

ZACHRY DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

LETTER FROM THE DEPARTMENT HEAD



For the past eight years, I have had the privilege to serve as the department head of the Zachry Department of Civil and Environmental Engineering at Texas A&M University. As I step down from this position, it is good to know that Dr. Zachary Grasley assumes leadership as the 18th department head.

Despite the challenges of a global pandemic, the faculty continued their exciting research efforts. One faculty member was involved in developing a dashboard to predict supply chain threats from the COVID-19 pandemic with the potential for global applications. Another, inspired by a contagion model, developed a model to predict flooding in urban road networks. Building a better world is our motto and using bacteria that eat sludge to produce bioplastic is a sustainable solution saving valuable resources. Another multidisciplinary project brings together engineers and historians using drones and GIS mapping to image grave markers to create an interactive map to memorialize veterans in national cemeteries.

The support of tomorrow's students by today's former students, whose

education opened doors to professional success, has no better exemplar than the JQ Engineering Fellowship in Sustainability. These are but a few of the many impactful projects that the faculty and students have underway.

Sincerely,

Robin Autenrieth Former Department Head Professor A.P. and Florence Wiley Professor III

TEXAS A&M UNIVERSITY Zachry Department of Civil & Environmental Engineering

BY THE NUMBERS

29% Female Undergraduate Enrollment

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26.1% Female Graduate Enrollment

GRASLEY TO HEAD CIVIL AND ENVIRONMENTAL ENGINEERING DEPARTMENT

Dr. Zachary Grasley took the helm as head of the civil and environmental engineering department on Sept. 1, 2021. Grasley has been the Center for Infrastructure Renewal (CIR) director at Texas A&M since January 2018.

"I am really excited for the opportunity to lead this dynamic department with such talented and hard-working staff, students and faculty," he said.

While directing the CIR, he helped facilitate the initiation and continued development of research labs and established significant collaborations with key external partners. Grasley's research spans from fundamental studies on mechanisms and modeling to applied solutions that lead to intellectual property and commercialization.

He is a fellow of the American Society of Civil Engineers, the American Concrete Institute and the American Ceramic Society. Grasley also has held leadership and service roles in the American Concrete Institute and the American Ceramic Society.

He originally joined Texas A&M in 2006 after completing his bachelor's degree in civil engineering at Michigan Technological University and his master's and doctoral degrees in civil engineering at the University of Illinois at Urbana-Champaign. Grasley accepted a faculty position at Virginia Tech in 2012 and returned to Texas A&M in 2014.

Grasley holds the Zachry Chair for Construction Integration and is an inaugural Presidential Impact Fellow. He is also a professor in the materials science and engineering department.

Grasley replaced Dr. Robin Autenrieth, who served in an interim capacity for one year before becoming department head in 2014.

She returned to full-time faculty in the fall. During her tenure, Autenrieth

oversaw the growth of the department, including academic programs such as the environmental engineering degree program. She also increased endowments and recruited several highly talented faculty members.

The COVID-19 Binational Dashboard, a web-based dashboard designed to predict pandemic threats to supply chains, share data and foster analysis, is now available from the Cross-Border Threat Screening and Supply Chain Defense.

Dr. Zenon Medina-Cetina said there is significant concern that some supply chains could break.

The goal is to develop near real-time analytics to provide strategic information about COVID-19 and related current and emerging threats, vulnerability of the health supply chain systems and likely impacts a combination of these may cause to society, the economy and the environment.

Viewers can access Mexican and U.S. statistics on confirmed cases, negative cases, pending results, active cases, deaths and recovery estimates.

Medina-Cetina said the dashboard steps beyond an initial look to provide concentrated information to generate a risk-guided platform and risk-management strategies that could become a model to other regions worldwide.

CONTAGION MODEL PREDICTS URBAN FLOODING

Inspired by the same modeling used to predict the pandemic spread, researchers have created a model to accurately forecast floodwater spread and recession in urban road networks. With this new approach, researchers have created a simple and powerful mathematical approach to solve a complex problem.

The contagion model, Susceptible-Exposed-Infected-Recovered (SEIR), maps the spread of infectious diseases mathematically. Dr. Ali Mostafavi and his team integrated the SEIR model and discovered the probability of flooding depends on the degree to which the nearby road segments are flooded.

Translated to flooding, susceptible is a road that could flood because it is in a flood plain; exposed is a road that has flooding due to rainwater or overflow from a nearby channel; infected is a road that is flooded and cannot be used; recovered is a road where the floodwater has receded.

The team verified the model with historical flooding data in Harris County during Hurricane Harvey in 2017. The results show the model can monitor and predict the evolution of flooded roads over time.

TEXAS A&M TO MAP VETERAN CEMETERIES

The National Cemetery Administration awarded a contract to the Texas A&M Engineering Experiment Station as part of their Veterans Legacy Program to engage students in developing an immersive and interactive digitized national cemetery experience.

Researchers will develop Geographic Information System-based applications to memorialize veterans interred in three national cemeteries: Houston National Cemetery and San Antonio National Cemetery in Texas, and Alexandria National Cemetery in Virginia.

"Capturing U.S. veterans' legacies and enabling virtual visits to their headstones through technology requires a transdisciplinary approach," said Dr. Stacey Lyle. "By transcending disciplinary boundaries between history, geoscience and engineering, we will preserve and make accessible the stories of American veterans' great contributions to our freedoms, for all people to experience."

SLUDGE EATING BACTERIA MAKE BIODEGRADABLE PLASTICS

The United States generates a colossal seven million tons of sewage sludge annually, enough to fill 2,500 Olympic-sized swimming pools. A substantial amount is disposed of in landfills. Researchers have uncovered an efficient way to use leftover sludge to make biodegradable plastics.

Researchers discovered the bacterium Zobellella denitrificans ZD1, found in tropical, coastal trees and shrubs, can consume sludge and wastewater to produce polyhydroxybutyrate, a type of biopolymer that can replace petroleum-based plastics.

"Zobellella denitrificans ZD1's natural preference for salinity is fantastic because we can, if needed, tweak the chemical composition of the waste by just adding common salts," said Dr. Kung-Hui (Bella) Chu. "So, we are offering a low-cost, sustainable method to make bioplastics and another way to repurpose biowastes that are costly to dispose of."

JQ ENGINEERING, LLP ESTABLISHES SUSTAINABILITY FELLOWSHIP

JQ Engineering, LLP, established the JQ Engineering Endowed Fellowship in Sustainability in the Zachry Department of Civil and Environmental Engineering.

Distributions from this endowment will provide one or more fellowships to full-time students in good standing pursuing a graduate civil engineering degree focusing on sustainable development.

JQ Engineering CEO Stephen Lucy and his partners were the driving forces behind this fellowship.

"My partners in JQ Engineering, Christopher Story '95 and John Hoenig '00, are Aggies and civil engineering graduates," Lucy said. "We all wanted to give back and provide support targeted at first-generation and underrepresented groups. Through our shared commitment to Texas A&M, we have established several fellowships within the Zachry Department of Civil and Environmental Engineering."

Lucy's father, Dan H. Lucy '48, was also a graduate of the civil engineering department, and was a first-generation college student. "Since second grade, I told everyone I was going to attend Texas A&M and be a civil engineer," Lucy said. "Both myself and my brother Dan, class of '81, followed in our father's footsteps and became civil engineers."

Ultimately, Lucy said that Texas A&M is second only to his family regarding the positive impact on his life. "Education opens up so many opportunities," he said. "In addition to a great education, Texas A&M also provides access to the Aggie network, which is of immeasurable value."

Zachry Department of Civil & Environmental Engineering

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ZACHRY DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

Building our world and our future

Developing a resilient and sustainable infrastructure

Preparing workforce-ready civil and environmental engineers

One department | Nine specialties

An extensive alumni network