts and donations to mark the department's 80th year milestone. With Dr. Lewis Ntamo being appointed department head in 2020, growth continues to be at the forefront.

"We will continue the outreach efforts that Dr. Lawley started so that our department fulfills its vision of being a top-five program in the nation in the next five years and continues to attract the best students to Texas A&M," said Ntamo. "On behalf of the department, I am very grateful to all our donors for their generosity, especially during a pandemic."

In March 2020, the outreach team held 18 online events reaching over 400 former students. ▀



HUMAN / AI-SYNERGY IN COMBAT VEHICLES

As soldier safety in combat continues to be a priority, the military and researchers are leveraging artificial intelligence in service vehicles.

Dr. Thomas Ferris is working with The Crew Optimization and Augmentation Technologies (COAT) program to support human crew members in future ground vehicle systems.

"This project looks at sharing jobs between humans and autonomy," Ferris said. "This requires knowing which jobs are best suited for humans and which for artificial intelligence (AI) agents, and how to ensure mission effectiveness of the human-vehicle system as responsibilities and roles change."

Soldiers will have the ability to see all external activity from inside the vehicle and be protected by its armor, making missions substantially safer.

Technologies being investigated include video cameras capturing real-time surroundings and feeding data back to soldiers inside the vehicle. Soldiers inside the cockpit can use

these feeds to drive the vehicle they are currently passengers in or drive a completely separate remote-controlled vehicle. The soldier's task responsibilities need to be flexible in order to support management of the vehicle and promote safer, more effective mission performance.

In a recent experiment, test subjects drove military vehicles through eight courses at Camp Grayling. Each course required a different driving function to determine how subjects perform using display configurations, including helmet- and vehicle-mounted visual displays.

"I always want to make sure that where my contributions are going are toward safer and better systems for soldiers, and I feel this is both an exciting and noble research effort," Ferris said. ▀



FEATURED RESEARCHER

Dr. Thomas Ferris

Associate Professor, Industrial and Systems Engineering
tferris@tamu.edu



BMI, AGE CAN INCREASE NECK PAIN RISK

With roughly 80% of jobs being sedentary, neck pain is a growing occupational hazard. Is bad posture solely to blame?

Texas A&M researchers found that while poor neck and head postures are the primary determinants of neck pain, body mass index, age and time of day also influence the neck's ability to perform sustained or repeated movements.

"Neck pain is one of the leading and fastest-growing causes of disability in the world," said Dr. Xudong Zhang. "Our study has pointed to a combination of work and personal factors that strongly influence the strength and endurance of the neck over time."

Zhang says a quantitative study has been lacking on how personal factors like sex, weight and age can affect neck strength and endurance.

He and his team recruited 40 adults with no previous neck-related issues to perform controlled, "sustained-till exhaustion" head-neck exertions in a laboratory setting.

"It is intuitive to think that over the course of the day, our necks get more tired since we use it more," said Zhang. "But roughly half of our participants were tested in the morning and the remaining in the afternoon. Some of the participants had day jobs and some worked the night shift. We consistently found the time-of-day effect on neck endurance." ▼



FEATURED RESEARCHER

Dr. Xudong Zhang

Professor, Industrial and Systems Engineering
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DATA COMPARISON TECHNOLOGY MAY **BOOST WIND PRODUCTION**



Despite the many technological advancements made in upgrading wind-powered systems, finding a reliable way to assess competing technologies continues to be a challenge. In a new study, researchers at Texas A&M use advanced data science methods to compare the performance of different wind turbine designs.

“Currently, there is no method to validate if a newly created technology will increase wind energy production and efficiency by a certain amount,” said Dr. Yu Ding. “In this study, we provided a practical solution to a problem that has existed in the wind industry for quite some time.”

As of 2020, about 8.4% of all electricity produced in the United States came from wind energy. The Department of Energy plans to increase the footprint of wind energy to 20% in the coming decade.

As a result, there has been a surge of novel technologies, particularly to the blades. These upgrades promise an improvement in the performance of wind turbines and power production. However, testing whether these quantities will go up is arduous.

The team collaborated with an industry that owns inland wind farms to collect their data. These machines were fitted with sensors to track power produced, wind speeds, wind directions and temperature. The researchers collected data over four-and-a-half years, and the turbines received three technological upgrades.

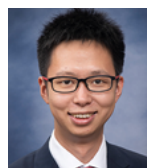
Using an advanced data comparison methodology that Ding developed with Dr. Rui Tuo, the team reduced the uncertainty in quantifying improvements in wind turbine performance. ▼



FEATURED RESEARCHERS

Dr. Yu Ding

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Dr. Rui Tuo

Assistant Professor, Industrial and Systems Engineering
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TEXAS A&M UNIVERSITY

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Department of Industrial
& Systems Engineering

engineering.tamu.edu/industrial

WM MICHAEL BARNES '64 DEPARTMENT
OF INDUSTRIAL & SYSTEMS ENGINEERING

AREAS OF FOCUS

Advanced Manufacturing

Data Science

Health and Human
Systems Engineering

Operations Research

DEGREE PROGRAMS

UNDERGRADUATE

- Bachelor of Science in Industrial Engineering
- Accelerated Degree: Bachelor of Science in Industrial Engineering and Master of Public Health
- Accelerated Degree: Bachelor of Science and Master of Science in Finance
- Bachelor of Science in Data Engineering*

GRADUATE

- Master of Engineering in Industrial Engineering (*distance option*)
- Master of Engineering in Systems Engineering
- Master of Science in Engineering Management (*distance option*)
- Master of Science in Industrial Engineering
- Executive Master of Science in Engineering Management
- Doctor of Philosophy in Industrial Engineering

MINORS

- Minor in Industrial Engineering

**Offered Fall 2022
pending approval*