

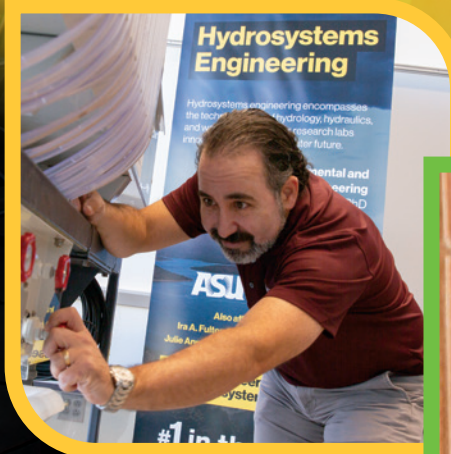


SCHOOL OF Sustainable Engineering and the Built Environment



The **Spectrum** of Sustainable Engineering:

from **Classroom** to **Community**



ASU Ira A. Fulton Schools of Engineering
Arizona State University

The Year in Review

2023

The Ira A. Fulton Schools of Engineering at Arizona State University Offers

What's Inside

ASU Ira A. Fulton Schools of Engineering
Arizona State University

25 undergraduate programs and 50 graduate programs in its eight schools

 <p>SSEBE School of Sustainable Engineering and the Built Environment Ram Pendyala, Director</p>	 <p>SCAI School of Computing and Augmented Intelligence Ross Maciejewski, Director</p>	 <p>ECEE School of Electrical, Computer and Energy Engineering Stephen Phillips, Director</p>	 <p>SEMTE School for Engineering of Matter, Transport and Energy Anthony Waas, Director</p>
 <p>SBHSE School of Biological and Health Systems Engineering Heather Clark, Director</p>	 <p>TPS The Polytechnic School Kurt Paterson, Director</p>	 <p>SMSN School of Manufacturing Systems and Networks Binil Starly, Director</p>	 <p>SIE School of Integrated Engineering Shawn Jordan, Interim Director</p>

ASU named #1 in innovation for 9th consecutive year.

#1 in the U.S. for innovation
ASU ahead of MIT and Stanford
—U.S. News & World Report, 9 years, 2016–24



Research Centers

Additional Research Centers

National Science Foundation Engineering Research Centers (ERCs)

CBBG
Center for Bio-mediated and Bio-inspired Geotechnics
Center for Bio-mediated and Bio-inspired Geotechnics (CBBG) – Lead, ASU

NEWT
Nanotechnology Enabled Water Treatment Systems (NEWT) – Partner, ASU

- Arizona Center for Algae Technology and Innovation (AzCATI)
- Biodesign Center for Environmental Health Engineering
- Biodesign Center for Health Through Microbiomes (BCHTM)
- Center for Carbon Efficient and Advanced Manufacturing of Materials and Structures (CAMMS)
- Center for Hydrologic Innovations
- Center for Negative Carbon Emissions (CNCE)
- Center for Teaching Old Models New Tricks (TOMNET) a USDOT Tier 1 University Transportation Center
- Metis Center for Infrastructure and Sustainable Engineering
- National Center for Infrastructure Transformation (NCIT)
- National Center of Excellence on SMART Innovations
- Southwest Pavement Technology Consortium (SPTC)
- Swette Center for Environmental Biotechnology
- Water & Environmental Technology Center (WET)
- Science and Technologies for Phosphorus Sustainability (STEPS)



School of Sustainable Engineering and the Built Environment

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ASU is a comprehensive public research university, measured not by whom it excludes, but by whom it includes and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves.

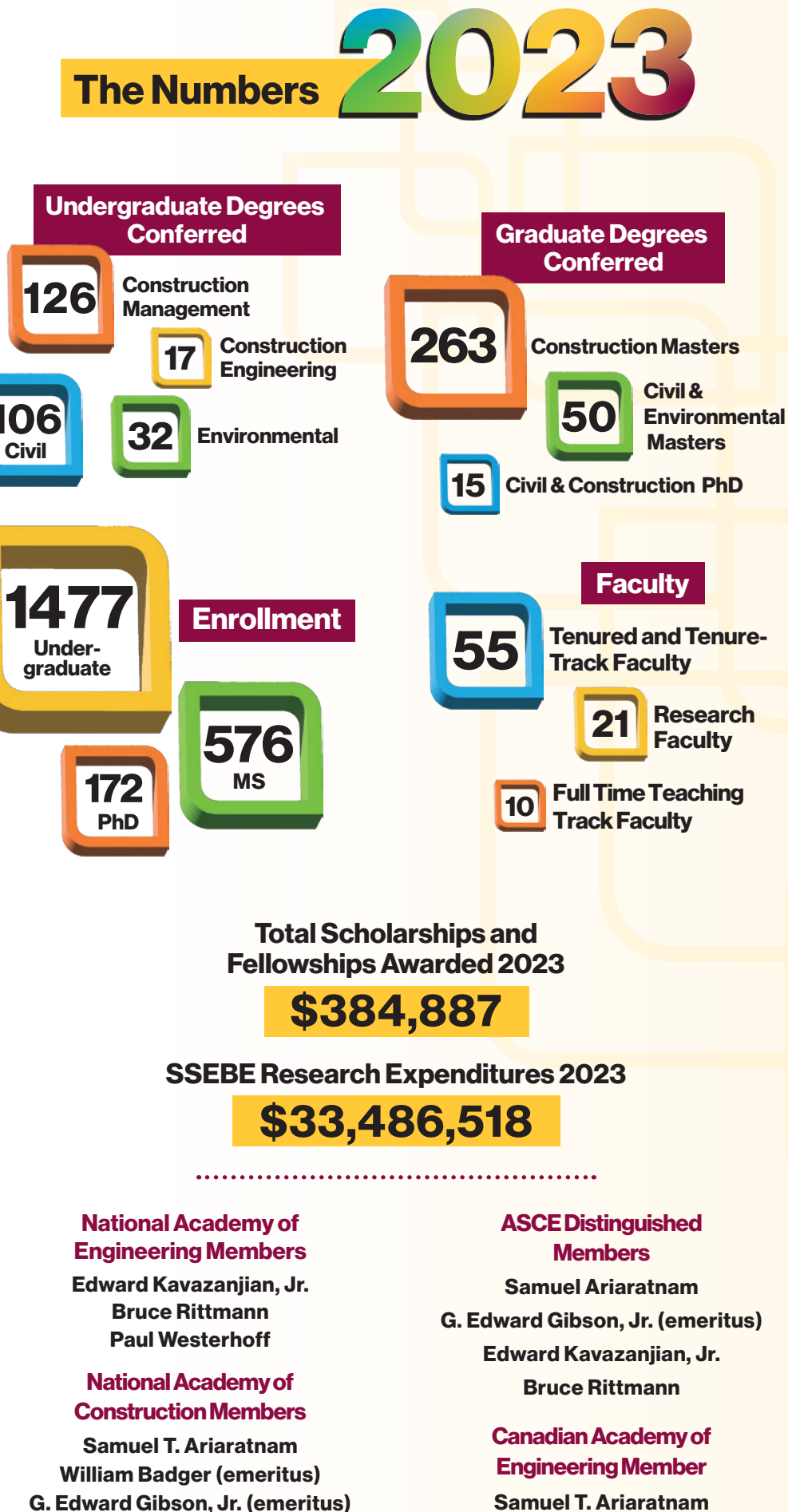
Mission

Demonstrate leadership in academic excellence and accessibility

Establish national standing in academic quality and impact of colleges and schools in every field

Establish ASU as a global center for interdisciplinary research, discovery and development by 2020

Enhance our local impact and social embeddedness



Welcome to the 2023 Annual Report of the School of Sustainable Engineering and the Built Environment (SSEBE) at Arizona State University. I am thrilled to share with you the remarkable accomplishments and groundbreaking innovations from our dedicated community of scholars, researchers, alumni, and students. This past year has been a testament to our unwavering commitment to inclusive excellence, sustainability, and impactful engagement.

Our faculty colleagues have received numerous accolades for their outstanding contributions to research and education. **Kristen Parrish** won the **2023 Outstanding Educator Award** from the **Architectural Engineering Institute of the American Society of Civil Engineers**, **Kerry Hamilton** won the **2023 AZ Water Quentin Mees Research Award**, and **Anca Delgado** was awarded the **2023 German-American Frontiers of Engineering Symposium Fellowship**. **Paul Westerhoff** was inducted into the **National Academy of Engineering (NAE)**, joining **Bruce Rittmann** and **Edward Kavazanjian** as members of NAE who serve on our faculty.

We are continuing to push the frontiers of research and discovery while educating the next generation of scholars and scientists. We recently established the **Center for Hydrologic Innovations** in concert with the Global Futures Laboratory. This center, led by Fulton Professor of Hydrosystems Engineering, **Enrique Vivoni**, is a collaborative effort to address critical water challenges in the desert southwest. In the realm of sustainable construction, we are proud to highlight the work of Fulton Professor **Narayanan Neithalath** who is advancing sustainable concrete technologies, including 3D printing of concrete that can withstand extreme environmental conditions. Through an NSF-funded AccelNet grant, his team is building international coalitions to tackle the challenge of infrastructure decarbonization. **Ruijie Zeng** was awarded the prestigious **NSF CAREER award** for his innovative research on agricultural drainage systems using drone technology. This recognition underscores our faculty's dedication to addressing real-world water resource challenges through cutting-edge research. The **Biodesign Center for Health Through Microbiomes** is blazing new trails in advancing human health under the leadership of **Rosa Krajmalnik-Brown**. A team guided by **Kamil Kaloush** was recognized with the **IRF Global Road Achievement Award for Research** for their pioneering work in developing novel materials for sustainable and durable infrastructure, while novel bio-based sustainable pavement materials are being pioneered by **Elham Fini** and her team.

Our students continue to excel, pushing the boundaries of sustainable engineering and the built environment.

Zhaocheng Wang won the prestigious **Paul F. Boulos Excellence in Computational Hydraulics/Hydrology Award**. His groundbreaking work on land surface modeling is advancing our understanding of hydrologic processes and promoting water sustainability and resilience. **Abbie Dirks**, a recent Master's graduate in Civil Engineering, was recognized as a **University Transportation Centers Student of the Year** for her research on urban resilience and equity in the wake of extreme disruptions such as the COVID-19 pandemic. **Kartik Bhagat** received the **AEESP Master's Thesis Award** for his outstanding research in environmental engineering.



Ram Pendyala

Our school is home to more than a dozen student organizations, providing students exceptional opportunities for professional development and engagement beyond the classroom. We were proud to co-host and co-organize the **Engineering Game Day** event in concert with the **American Council of Engineering Companies of Arizona**; this event brought 120 middle school students to our football stadium to learn about the vital role of engineering in infrastructure development and community development.

These are just a few of the accomplishments that you will read about in the pages that follow. To truly appreciate the breadth and depth of our work, I encourage you to check out the full report. Inside, you will find detailed stories of our research impact, faculty honors, student achievements, and much more. Each feature highlights the incredible efforts and accomplishments of our SSEBE community.

Our success would not be possible without the hard work and dedication of our students, staff, partners, and faculty. We are immensely grateful for their contributions and proud of their achievements. As we look forward to the coming year, we remain committed to driving innovation, fostering sustainability, and making a positive impact on our communities and the world. Thank you for being a part of our journey and for supporting the School of Sustainable Engineering and the Built Environment. Together, we are building a brighter, more sustainable future.

Warm regards,

Ram M. Pendyala, PhD
 Professor and Director
 School of Sustainable Engineering
 and the Built Environment

Civil, Environmental, and Sustainable Engineering (CESE)

Kamil Kaloush, PhD, PE
FORTA Professor of Pavement Engineering
CESE Undergraduate Program Chair

First and foremost, I would like to express my sincere gratitude to our previous chair, Professor Keith Hjelmstad, for his dedicated service and leadership. His contributions have laid a strong foundation for our program and contributed to the success and growth we have seen in the past several years.

Our enrollment has been consistent and pleasantly on an increasing trajectory. Thanks to our outstanding advising staff, their tireless efforts in guiding and supporting our students have been instrumental in this sustained growth. A special acknowledgment goes also to our adjunct faculty members. Their expertise, industry insights, and passion for teaching enrich our program and enhance the student experience. Last but not least, I want to express my deep appreciation for our full-time faculty. Their commitment to excellence in teaching, research, and mentorship is the backbone of our program. They inspire our students and contribute significantly to the success of our program.

I want to extend a heartfelt thank you to our Friends of Civil and Environmental Engineering industry members. Their unwavering support and contributions in various capacities — whether through mentorship, internships, scholarships, or guest lectures — have enriched our program and empowered our students. We truly appreciate their commitment to shaping the next generation of civil engineers.

As you explore our curriculum, courses, and opportunities, I invite you to reach out to learn more. In 2024, based on popular demand from both students and industry professionals, we bring back two new courses: Civil 3D/AutoCAD and Surveying. Additionally, we will continue to build on the success we have had and expand collaboration with our Career Fair companies who play a pivotal role in connecting our students with real-world opportunities. Their engagement and recruitment efforts have opened doors for countless students, and we value their partnership.

In the past three years, our civil engineering undergraduate program has been ranked in the top 20 among public universities; this is because it emphasizes a strong foundation in engineering principles, hands-on experiences, and encourages collaboration with industry partners. We strive to prepare our graduates to excel in their careers and make a positive impact in society.

Feel free to explore our program further and reach out with any questions. I look forward to connecting with you!



Construction Engineering (CNE)

Samuel T. Ariaratnam, PhD, PE, PEng, FCSCE, FISTT, FCAE, NAC, Dist.MASCE
Professor • Sunstate Chair of Construction Management & Engineering
CNE Programs Chair

The Construction Engineering program continues to produce top graduates here at ASU. Our students are gainfully employed at government agencies, construction companies, and engineering firms throughout the US with some taking positions internationally upon graduation. Undergraduate internships continue to be strong for our students, as they gain invaluable practical experience during their studies. This provides a great compliment to their classroom experience. Enrollment continues to increase steadily with our students coming from across the country. We definitely have geographical diversity in our program!

Investments from the Infrastructure Investment and Jobs Act signed in 2021 have increased spending to modernize our roads, bridges, transit, ports, airports, broadband, and water/wastewater systems. These are all areas that our Construction Engineering graduates are prepared to address upon graduation. Our program continues to emphasize planning, design, and management for the construction of infrastructure.

I am fully committed to growing our nationally and internationally recognized Construction Engineering Program at both the undergraduate and graduate levels. Our faculty will continue to engage closely with our industry stakeholders to ensure that the curriculum best prepares our students for the industry.



Environmental Engineering (EVE)

Trevor H. Boyer, PhD
Professor • EVE Programs Chair

Greetings from Environmental Engineering (EVE) at ASU, which offers BSE and MS degrees in Environmental Engineering. Both degrees continue to grow with over 180 students enrolled in the ABET-accredited BSE degree in EVE. The mission of the EVE program is to educate tomorrow's engineers to solve complex environmental problems and design systems at the human, urban, and planetary scale. To achieve this mission, the EVE program includes courses that span fundamental principles, engineering design, and emerging topics, as well as different teaching techniques including problem-based learning and experiential learning. As an example, the EVE program created a unique course entitled "Data Science for Environmental and Civil Engineers" in which students learn the data science process of data collection, processing, analysis, visualization, and sharing and apply these techniques to real environmental

data sets. The inclusion of emerging topics in the curriculum, such as data science, enables graduates from the program to have a strong understanding of environmental engineering principles and design along with complementary knowledge and skills. Another unique aspect of the EVE program is the required internship or research experience. Completing an internship or research experience helps students refine their interest in environmental engineering, understand the market, and provides students with career preparedness prior to graduation. I look forward to updating you on the progress and accomplishments of the EVE program in the coming years.



Del E. Webb School of Construction (DEWSC)

Timothy Becker, PhD, PE
Eminent Scholar • Interim Programs Chair
Del E. Webb School of Construction

At various gatherings held during the fall semester of 2023, many stakeholders of the Del E. Webb School of Construction, including faculty, alumni, students, and industry partners, engaged in the development of a strategic plan to guide the program over the next three years. Two of the guiding principles that emerged from the process are Industry Integration and Willing Exemplar.

Industry Integration is deeper than engagement or support. Integration means:

- 35+ faculty associates, from industry, teaching classes
- 75+ early career professional, the MentorForce, supporting our student organizations and competition teams
- 20+ members of our Executive Council, and
- 30+ companies investing in our Industry Partner Circle (IPC) to advance our program.

Willing Exemplar describes the service attitude and community culture of the DEWSC faculty, faculty associates, and staff. This academic year we've held many successful outreach events, including the first Concrete Block Party, the 20th Construction in Indian Country conference, the DEWSC alumni and family picnic, two scholarship golf tournaments, and the inaugural Forum for the Advancement of Women in Construction.

Our amazing faculty continues to be leaders in construction education and research. Dr. Kristen Parrish and Dr. Samuel Ariaratnam have recently been awarded grants of \$9 and \$4.3 million, respectively. These are record-setting amounts for DEWSC research.

We encourage anyone interested in keeping up to date with the many activities and accomplishments of DEWSC, to follow us on Linked In.



Graduate Programs

Narayanan Neithalath, PhD
Fulton Professor of Structural Materials
SSEBE Graduate Programs Chair



The graduate degree programs in SSEBE encompass Civil, Environmental and Sustainable Engineering (CESE), Construction Management (CON) and Construction Engineering (Con Eng). We offer PhD and MS degrees in CESE and CON, and MS degrees in Environmental Engineering and Construction Engineering. In addition to our continual growth in our Masters programs, our Fulton Fellowship program within our PhD program resulted in the addition of more than 30 new PhD students. We have continued to engage in efforts to increase the number of students from under-represented groups in our graduate program. SSEBE is the recipient of two presidential graduate fellowships that is targeted to recruit minority students.

The MS program in Environmental Engineering is growing, and complements our growing undergraduate Environmental Engineering degree program. We have developed a concentration in the MS program in data science, analytics and engineering that provides an advanced education in high-demand data science related to aspects of importance to sustainable engineering and the built environment. We have online Masters programs in Construction Management and Sustainable Engineering, and have plans to develop targeted online degree programs that fill critical niche in the areas of construction engineering and infrastructure. Our aim is to make SSEBE online programs the preferred choice for students and professionals seeking advanced education and credentialing.

With increasing PhD enrollments and our large research enterprise, our rankings are expected to improve in the coming years. We hope that, with the support of all our constituents, well-wishers, and contributors, SSEBE will have an excellent year ahead in graduate education and research, contributing to solutions to some of the vexing problems facing humanity.

Construction Management and Technology Graduate Programs

Kristen Parrish, PhD
Associate Professor • DEWSC Graduate Programs Coordinator



The Construction Management and Technology graduate programs are on the rise again. This growth allows us to serve the needs of the construction industry in Arizona and beyond. We continue to grow our in-person and online course offerings, adding new courses in each of our core curriculum areas, Construction Technology and Project Management & Control. Notably, our students can now enroll in courses like Envelope Systems, Disaster Management, and HR for Construction. These curricular updates ensure that we are meeting our students' needs and equipping them for success. We continue to diversify the types of culminating experiences our students complete, helping students develop the skills and competencies required for their careers as construction managers, facility managers, estimators, etc. Our doctoral program also continues to develop future faculty and industry leaders, and we are planning to begin offering a Doctorate of Engineering (DEng) that offers full-time professionals the flexibility to complete a doctorate while working.

We continue to recruit students from across the globe into our programs and love to engage our industry partners and alumni in these efforts; please reach out if you are interested in helping to grow the pipeline and pathways for the next-generation of construction managers, by hiring our students, teaching a course, or sponsoring or attending an event!



Kristen Parrish

Professor Kristen Parrish in the Del E Webb School of Construction of the School of Sustainable Engineering and the Built Environment won the **2023 Outstanding Educator Award** from the Architectural Engineering Institute of the American Society of Civil Engineers. This award recognizes outstanding educators who inspire students and make a difference through their teaching excellence. Dr. Parrish is also the recipient of a **\$9M Department of Energy grant** to build microgrids that will provide reliable power for the Hopi Reservation.



Paul Westerhoff

Professor Paul Westerhoff was inducted into the **National Academy of Engineering**. "This is a highly deserved recognition for Paul's significant and long-lasting contributions to water safety through the development of advanced water treatment and reuse systems," says Pedro J.J. Alvarez, who is the founding director of the National Science Foundation Engineering Research Center on Nanotechnology-Enabled Water Treatment, or NEWT. Westerhoff is the center's deputy director.



Kerry Hamilton

Professor Kerry Hamilton won the **2023 AZ Water Quentin Mees Research Award**. The AZ Water Association Quentin Mees Research Award celebrates academic achievements by recognizing authors of exceptional research papers. In addition, the award is an effort to bring research in water-related technology to the level of practical use.



Anca Delgado

Professor Anca Delgado was awarded the **2023 German-American Frontiers of Engineering symposium fellowship** which was held in Jülich, Germany. The event was intended to facilitate international and cross-disciplinary research collaboration, promote the transfer of new techniques and approaches across disparate engineering fields, and encourage the creation of a transatlantic network of world-class engineers. GAFOE is carried out in cooperation with the Alexander von Humboldt Foundation and supported by The Grainger Foundation.



Samuel Ariaratnam

Professor Samuel Ariaratnam was inducted to the **European Academy of Sciences and Arts, or EASA** for his exceptional contributions to the technical and environmental sciences field. As a member of EASA, Ariaratnam joins 2,000 leading scientists, artists and executive professionals honored by the academy.

New Faculty Join SSEBE



Tim Becker

Interim Programs Chair, Del E. Webb School of Construction, Eminent Scholar

PhD, North Carolina State University

Expertise: Construction Engineering and Management



Udaya Halabe

Teaching Professor

PhD, Massachusetts Institute of Technology

Expertise: Nondestructive Testing of Structures and Materials



Monica Perrin

Assistant Teaching Professor

MS, Arizona State University

Expertise: Sustainability Design and Construction Trends



Emmanuel Salifu

Assistant Professor

PhD, University of Strathclyde, Glasgow, UK

Expertise: Bio Geotechnical Engineering



Ricardo Eiris

Assistant Professor

PhD, University of Florida

Expertise: Construction Engineering



Nariman Mahabadi

Assistant Professor

PhD, Arizona State University

Expertise: Geotechnical Engineering



Dwarak Ravikumar

Assistant Professor

PhD, Arizona State University

Expertise: Energy Systems, Multi-Criterial Decision Analysis



Ravi Kiran Yellavajjala

Associate Professor

PhD, University of Notre Dame

Expertise: Data-Driven Structural Engineering

Kamil Kaloush

IRF Global Road Achievement Award for Research

"We are pleased to add this prestigious award to our innovative pavement engineering program at ASU. This recognition will significantly support our technology transfer efforts, accelerate field implementation, and connect us with industry partners to distribute the product worldwide. We are grateful and sincerely appreciative to the IRF for all the support they provided over the past decade."

Kamil Kaloush

FORTA Professor of Pavement Engineering



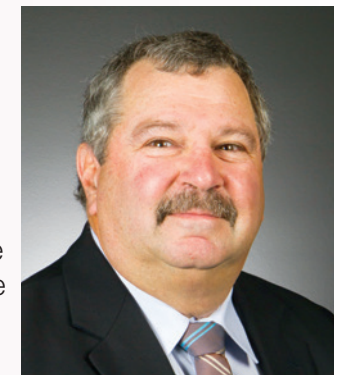
Enrique Vivoni

Professor **Enrique Vivoni**, Director, Center for Hydrologic Innovations won the **2023 Governor's Award for Arizona's Future**. Using a \$1,000,000 NASA grant, ASU researchers and Central Arizona Project studied the impacts of climate and land-use changes on the Colorado River Basin. The study used Earth-observing satellites and ground data to visualize the potential effects of a water shortage over a 150-year period. The study results will better inform decision making regarding water supplies as the state faces climate change.

Edward Kavazanjian

2023 C.W. Lovell Distinguished Lecturer at Purdue

Biomediated carbonate precipitation uses either enzymes (enzyme induced carbonate precipitation, or EICP) or microbes (microbially induced carbonate precipitation, or MICP) to induce precipitation of calcium carbonate in granular soils, turning cohesionless sand into a sandstone-like material ("geo-alchemy"). Laboratory testing and field trials show that these technologies can non-disruptively enhance foundation bearing capacity and mitigate the potential for earthquake-induced liquefaction.



Zhihua Wang

2023 International Association for Urban Climate Timothy Oke Award

Conferred by the International Association for Urban Climate, or IAUC, during the 11th International Conference on Urban Climate in Sydney, this accolade recognizes Wang's outstanding professional contributions in multiscale urban climate modeling, land-atmospheric interactions and urban sustainability. Wang, who joined the ASU faculty 12 years ago, has demonstrated leadership and made a significant impact in these fields of study over a sustained period.

New Research Faculty

Irfan Batur

PhD, Arizona State University

Expertise: Travel behavior, sustainable and equitable transportation

Gamze Ersan

PhD, Istanbul University

Expertise: Adsorption and in-situ electro-regeneration; statistical modeling

Amin Mojiri

PhD, University of Science Malaysia

Expertise: Treatment of water and wastewater

Faculty Honors and Awards

2023 Outstanding Student Awards



Riley Berg
BSE in environmental engineering



Taylor Brown
BSE in construction engineering



Aidan Carson
BSE in civil engineering



Tianna Chemello
BSE in environmental engineering



Jacob Kopitske
BS in construction management and technology



Jessica Roy
BSE in construction engineering



Will Snitzer
BSE in construction management and technology



Benjamin Tan
BSE in civil engineering

Leadership and Service Awards

- Thomas Edwards
- Dilan Evans
- Jillian Franke
- Ryan Koenig-Vinicombe
- Brennan Liu
- Jacob Sullivan
- Taylor Tuckett
- Susanna Westersund

4.0 Awards

- Amer Bektas
- Riley Berg
- Tianna Chemello
- Dilan Evans
- Brendan Jordan
- Jacob Kopitske
- Parker Nichols
- Spencer Timothy

Engineer-in-Training Certification

- Katelin Aden
- Jack Baer
- Hannah Collins
- Abbie Dirks
- Carter Doyle
- Farideh Ehsasi
- Prashant Gautam
- Jacqueline Kuo
- Matthew Link
- Keanu Mcelroy
- Kyle Reep
- William Snitze
- Jacob Thiele
- Caleb Woodward

2023 WateReuse Arizona Scholarship Recipient

Congratulations to **Gabriel Cerron** who was awarded two scholarships of \$3,000 from WateReuse Arizona at their 2023 Symposium. Gabriel is a third-year PhD student pursuing a degree in Environmental Engineering at Arizona State University, specializing in electrochemical technologies for water reuse and resource recovery. Originally from Peru, Gabriel enjoys traveling and visiting new places, sports and outdoor activities.

[WateReuse Arizona Symposium 2023](#)



TOMNET Student of the Year

Presented by USDOT's University Transportation Centers (UTC) Program and the Council of University Transportation Centers



Congratulations to **Abbie Dirks** for completing her Master's degree in Civil Engineering in Spring 2023 with a focus in transportation systems. She worked on several projects related to measuring and modeling traveler behavior and values, particularly in the wake of the COVID-19 pandemic. Her work is contributing to understanding food access vulnerability during a prolonged disruption and identifying strategies to enhance urban resilience and sustainable transportation.

Paul F. Boulos Excellence in Computational Hydraulics/Hydrology Award

Dr. Zhaocheng Wang, postdoctoral scholar in the Center for Hydrologic Innovations, won the **2023 Paul F. Boulos Excellence in Computational Hydraulics/Hydrology Award from the American Academy of Environmental Engineers and Scientists** for his work on land surface modeling. Zhaocheng aims to improve the understanding of hydrologic processes and advance water sustainability and resilience by combining ground observations, remote sensing datasets, and regional hydrologic models.

[Paul F. Boulos Excellence in Computational Hydraulics/Hydrology Award](#)



AEESP Master's Thesis Awards

Kartik Bhagat, advised by Dr. Francois Perrault, was awarded this honor in 2023. He stated the following, "I am deeply grateful to the AEESP committee for awarding me the 2023 Master Thesis Award. My heartfelt thanks go to my thesis advisor, Dr. Francois Perreault, as well as my family and colleagues for their invaluable guidance, resources, and encouragement throughout my research. This honor is a testament to their dedication and my passion for this field."

[AEESP Master's Thesis Awards](#)





Dibble CEO Greg Haggerty shakes hands with students from the Laveen School District at the start of a tour of Sun Devil Stadium. Haggerty worked with the Ira A. Fulton Schools of Engineering at Arizona State University to organize the stadium tour, which showcased how engineering is involved in hosting an ASU football game. The tour introduced students to careers in engineering and other STEM fields. Photographer: Erik Wirtanen/ASU

Engineering game day

Arizona K-12 students tour Sun Devil Stadium to learn how engineering plays a role in hosting an ASU football game

Fall weekends can get exciting when more than 50,000 football fans descend upon Sun Devil Stadium on Arizona State University's Tempe campus. Nearly every facet of any gamegoer's experience involves some facet of engineering. To get to the stadium, most fans use some form of transportation, which involves engineering. The stadium itself was designed and built by architects and engineers.

The event was hosted by **Dibble** and **engineers in the Ira A. Fulton Schools of Engineering at ASU**. Dibble is a member of the Friends of Civil and Environmental Engineering, also known as FOCE², an industry advisory group in the School of Sustainable Engineering and the Built Environment, that champions workforce development initiatives.

Greg Haggerty, CEO of Dibble, educated and inspired a group of 120 seventh and eighth-grade students from the Laveen School District during a visit to Sun Devil Stadium. The world of science and engineering can seem daunting to young minds, but tour volunteers helped them understand that it's sometimes hard to comprehend how vast engineering's impact can be.

On the tour, students learned about engineering through the lens of professional engineers. One volunteer, **Victoria Flys**, who is a Fulton Schools alumna and currently a structural engineer at Meyer Borgman Johnson, explained to students how structural engineering and concrete work went into the building of Sun Devil Stadium. Christina Pineda, an eighth-grade teacher at Rogers Ranch Elementary, says the girls in her class were happy to learn from Flys' example that women can be successful engineers.



Lana Banzon

Lana Banzon, a civil engineering junior, is exploring how to turn mine tailings — the byproducts or waste from the mining process — into valuable silicon salts in a FURI project with faculty mentor Narayanan Neithalath, a professor of civil, environmental and sustainable engineering. Practices for mining uranium and other resources are often highly toxic. However, a process called alkali activation can help silicates in mine tailings be used as an eco-friendly binder for concrete or grout.

The **Fulton Undergraduate Research Initiative**, or **FURI**, gives students valuable experiences in which they spend a semester conceptualizing an idea, developing a plan and investigating their research question with a faculty mentor.

Othman Al-Alawi

Civil engineering senior **Othman Al-Alawi** conducted research in the FURI program over the summer with mentor Hasan Ozer, an associate professor of civil, environmental and sustainable engineering. Al-Alawi's research harnessed drones with thermal cameras to help evaluate sustainable pavement treatments' impact on urban heat islands. His work has contributed to a research paper on which he is a co-author with Ozer's doctoral students. The paper, "Thermal Profiling of Asphalt Pavement Construction using Uncrewed Aerial Vehicle (UAV)," was presented at a major event hosted by the Transportation Research Board in Washington, D.C.



Almeida, Jovani
Associated Minority Contractors Association (AMCA) NAMU Scholarship

Almeida, Jovani
CFMA Joseph J. Quigley Memorial Scholarship

Almeida, Jovani
DeTommaso Endowment (NAMU)

Ayala, Roxanne
Dennis Conway Scholarship

Ayala, Roxanne
Erma E. and Clyde M. Easterly Jr. Construction Scholarship

Ayala, Juventino
James L. Fann Memorial Scholarship

Banister, Natalie
James L. Fann Memorial Scholarship

Barrientos, Christopher
Charles and Nancy O'Bannon Scholarship for Construction

Barrientos, Christopher
Jan Bennett Endowed Scholarship

Barrington, Zach
Del E. Webb Foundation Finance and Accounting Scholarship

Barrington, Zach
Robert J. Wheeler Memorial Scholarship

Blair, Antonio
Elyse and Paul Johnson Maroon and Gold Scholarship

Blair, Antonio
Jan Tuma Memorial Scholarship

Blair, Antonio
Olsson Scholarship

Blakley, Colton
Eric and Jennifer Butler New American University Scholarship

Blakley, Colton
John G. Colton Construction Study Fund

Bollinger, Samuel
Del E. Webb Foundation Undergraduate Student Scholarship

Borgman, Harrison
Robert H. Johnson Undergraduate Scholarship

Borgman, Harrison
Team DSC Scholarship for Excellence in Craftsmanship

Bowler, Zachary
Briston Veteran Advancement Scholarship

Bowler, Zachary
The Beavers Heavy Construction Scholarship

Boyer, Ellie
Nellie 'Jean' Randle Scholarship

Caramucci, Sal
Jan Bennett Endowed Scholarship

Curry, Sara
Blowers Engineering Scholarship

Danekar, Shriya Padmanabh
Martin H. Rosness Memorial Scholarship

Davulcu, Zeynep
Jim Bebout Scholarship

Dickinson, Preston
James Grose New American University Scholarship (NAMU)

Dickinson, Preston
R. Glen Schoeffler Scholarship

Dwyer, Brandon
Del E. Webb Foundation Undergraduate Student Scholarship

Felix Corona, Laura
Daniel and Katherine Mardian Scholarship

Felix Corona, Laura
Ron Pratte Scholarship

Fu, Tiffany
Arizona Society of Civil Engineers (AzSCE) Scholarship

Fu, Tiffany
Terry Bourland Memorial NAMU Scholarship

Garcia, Christian
Dave Clifton Memorial and ASPE Chapter 6 Scholarship

Garcia, Christian
James Grose New American University Scholarship (NAMU)

Garcia, Christian
Von Berg Scholarship

Garcia, Erica
Carl L. and Jean Wolcott Meng Memorial Scholarship

Gardnerjordan, Liv
Ben C. Griggs Memorial Scholarship

Gauthier, Alexandra
Fulton Schools Global Education Scholarship

Gehrmann, Alexander
Del E. Webb Memorial Scholarship

Gehrmann, Alexander
Robert H. Johnson Undergraduate Scholarship

Haley, Tyler
Von Berg Scholarship

Hampton, Brooke
Advancing Women in Construction (AWIC)

Hampton, Brooke
Marvin Sheldon Memorial Scholarship

Hamza, Youssef
A.G.C. Construction ASU Student Scholarship

Hayden, Kelly
Anderson Family Scholarship in Memory of Lola Ann Andrews

Huerta McWhirter, Robert
Andrew Hanneman Scholarship

Huerta McWhirter, Robert
CFMA Joseph J. Quigley Memorial Scholarship

Jimenez, Maria
Rod J. McMullin SRP Water Resource Scholarship

King, Jacqueline
Del E. Webb Foundation Women in Construction Scholarship

King, Jacqueline
Del E. Webb Memorial Scholarship

King, Jacqueline
Edd and Gail Gibson M&G Leaders Scholarship

Kronert, Nathaniel
Erma E. and Clyde M. Easterly Jr. Construction Scholarship

Kronert, Nathaniel
Robert J. Wheeler Memorial Scholarship

Kronert, Nathaniel
Samuel F. Kitchell Undergraduate Leadership Award

Lajoie, Madeline
Anderson Family Scholarship in Memory of Lola Ann Andrews

Le, Dylan
Charles and Nancy O'Bannon Scholarship - Civil

Lee, Xana
Jamal Sarsam Civil Engineering Award

Livingston, Jacob
Fulton Schools Global Education Scholarship

Long, Leonard
Construction in Indian Country Native American Scholarship

Long, Leonard
Robert J. Wheeler Memorial Scholarship

Manago, Lily
Andrew Hanneman Scholarship

Manago, Lily
Erma E. and Clyde M. Easterly Jr. Construction Scholarship

Manago, Lily
Samuel F. Kitchell Undergraduate Leadership Award

Mast, Emma
Fulton Schools Global Education Scholarship

Mccray, Cayden
Eric and Kristina Petrie Scholarship

Mccray, Cayden
Von Berg Scholarship

Mcgill, Payson
Daniel and Katherine Mardian Scholarship

Mcgill, Payson
Erma E. and Clyde M. Easterly Jr. Construction Scholarship

Miller, Andrew
John G. Colton Construction Study Fund

Miller, Andrew
Samuel F. Kitchell Undergraduate Leadership Award

Montano, Samuel
Matthew Witczak Scholarship

Montano, Samuel
Terracon Scholarship

Munguia, Diana
Del E. Webb Foundation Women in Construction Scholarship

Munguia, Diana
Opus West Construction Corporation Undergraduate Scholarship

Navarrete, Samantha
Del E. Webb Foundation Undergraduate Student Scholarship

Noble, Aidan
William A. Pulice Scholarship Endowment

Noel, Abby
Girls Scouts of the USA Scholarships (Renewals Only)

Noel, Abby
Matthew Witczak Scholarship

Noel, Abby
Pathways for the Future Scholarship

Noel, Abby
Terracon Scholarship

Oblea Mercado, Jennifer
Carter Opportunity Scholarship

Oblea Mercado, Jennifer
Kaloush Family Scholarship

Owusu Sarpong, Eric
The Ames Family Scholarship

Paulson, Luke
Andrew Hanneman Scholarship

Paulson, Luke
Von Berg Scholarship

Percell, Mia
Del E. Webb Foundation Undergraduate Student Scholarship

Perez, Drew
FNF Construction, Inc. Scholarship

Perry, Aiden
The Beavers Heavy Construction Scholarship

Pingel, Harlie
Fulton Schools Global Education Scholarship

Prey, Haley
Fulton Schools Global Education Scholarship

Prey, Haley
Paragon Structural Design, Inc. Scholarship

Prey, Haley
Structural Engineers Association of Arizona Scholarship

Raiche, George
A.G.C. Construction ASU Student Scholarship

Reid, Joseph
A.G.C. Construction ASU Student Scholarship

Roberts, Keaton
A.G.C. Construction ASU Student Scholarship

Roberts, Keaton
The Beavers Heavy Construction Scholarship

Rodriguez, Jesus
Engineering Futures Scholarship

Romeroflores, Monique
Dr. Sandra L. Weber Memorial Scholarship

Romeroflores, Monique
Engineering Veterans Scholarship

Romeroflores, Monique
Erma E. and Clyde M. Easterly Jr. Construction Scholarship

Rope, Jayden
Construction in Indian Country Native American Scholarship

Rudinski, Christian
Pulte Home Corporation Scholarship

Rueda Marquez, Brian
DeTommaso Endowment (NAMU)

Rueda Marquez, Brian
Erma E. and Clyde M. Easterly Jr. Construction Scholarship

Saegert, Matthew
Ben C. Griggs Memorial Scholarship

Saegert, Matthew
DeTommaso Endowment (NAMU)

Schmader, Mackenzie
Advancing Women in Construction (AWIC)

Schmader, Mackenzie
Dave Clifton Memorial and ASPE Chapter 6 Scholarship

Schmader, Mackenzie
PENTA Building Group Scholarship

Schroth, Shelby
D. L. Withers Construction Scholarship

Schroth, Shelby
Frank M. Chandler Memorial Scholarship

Schroth, Shelby
Von Berg Scholarship

Sensharma, Nikhil
Fulton Schools Global Education Scholarship

Serrano, Robert
Tom and JoAnn Prescott New American University Scholarship

Sheppard, Isaac
A.G.C. Construction ASU Student Scholarship

Sheppard, Isaac
Stephen and Therese Pisarcik Scholarship

Snitzer, William
A.G.C. Construction ASU Student Scholarship

Snitzer, William
The Beavers Heavy Construction Scholarship

Sowell, Maggie
Amy Geiser and Kent Geiser Honorary Scholarship

Speyrer, Willem
Del E. Webb Foundation Undergraduate Student Scholarship

Syed, Omar Ruman
Frank M. Chandler Memorial Scholarship

Taylor, Wayne
Construction in Indian Country Native American Scholarship

Thippireddy, Koushik Reddy
Fulton Schools Global Education Scholarship

Torres, Sebastian
Associated Minority Contractors Association (AMCA) NAMU Scholarship

2023 Scholarships

Torres, Sebastian
Del E. Webb Memorial
Scholarship

Torres, Sebastian
DeTommaso Endowment
(NAMU)

Torres, Sebastian
Robert H. Johnson
Undergraduate Scholarship

Torres Gasca, Mario
Olsson Scholarship

Torres Gasca, Mario
Rod J. McMullin SRP Water
Resource Scholarship

Tran, Carrina
Dusan Krajinovic and
Family Scholarship

Trommler, Aidan
Stantec Scholarship

Underwood, Jacob
Fulton Schools Global
Education Scholarship

Upshaw, Jaden
Construction in Indian
Country Native American
Scholarship

Upshaw, Jaden
Von Berg Scholarship

Vass, Shane
D. L. Withers Construction
Scholarship

Vass, Shane
Von Berg Scholarship

Vital, Aiden
Terracon Scholarship

Walker, Landon
The Marilyn and James
Schmidlin Scholarship

Wells, Aubrey
Del E. Webb Memorial
Scholarship

Wells, Aubrey
Robert H. Johnson
Undergraduate Scholarship

White, Noah
Jason McElroy Memorial
Scholarship

White, Noah
Robert H. Johnson
Undergraduate Scholarship

Williams, Mikaila
Del E. Webb Foundation
Finance and Accounting
Scholarship

Woodward, Kade
Del E. Webb Memorial
Scholarship

Woodward, Kade
Robert H. Johnson
Undergraduate Scholarship

Woodward, Caleb
Matthew Witczak
Scholarship

Zanovitch, Jonathan
Arlo Richardson
Scholarship

**Alnahari, Mohammed Saeed Abdo
Mohammed**
*Exploring the Potential of Blockchain
Technology for Improved Management
and Safety of Underground Utilities*
Chair: Samuel Ariaratnam

Aloraini, Saleh
*The Impact of Environmental Factors
on Surface and Treated Water
Microbiome*
Chair: Morteza Abbaszadegan

Batur, Irfan
*Understanding and Modeling the
Nexus of Mobility, Time Poverty, and
Wellbeing*
Chair: Ram Pendyala

Bezerra Magassy, Tassio
*Emerging Mobility Services and
Technologies: Understanding User
Adoption and Travel Impacts*
Chair: Ram Pendyala

Chang Recavarren, Luis
*Establishing the effect of building
design on construction work*
Chair: Avi Wiesel

Ehsasi, Farideh
*Efficacy and Durability of Microbially/
Enzyme-Induced Carbonate
Precipitation (MICP/EICP) for Dust
Mitigation of Various Soil Types
and Under Different Environmental
Conditions*
Chair: Edward Kavazanjian

El Kassis, Rita
*The Use of Augmented Reality for
Communication in Uncontrolled
Construction Environment*
Chair: Mounir El Asmar & Steven Ayer

Hoff, Ryan
*A Proposal for Infrastructure Dynamic
Adaptation and Detailed Risk Analysis
for Black Swans*
Chair: Mikhail Chester

Joshi, Sayalee
*Understanding Drinking Water
Quality and Evaluating the Risks of
Opportunistic Pathogens in Building
Water Systems*
Chair: Kerry Hamilton

Menchu Maldonado, Maria
*Evaluating Drivers and Sources of
Pathogens to Surface Waters in
Primarily Arid and Semi-Arid Tribal
Lands of the United States*
Chair: Rebecca Muenich

Paladugu, Bala Sai Krishna
*Artificial Intelligence Models for
Digitized Operations and Maintenance
of Large Infrastructure Systems*
Chair: David Grau

Patil, Karan
*Development of Realistic and
Emotional Virtual Reality for
Construction Safety Training*
Chair: Steven Ayer

Rajwade, Kimya
*Novel Strategies for Fouling Control in
Desalination Treatment Systems*
Chair: Francois Perreault

Robles, Aide
*Bench-scale Development of Microbial
Chain Elongation as a Bioremediation
Technology for Chlorinated Ethenes*
Chair: Anca Delgado

Savicky, John
*Exploration of Solicitation Optimization
Within the Built Environment*
Chair: Kenneth Sullivan

Skinner, Justin
*Experimental and Meta-analyses
Insights into Microbial Transformation
of PFAS and Trichloroethene*
Chair: Anca Delgado

Tang, Yong
*Bio-inspired Rotational Burrowing
Mechanism and Self-burrowing Robot*
Chair: Junliang Tao

Wang, Zhaocheng
*Innovations in Detecting and Modeling
Dryland Hydrologic Changes*
Chair: Enrique Vivoni

Woolley, Miriam
*Laboratory and Field Evaluation
of Enzyme Induced Carbonate
Precipitation (EICP) for Fugitive Dust
Mitigation*
Chair: Edward Kavazanjian

Yang, Xueli
*Complex Hydroclimate System
Modeling: Causation, Tipping, and
Extremes*
Chair: Zhihua Wang

Zhao, Zhe
*Manufacturable and Physically Flexible
UV-C Side-emitting Optical Fibers for
Biofilm Inhibition in Pressurized Water
Systems*
Chair: Paul Westerhoff

Zheng, Chenwei
*Biodegradation of Surfactants in the
O₂-based MBfR and the Impacts
on the Microbial Community and
Antimicrobial-resistance Genes*
Chair: Bruce Rittmann

Zhong, Yi
*Bio-inspired Active Wireless
Underground Sensor Networks
Enabled by Self-burrowing Robots*
Chair: Junliang Tao

2023 Fellowships

Hogue, Derek
Phoenix/Scottsdale
Groundwater
Contamination Scholarship
for Environmental Science

Kwon, Patrick
Kavazanjian Fellowship

Hinsberg, Katrina
LC Jacobson Graduate
Fellowship

**Nolastname, Kavana
Sadashive Gowda**
Betty Hum Graduate
Assistantship

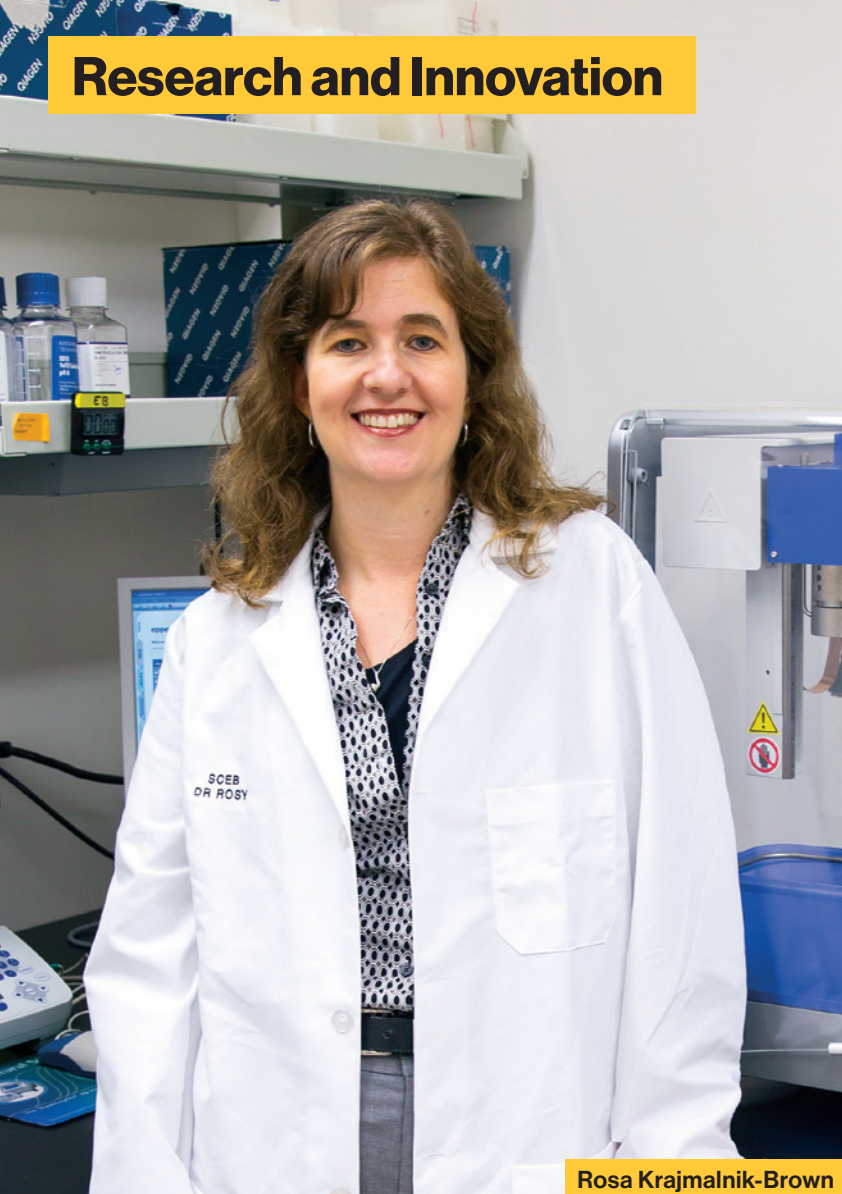
Ajmera, Devesh Deepak
Del E Webb Foundation
Graduate

Doshi, Nishit Ketan
Del E Webb Foundation
Graduate

Sontakke, Raj Ganesh
Del E Webb Foundation
Graduate

Popuri, Hemachandra
Ferdinand A. Stanchi
Fellowship





Rosa Krajmalnik-Brown

ASU's Biodesign Institute blazes new research trails

Stream of funding spurs advances in human health

Rosa Krajmalnik-Brown directs the newly established **Biodesign Center for Health Through Microbiomes** and is a professor with the School of Sustainable Engineering and the Built Environment. Her new \$2.6 million, five-year grant is from the NIH National Institute of Environmental Health Sciences.

The project explores aflatoxin, a carcinogen produced by *Aspergillus flavus* and *A. parasiticus*, pathogenic fungi that grow on maize. The research will evaluate the effect of aflatoxin exposure on growth in children, determining whether aflatoxin effects are mediated by the gut microbiome and inflammation.

"I am very excited about this project because it brings together an amazing team and topics I am passionate about, including food quality, environmental exposure, biotransformation's of organic chemicals, gut microbiomes and child development," Krajmalnik-Brown says. "I am looking forward to bringing this expertise together to help children in less privileged countries."

The project studies the temporal changes in diet, aflatoxin exposure and growth in a prospective cohort of children from rural Guatemala, a country with one of the highest rates of child stunting and aflatoxin exposure globally. The study involves an international research team, including the Maya Health Alliance, Brigham and Women's Hospital, Harvard Medical School Department of Global Health and Social Medicine and Centro de Investigaciones en Nutricion y Salud (CIENSA).



Biodesign Institute Building C. Photo by Charlie Leight/ASU Now



Ruijie Zeng, an assistant professor of civil, environmental and sustainable engineering, was selected for a 2023 NSF CAREER award for his research in agricultural drainage systems. Photographer: Erika Gronek/ASU

ASU researcher maps farm drainage networks to conserve water

As water conservation efforts increase worldwide, **Ruijie Zeng**, an **assistant professor of Civil, Environmental and Sustainable Engineering**, recognizes the need for improved mapping of agricultural drainage networks and natural rivers to upscale water management practices on farms.

Zeng has identified knowledge gaps in agricultural drainage mapping that he believes can be answered using algorithms, drones and simulation models. With support from a 2023 National Science Foundation Faculty Early Career Development Program (CAREER) Award, he will advance research that applies to farming on a larger scale.

"We are absolutely delighted to see Dr. Zeng's innovative research endeavors supported through the award of a prestigious and highly competitive NSF CAREER award," says Ram Pendyala, director of the School of Sustainable Engineering and the Built Environment. "His work aimed at re-engineering agricultural drainage infrastructure is going to be highly impactful, especially for areas such as the Southwest that are facing an unprecedented drought."

This is where Zeng and Chuncheng Yao, a civil, environmental and sustainable engineering doctoral student, step in. Using unmanned aerial vehicles, or drones, Zeng and Yao plan to research farm drainage networks through multi-spectral imagery. Using near infrared bands that human eyes cannot see, Zeng and Yao can determine a surface's soil moisture patterns to help indicate where drainage is occurring.

Enrique Vivoni, the Fulton Professor of Hydrosystems Engineering, works in the Hydrology Research Lab in the Walton Center for Planetary Health. Vivoni has launched a new research center, the Center for Hydrologic Innovations, to more quickly translate academic research and expertise in hydrology and hydrosystems engineering into tools that water management decision-makers can use. Photographer: Erika Gronek/ASU



New ASU center to help make better water decisions faster

Arizona's water supply — including the Colorado River, which also provides water to six other Western states — is drying up. A warming climate is causing the region to undergo aridification, a process of permanently increasing dryness that goes beyond temporary drought conditions. Demand for water continues to grow, particularly in agriculture, despite the dwindling supply. To keep this vital resource flowing now and in the future, decision-makers at both the local and national levels need the right information to make plans and policies related to water. To use this information and data effectively, the research community and water management stakeholders need to work together. So, **Enrique Vivoni**, the **Fulton Professor of Hydrosystems Engineering** is leading efforts to more quickly translate academic expertise and research into actionable tools for decision-makers through a new research center.

The Center for Hydrologic Innovations — a partnership between the School of Sustainable Engineering and the Built Environment and the Julie Ann Wrigley Global Futures Laboratory — is bringing together academic researchers and external stakeholders to collaboratively develop solutions that can address the most pressing water challenges in the desert southwest. The center provides support to other centers and initiatives at the university and builds on ASU's strengths in water science and resource management, which were recently recognized through the Arizona Water Innovation Initiative, a \$40 million investment by the state of Arizona. ASU was chosen to lead this multiyear initiative to provide immediate, actionable and evidence-based solutions to help ensure Arizona will continue to thrive with a secure future water supply.

“Through applied engineering projects, the folks we're working with and working for have a say in the development of products that they can immediately use,” says Vivoni, the center's director and a senior global futures scientist with the ASU Global Futures Laboratory.

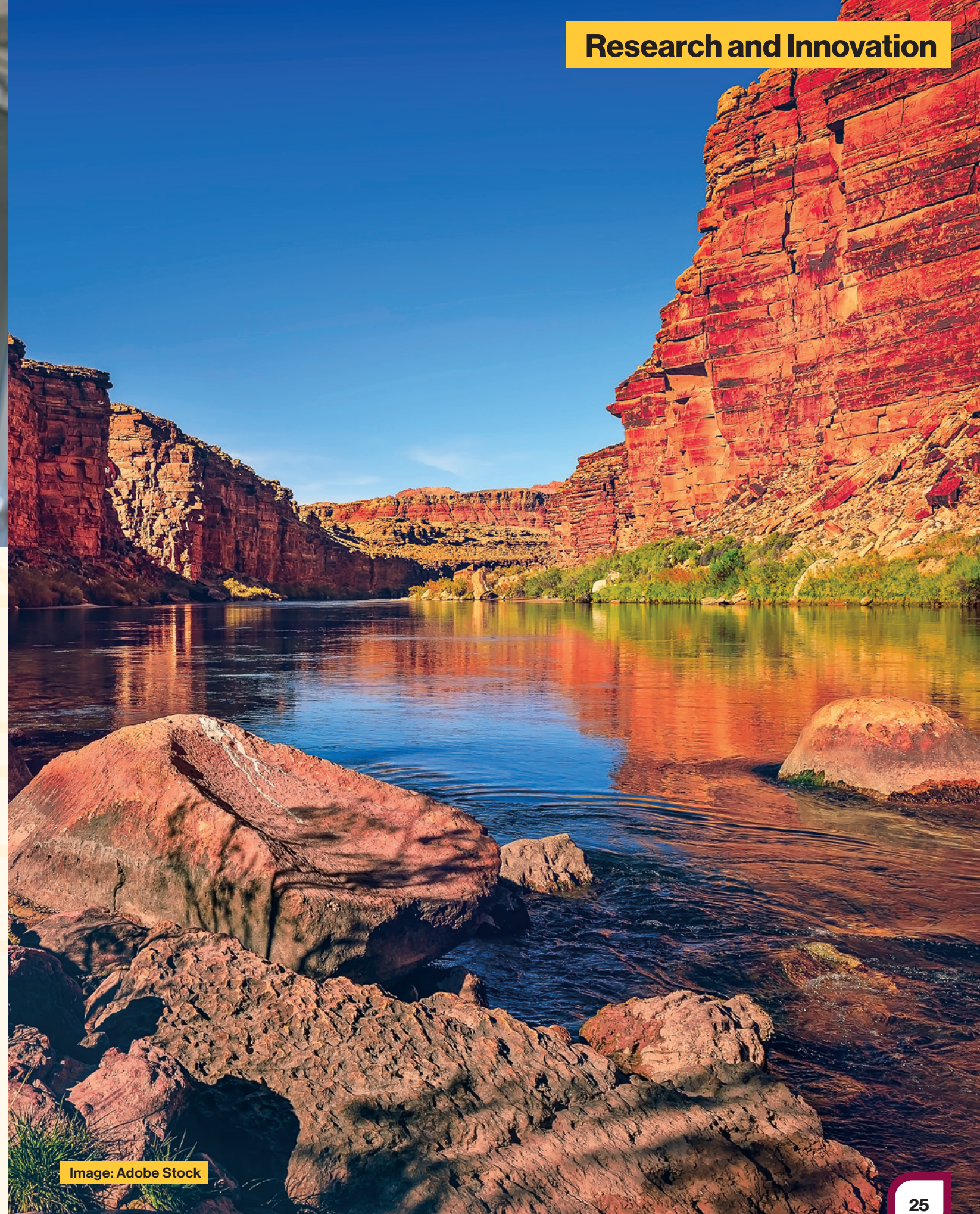


Image: Adobe Stock



Professor Ram Pendyala (at right), is directing work by ASU researchers for the new National Center for Understanding Future Travel Behavior and Demand. Pendyala's research has engaged Fulton Schools Graduate Research Associates (from left to right) Victor Alhassan and Tassio Magassy, Assistant Research Professor Irfan Batur, and Graduate Research Assistant Abbie Dirks. Photographer: Emmitt Duerson/ASU

Designing next-generation transportation systems

Leading roles in two new national University Transportation Centers provides ASU researchers platform to advance smart, sustainable and socially responsible transportation systems of tomorrow

The National Center for Understanding Future Travel Behavior and Demand is dedicated to improving the mobility of both people and goods. The new \$40 million center is led by the University of Texas at Austin.

Professor **Ram Pendyala, director of the School of Sustainable Engineering and the Built Environment**, is the center's principal investigator at ASU. Pendyala also directs Teaching Old Models New Tricks, or TOMNET, a University Transportation Center sponsored and established by the U.S. Department of Transportation in 2016 under the Fixing America's Surface Transportation Act. He is internationally recognized for his work in forecasting freight and passenger travel demand, understanding human activity-mobility patterns and advancing sustainable transportation pathways.

Claudia Zapata, an associate professor in the School of Sustainable Engineering and the Built Environment, is the principal investigator at ASU for the new National Center for Infrastructure Transformation. Zapata is currently deputy director of the National Science Foundation Center for Bio-mediated and Bio-inspired Geotechnics, or CBBG. Her expertise is in geotechnical and geo-environmental engineering with a strong focus on transportation geotechnics and the assessment of the impacts of climate, soil conditions and other environmental factors on pavement performance and foundations.

The center's activities are dedicated to improving the durability and extending the life span of transportation infrastructure. Zapata serves as an associate director of the new national center led by Prairie View A&M University in Texas.

The goals of the awarded centers encompass reducing traffic congestion and promoting transportation safety, reducing transportation cybersecurity risks, improving the resilience of transportation infrastructure and enabling more efficient movement of people and freight. The program also puts a strong emphasis on preservation of the environments that transportation systems and travel activity impact, as well as addressing the effects of the carbon footprint of various modes of transportation on climate.



ASU researchers who contribute to the work of the new National Center for Infrastructure Transformation include: (sitting, left to right) Claudia Zapata, Hazan Ozer and Jolina Karam, (standing left to right) Jennifer Chandler, Jean Larson, Kamil Kaloush, Jose Medina, and Saleh Alothman. Photographer: Emmitt Duerson/ASU

Testing pavements to prepare for changing traffic patterns

ASU researchers' innovative testing system will ensure Arizona's asphalt infrastructure is ready for extreme temperatures and new challenges

Do you ever feel stuck in a rut — a literal rut in the road? These permanent deformations in asphalt pavement happen everywhere, but they can be particularly challenging in Arizona due to the state's high temperatures, slow traffic speeds due to congestion and other factors.

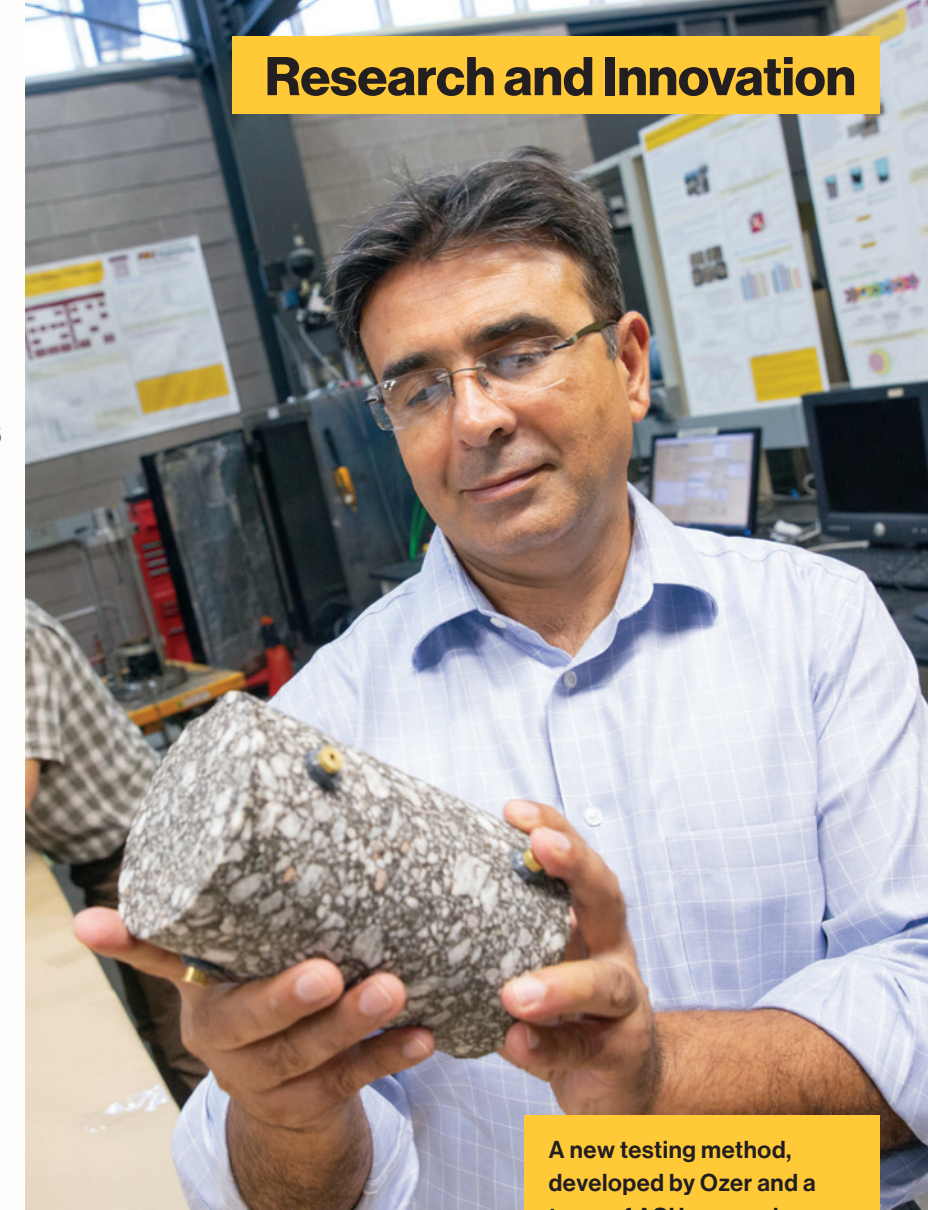
Hasan Ozer, an associate professor of civil, environmental and sustainable engineering, is an expert in assessing the structural performance of pavements to advance sustainable transportation infrastructure.

"Asphalt pavement deformation is one of the most critical distresses closely monitored by government agencies, especially for highways," Ozer says. "Maintaining rutting below the critical threshold is crucially important for the safety of the traveling public."

Ozer is a researcher in ASU's **Pavement Analysis and Design group**. He and his research team have developed an innovative, first-of-its-kind testing method that mimics moving traffic load patterns that cause rutting and other asphalt pavement deformation problems.

In a research project funded by a collaborative program between the U.S. Federal Aviation Administration and the National Asphalt Pavement Association led by Rutgers University with collaborators at the National Center for Asphalt Technology, Ozer is using the dynamic triaxial testing system to conduct advanced experiments that will help understand the root causes and various forms of pavement failures at airports.

The ASU team has worked closely with pavement engineers and researchers at the Federal Aviation Administration's William J. Hughes Technical Center in Atlantic City, New Jersey, to advance pavement technologies and develop methods and specifications for smooth and cost-effective airport operations. The team tested pavement mixes from airports in Tucson, Arizona, Dothan, Alabama, and Tampa, Florida, to represent different climatic zones and regional materials. The results helped develop construction and material specifications that can be used by the Federal Aviation Administration to ensure airports are using pavements that can withstand the stresses of increased aircraft traffic.



A new testing method, developed by Ozer and a team of ASU researchers, is helping to understand asphalt deformation challenges such as rutting, which can be dangerous to drivers and costly to repair. The test is already contributing to addressing potential rutting issues related to changing traffic patterns from the introduction of automated and connected semitrucks on highways and increased airport traffic on taxiways and runways. Photographer: Erika Gronek/ASU



ASU, NASA project zooms in on the structure of meteorites

Researchers in the Ira A. Fulton Schools of Engineering and the School of Earth and Space Exploration seek to understand the macroscopic characteristics of space rocks that fall to Earth

Clay-rich carbonaceous chondrite meteorites often fall from space, but their physical properties are not widely studied because of the destructive nature of testing methods. But these meteorites will soon be given a close examination in a three-year, NASA-funded collaborative study by Arizona State University researchers. Over the last several decades, a growing number of meteorites have accumulated on the Earth's surface, making them a focus for researchers around the world, including at Arizona State University. Even researchers without a traditional background in meteoritics or geochemistry are interested in studying them.

"I have no problem admitting that I knew absolutely nothing about meteorites," says **Christian Hoover**, an **associate professor of civil, environmental and sustainable engineering**. "I knew that I worked on cement and on gas shales. They're both comprised of many smaller material ingredients that spread across different length scales, just like I've since learned meteorites to be."

Hoover's research is focused on small-scale mechanics. He views materials at microscopic levels to learn more about their characteristics and answer questions such as why a material may behave a certain way when it is alone and acts in other ways when mixed with other materials.

Hoover said he was intrigued by the idea of applying his knowledge to a new area of study — in this case, the study of meteorites. That curiosity set the stage for him to be the lead investigator in a three-year collaboration with Laurence Garvie, a research professor in ASU's Buseck Center for Meteorite Studies, or BCMS; Erik Asphaug, a professor in the Lunar and Planetary Laboratory at the University of Arizona; and Desiree Cotto-Figueroa, an associate professor in the Department of Physics and Electronics at the University of Puerto Rico at Humacao.

The funding for the project comes from NASA's Yearly Opportunities for Research in Planetary Defense, more commonly referred to as YORPD.



Christian Hoover was recently awarded a National Science Foundation CAREER Award for his work in small-scale mechanics. He typically investigates materials at nano-meter scale.



Professor Narayanan Neithalath's work has contributed to the development of innovations to make concrete production eco-friendly, improve cement manufacturing and achieve advances in construction processes. Neithalath's accomplishments to date have earned him the status of Fellow of the American Concrete Institute. Photographer: Bobbi Ramirez/ASU

Curbing concrete's carbon emissions with innovations in cement manufacturing

National Science Foundation supports ASU research to reduce harmful environmental impacts

Concrete and cement manufacturing remain industrial processes producing large amounts of carbon dioxide emissions contributing to air pollution, global warming and other threats to human and environmental health. At ASU, researchers are engaged in research pursuits to find ways to significantly reduce those hazardous impacts.

Cement manufacturing has come to be known as a particularly hard-to-decarbonize operation, largely because of CO₂ emissions produced by the standard chemical process used by industry. Standing in the way of a solution is the lack of economical and scalable options to provide the high temperatures needed to produce the necessary chemical reactions required for the production

process, says **Narayanan Neithalath**, the **Fulton Professor of Structural Materials** in the School of Sustainable Engineering and the Built Environment.

Through a National Science Foundation Future Manufacturing Research Grant, Neithalath and his research team are exploring new processing techniques for manufacturing cement to reduce carbon emissions through a synergy of novel energy sources and alterations in the processes and the ingredients used in the manufacturing operations. To address these carbon emission challenges, Neithalath said the research is focusing on two main goals. The first involves separating lime from the limestone without producing carbon dioxide through novel electrolytic and hybrid routes. The second involves cement synthesis through a low-energy pathway, utilizing autocatalysis, a process for which energy can be provided through renewable sources such as solar power.

"The big challenge is not only about creating a new manufacturing process that is environmentally sustainable," Neithalath said. "It is also about manufacturing concrete with the lowest carbon emissions possible without a big increase in the price. This is what we hope to accomplish."

New asphalt binder alternative is less toxic, more sustainable than conventional blend

Bio-based patch from ASU will lead to safer travels and recreation

Asphalt is primarily known for use in roadways, but it's also used in other platforms for activities where breathing toxic fumes can be dangerous. Outdoor use on driveways, rooftops and parking lots, especially in the Arizona sun, can lead to toxic fume exposure.

An ASU team, led by **associate professor Ellie Fini** in the School of Sustainable Engineering and the Built Environment (SSEBE), has developed **AirDuo**, a new, patent-pending asphalt binder that not only diminishes toxic fumes of the overall asphalt-surfaced area, but also increases sustainability.

AirDuo's first local trial was initiated in late August as a patch in ASU's Gammage Auditorium parking lot. Attendees of a theater production at Gammage the same night gave the patch a workout as they arrived and departed, and Frank Castro, associate director of Facility Maintenance, reported to Fini the next day that the patch had "held up great."

Fini has conducted research to investigate alternative asphalt binders, including a study on how iron-rich biochar absorbs volatile organic compounds from asphalt surfaces, and how it is both an eco-friendly and cost-effective alternative to bitumen components.

"When we use algae to make AirDuo, as we did from last year's November harvest from ASU's Center for Algae Technology and Innovation (AzCATI), it can be carbon negative," said Fini, who collaborated on the algal components of the project with Peter Lammers, a research professor in SSEBE; Taylor Weiss, a Polytechnic School assistant professor; and Shuguang Deng, a professor in the School for Engineering of Matter, Transport and Energy (SEMTE).

The research on bitumen asphalt binder alternatives began with a 2019 grant from the National Science Foundation on algae-derived products. A grant from the U.S. Department of Agriculture with a focus on emission reduction and environmental health supported the research and also helped with the lab-to-market transition.

"Our next steps are larger projects on the ASU campus, and then perhaps in Flagstaff and Tucson. Our team invites other states and institutions to join the AP1 (AirDuo Paving) campaign and test it on their sites too," Fini said.



ASU's Ellie Fini surveyed the ASU Gammage Auditorium parking lot site where the first trial of AirDuo, a low-carbon asphalt binder, was used for a recent patch. AirDuo has the potential to be used for many asphalt paving processes, not just patches. Photo by Bobbi Ramirez/ASU

ASU researchers have developed a new technique called microbially induced desaturation to help limit damage from earthquake-induced liquefaction.

Photo: Soil liquefaction from the M 6.0 13 June 2011 Christchurch earthquake by Mark Lincoln is licensed under CC BY 2.0.



Boosting seismic resilience

Fulton Schools biogeotechnical engineers seek to limit damage from earthquakes with new method to constrain soil liquefaction

Still considered one of the most destructive natural disasters in U.S. history after more than a century, the San Francisco earthquake of 1906 lasted less than a minute. Despite the brief duration, its powerful shockwaves set off a chain reaction producing widespread and severe destruction for several days. It wasn't simply the sheer force of the ground shaking that led to catastrophic aftereffects, says **Edward Kavazanjian**, a **Regents Professor of geotechnical engineering** in the School of Sustainable Engineering at the Build Environment.

"The initial cause of much of the damage done by the San Francisco earthquake was due to extraordinarily extensive liquefaction that ruptured the city's water lines," Kavazanjian says. Liquefaction, as Kavazanjian explained it, happens when the ground turns into a viscous fluid. It can cause buildings to sink below the surface of the land they sit on, make buried water tanks pop up to the surface, and cause the ground to shift laterally and crack open.

That risk is why the National Science Foundation is a major supporter of the kind of work being done by researchers at ASU's Center for Bio-mediated and Bio-inspired Geotechnics, or CBBG, directed by Kavazanjian, and the Biodesign Swette Center for Environmental Biotechnology, directed by **ASU Regents Professor of environmental engineering Bruce Rittmann**.

Current efforts to hinder liquefaction focus predominantly on boosting what the experts call seismic resilience, which involves strengthening the ground and structurally reinforcing buildings, infrastructure and their surroundings.

One recent demonstration of the effectiveness of the processes involved work by Kavazanjian's research group and Fulton Schools Associate Research Professor Leon van Paassen, along with Portland State University and University of Texas at Austin researchers, funded by the NSF's Natural Hazard Engineering Research Infrastructure program.

Findings from the project led to further development of the ground treatment technique, with a focus on reducing the potential for liquefaction of soils under and around existing infrastructure. The geotechnical engineering aspects of the project helped it earn a Western States Seismic Policy Council Award in Excellence for contributions to advances in preparing for, mitigating, responding to and recovering from earthquakes.



Edward Kavazanjian



Above: Building on the success of the three previous editions, Abu Dhabi University's (ADU) College of Engineering (CoE) hosted the 4th ADU-ASU Research Forum 2023, under the theme of "Concrete in Hot Weather: Building for Tomorrow, Innovations in Sustainable Design and 3D Printing for Smart Construction", in collaboration with the School of Sustainable Engineering and the Built Environment at Arizona State University.

Abu Dhabi University hosts the 4th ADU-ASU Research Forum 2023

Progress in advancing sustainability in the use of one of the world's most widely used construction materials — concrete— was the focus of the recent **Abu Dhabi University and Arizona State University Research Forum**. The event was presented in collaboration with the School of Sustainable Engineering and the Built Environment.

The event highlighted new construction technologies and methods, particularly advances in 3D printing of sustainable concrete that withstands extreme environmental conditions.

Professor Narayanan Neithalath said the event spotlighted international partnerships and other collective efforts that are producing innovative solutions leading to more effective construction and infrastructure resilience.

Narayanan Neithalath



Image: Adobe Stock

ASU researchers look to cut construction time and cost through concrete

Construction-induced disruptions can be a real headache, but closures lasting weeks or even months could soon be a thing of the past. A School of Sustainable Engineering and the Built Environment professor is developing an alternative way to mix concrete, which can save builders time and money with a result that he claims is just as strong.

"Our goal is to rethink this 100-year-old technology of only using steel rebars," said **Barzin Mobasher, a professor of civil, environmental and sustainable engineering**.

The regular way to make concrete uses steel rebars, and lots of them are put into frames to reinforce it. Mobasher is working on a new way of mixing in little things - called steel fibers - to achieve a similar product. In his lab, the concrete is put to the test.

They can simulate everything from cars driving on it to earthquakes.

Mobasher said crews will save money and time by eliminating steel rebar from projects. When the new concrete mixture was used on a part of the Valley Metro Light Rail's project in early 2023, what would have taken over 33 weeks for a 1.5-mile stretch was done in half the time and took the original projected cost of \$17 million down to just over \$5 million.

Currently, the researchers are working with Maricopa County on using this concrete to fix or replace bridges. They are currently performing tests, but they estimate they can do a replacement in about a week compared to the traditional 2-3 month duration.

Barzin Mobasher





Timothy Becker

Eminent Scholar brings students real-world view of construction industry

Timothy Becker draws on decades of professional experience to prepare next-generation leaders

In January 2023, **Becker** stepped into the position of **Eminent Scholar in the Del E. Webb School Construction** within the **School of Sustainable Engineering and the Built Environment**. With more than three decades of management and on-the-ground experience in the construction profession, he now aspires to arm students with the knowledge he has acquired.

During the spring 2023 semester Becker taught a first-of-its-kind course focused on human resources management within the construction industry. Becker is also carrying out a research program he describes as building strategically on his earlier research and industry work to advance integrated project delivery methods, lean construction processes, and cost optimization.

Becker is bringing a wealth of industry experience and the exuberance to apply it at ASU, says Professor Ram Pendyala, director of the School of Sustainable Engineering and the Built Environment. "He is passionate about developing an inclusive and well-prepared construction workforce of the future. Our students and faculty are going to benefit significantly from his wisdom and expertise in construction management and technology," Pendyala said. "His presence in the school's ecosystem reinforces our commitment to preparing students to be ready to contribute to the industry from day one on the job."



Image: Adobe Stock

MAG Matters: improving traffic safety throughout the region with emerging technology

The Maricopa Association of Governments (MAG) partners with public and private agencies to test the effectiveness of emerging technologies in improving safety and efficiency on the road. **Ram Pendyala, Director of the School of Sustainable Engineering and the Built Environment**, says the field of emerging technologies in transportation is constantly changing.

Technology makes traffic signals more adaptive and responsive to real-time traffic conditions. One such program in Phoenix tested AI-based smart traffic lights to help reduce congestion at intersections. It is an example of how advanced technologies can improve daily commutes.

"Bicyclists and pedestrians are particularly vulnerable. We don't necessarily have the greatest track record in Arizona with respect to safety for bicyclists and pedestrians. And I think that is where the sensing technology can really make a difference," said Pendyala. The smart intersections can identify traffic interactions, including pedestrians and cyclists as they approach the intersection. This information is then used to help manage the traffic flow.

The emerging technologies program at MAG continues to seek solutions that reduce congestion, improve safety, and have a lasting impact on the region's transportation system. Partnerships among public agencies like MAG, Arizona State University, and private companies provide an objective way to evaluate emerging technologies.

"I think it is very unique and fascinating to really be able to engage with the private sector and give them a testbed to deploy technologies and see what they can do in the real world," said Pendyala.



Ram Pendyala



Sanjay Paul (left) and Rumpa Dey (right) at the College Avenue Commons on Arizona State University's Tempe Campus. Paul and Dey are alumni of the School of Sustainable Engineering and the Built Environment. Photographer: Erika Gronck/ASU

ASU's engineering power couple

Rumpa Dey and Sanjay Paul, alumni of the School of Sustainable Engineering and the Built Environment, are no strangers to awards and recognitions. Last year, the husband-and-wife duo celebrated multiple prestigious honors recognizing their accomplishments as professional leaders in transportation and traffic engineering.

Even in life after ASU, the couple largely credits the university's proud and diverse community as a major factor to their success in the United States.

"When I think about ASU, it is full of beautiful memories," said Dey, who earned a master of science degree in civil engineering. "We came from Bangladesh to Arizona. I still remember that day; it was 118 degrees. Overall, it was a culture shock but in a good way."

"We learned so much about the United States and American culture," said Paul, who earned a doctoral degree with a focus on transportation engineering. "We developed a network of professionals through different activities and research projects. We had a network and I think that definitely helped us early on."

Currently, Dey is the associate vice president and Emerging Technology Leader for AECOM's Arizona and Utah divisions. Paul is the Arizona and New Mexico area traffic business class leader for HDR Engineering, Inc. Both, Dey and Paul have continued their involvement with the ASU community that they call family. As leaders in their companies, they reciprocate the opportunities they were given back to a new generation of students through mentorship and by connecting them to jobs.



Brittany Burbes



Rumpa Dey



Kimberly Martin



Andrew Moreno



Sanjay Paul



Curtis Smith

Image: Adobe Stock

ENR Southwest Names 2023 Top Young Professionals

An independent panel of judges selected 20 individuals as **Engineering News-Record (ENR) Southwest's 2023 Top Young Professionals**. This annual awards program recognizes 20 individuals under 40 years of age in each of ENR's 10 regions who have shown exceptional leadership and service throughout their career.

Six of those recognized are alumni from the School of Sustainable Engineering and the Built Environment or its Del E. Webb School of Construction.

Brittany Burbes – Project Executive at DPR Construction (BS in Construction Management)

Rumpa Dey – Arizona Emerging Technology Leader / Group Manager at AECOM (MS in Civil Engineering / Transportation)

Kimberly Martin – Senior Engineer of Innovation & Sustainability at Keller (PhD in Civil Engineering)

Andrew Moreno – Assistant Traffic Group Manager / Project Engineer at AZTEC Engineering Group, Inc. (BS in Civil Engineering)

Sanjay Paul – Desert Southwest Area Traffic Business Class Leader at HDR (PhD and MS in Transportation Engineering)

Curtis Smith – Project Controls Manager at Sundt Construction, Inc. (BS in Construction Management)



GCON construction company founders and Arizona State University alumni Mike Godbehere (left) and Gabriel Gavriilidis provide opportunities for work experience for many students in the Del E. Webb School of Construction. Photo by Kyle Zirkus Photography

Building foundations for the next generation

Two successful ASU alumni help Fulton Schools enhance education for today's construction students

Arizona State University alumni **Mike Godbehere** and **Gabriel Gavriilidis** founded their construction company **GCON** in 2003, and since then, they have provided opportunities for work experience for many students in the Del E. Webb School of Construction.

Godbehere serves as the executive committee chair for the Del E. Webb School of Construction within the School of Sustainable Engineering and the Built Environment. The company founders said much of the groundwork for their commitment to a socially conscious approach to business has its roots in their college education at ASU.

"We are creations of ASU and the Del E. Webb School of Construction," Godbehere said. "ASU played a crucial role in preparing us for our careers by giving us the leadership skills to succeed in our industry," Godbehere said of himself and Gavriilidis. "We want to make sure current and future students have that same opportunity. Close working relationships between professors and industry associates play a big role in giving students that educational advantage."

In his role on the construction school's executive committee, Godbehere has helped to establish and expand connections between ASU and construction business leaders, as well as fulfill the committee's role to evaluate the school's construction management education program to ensure it stays current with industry needs and trends.

"Mike's involvement has helped our graduates not only remain competitive, but become highly sought after throughout the industry," said Anthony Lamanna, the PENTA Building Group Professor and coordinator of the construction school's undergraduate program.

Godbehere's leadership has positively impacted faculty, staff, students, alumni and industry stakeholders, said **Timothy C. Becker**, eminent scholar and interim programs chair for the construction school.



Terracon Foundation scholarships empower future engineers

Consulting company supports ASU civil engineering students

Engineering is a field that drives innovation and shapes our world. To help ensure the development and training of students who will build and support the communities of tomorrow, it is essential to invest in the education and development of Arizona State University's future engineers.

The **Terracon Foundation**, the community investment branch of the employee-owned engineering consulting firm Terracon, has established a scholarship to support civil engineering students.

The Terracon Foundation Scholarship provides financial support to engineering students pursuing graduate or undergraduate degrees in civil, environmental and sustainable engineering. While scholarships have always been an essential means of helping students overcome financial barriers to education, industry collaborations with companies like Terracon also create opportunities for students to gain professional experience and industry knowledge.

"The true value lies in the unconditional support that Terracon and its employees provide for interns and students who are working on class projects necessary to complete their degree requirements," said **Kamil Kaloush**, **civil engineering program chair and professor**. "They participate in our classes as guest lecturers, provide speakers for engineering seminars and support our engineering student organizations' chapters."

Terracon Executive Vice President Tim Anderson, who is a 1987 ASU alum, says the scholarships can provide valuable opportunities for students with a company that is one of the largest in the country, with more than 6,000 employees in 175 locations.

In 2023, three students with exceptional academic potential in the field of civil engineering were recipients of the Terracon Foundation Scholarship. Beyond scholarships, the company encourages its employees to request grants to support organizations focused on education as well as the built and natural environments. To date, the Terracon Foundation has awarded nearly \$4 million in grants to community organizations, universities, dependents of employees and disaster relief efforts.



Professor Emeritus Sandra Houston (right) was presented a commemorative statuette during her recent induction into the School of Sustainable Engineering and the Built Environment Hall of Fame. She is pictured with Professor Ram Pendyala, school director. Photographer Erika Gronek/ASU



The late Edward Bouwer, a new Academy of Distinguished Alumni inductee, was an internationally prominent leader in environmental microbiology and biotechnology, known particularly for making advances in the bioremediation of contaminated groundwater. Photo courtesy of the Bouwer family

Academy of Distinguished Alumni inductee Chidambaram Gnanasambanthan has 40 years of experience in civil engineering-related structural engineering, project management and entrepreneurship. He was on the board of the American Council of Engineering Companies of Arizona for more than 11 years.

Photographer: Erika Gronek/ASU



Mark Kramer, a new member of Academy of Distinguished Alumni, leads the employee-owned company, Soil and Materials Engineers. It is among the top engineering design firms in the U.S. He has held leadership roles in the American Council of Engineering Companies of Michigan, including serving on its board of directors.

Photographer: Erika Gronek/ASU



James Murphy, a new Academy of Distinguished Alumni member, joined the Willmeng Construction company in 1999 as a young college graduate. Less than a decade later, he became the company's president. Murphy is now CEO, overseeing a company of more than 350 employees.

Photographer: Erika Gronek/ASU

Academy of Distinguished Alumni inductee Paul Von Berg worked on a wide range of projects in the construction industry throughout more than four decades. He was also on the board of directors of the national American Road and Transportation Builders Association.

Photographer: Erika Gronek/ASU



Professor Emeritus George Edward "Edd" Gibson, Jr. was inducted in the school's Hall of Fame. Gibson oversaw the growth of the school for almost a decade as its first director.

Photographer Erika Gronek/ASU

Shining spotlight on leaders, creators, innovators

School's new Hall of Fame, Academy of Distinguished Alumni members have led progress in education, research, industry, community service

More than just outstanding professional skills, expertise and career success are considered when assessing candidates for induction into the **Hall of Fame and Academy of Distinguished Alumni of the School of Sustainable Engineering and the Built Environment**.

A recent ceremony celebrated the achievements of two new Hall of Fame inductees whose work in engineering and construction fields exemplifies those qualities. **Professor Emeritus George Edward "Edd" Gibson, Jr.** and **Professor Emeritus Sandra Houston** are new members of the Hall of Fame.

Gibson came to ASU in 2009 to become chair of the Del E. Webb School of Construction within the School of Sustainable Engineering and the Built Environment. He then served as the latter school's director from 2010 to 2018. During his career, Gibson was elected to the National Academy of Construction, or NAC, received the Peurifoy Award for Outstanding Research from the American Society of Civil Engineers, or ASCE, and later won the Construction Industry Institute's Richard L. Tucker Leadership & Service Award. In 2020, Gibson was elected a Distinguished Member of ASCE.

"Edd Gibson's decades of contributions to research, teaching, service and leadership make him a standout among members of the school's Hall of Fame," said Samuel Ariaratnam, a professor of civil and construction engineering and Gibson's longtime colleague.

Houston served for a decade as chair of the school's civil and environmental engineering program, overseeing a period of its substantial expansion. During the 36 years she taught and conducted research in geotechnical engineering, she earned major awards for her expertise in unsaturated soil mechanics and related research. Houston also served as president of the ASCE Geo-Institute. In that role, she was instrumental in supporting the work of many who became contributors to impactful geotechnical research.

"She attracted stars to the field," said Houston's colleague, Claudia Zapata, an associate professor of civil, environmental and sustainable engineering. "But just as important, she was determined in her mission to bring more women into ASU's engineering faculty. Her work was part of much-needed efforts to advance equity and inclusion in the profession."

Houston remains active in the civil engineering field since her retirement. Zapata noted that Houston continues to mentor women faculty members and support efforts of the National Science Foundation to increase participation in STEM fields by women, minorities and people with disabilities.

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Principal
Elaine H. Wilson Consulting



The Friends of Civil & Environmental Engineering (FOCE²) is an industry advisory committee that includes leaders from the professional community and the School of Sustainable Engineering and the Built Environment (SSEBE) faculty and staff, all focused on facilitating partnerships and improving the quality and outcomes of the student experience. Industry membership and participation in FOCE² enables the civil engineering program to retain and motivate talented young students to achieve success and further the profession.

2023 FOCE² Members

Alpha Geotechnical, American Public Works Association, Ardurra, Arizona Department of Transportation, ASCE Phoenix Branch, Black & Veatch, Bowman Consulting, Burgess & Niple, Carollo Engineers, City of Phoenix, CivTech Inc., Coe & Van Loo (CVL Consultants), Consor Engineers, Coreslab Structures, Dibble & Associates Consulting Engineers, Entellus, Inc., Gannett Fleming Companies, GHD Inc., Hazen and Sawyer, HilgartWilson, LLC, Huitt-Zollars, Kimley-Horn, Langan Engineering, Markham Contracting Co., Meyer Borgman Johnson, Olsson, Prelude Engineering, Speedie & Associates, T & S Diversified (honorary member), Terracon, Tetra Tech, Water Works Engineers, Wood Patel and Associates, Y.S. Mantri & Associates

The Del E. Webb School of Construction Industry Partner Circle membership contributions are used by the Del E. Webb School of Construction to provide world-class education to construction students. There are several support opportunities for donor directed funds to make a difference.

Over the years, donors have helped the school become a leader in construction education. Some of the activities made possible by donors include awarding over 50 undergraduate scholarships each year, sending student teams to national competitions, hosting international construction conventions, and appointing endowed professors and chairs.

As of printing, the Industry Partner Circle (IPC) includes:

Gold Partners: Cannon and Wendt, Insurica, OKLAND, The Penta Building Group, Willmeng

Maroon Partners: Felix Construction Company, GCON Inc., Kiewit Infrastructure West Co., Rolling Plains, Rosendin Electric, Rummel, Stevens Leinweber, Sundt, Weitz

Sparky Partners: CORE Construction, Edge Construction, Field Verified Inc., FR Law Group, FNF, Holder Construction, JE Dunn, Jenco Inc., Kovach, LGE Design Build, Lovitt and Touche, A Marsh & McLennan Agency LLC, Markham Contracting Co. Inc., McCarthy Building Companies, Inc.

Pitchfork Partners: Bel-Aire Mechanical, CHASSE Building Team, Coreslab Structures, E&K, Small Giants, Wespac, Whiting Turner

Faculty Expertise



Morteza Abbaszadegan

Professor
Director, NSF WET Center
PhD, University of Arizona
Expertise: Health-Related Water Microbiology



Braden Allenby

President's Professor
Lincoln Professor of Ethics & Technology
PhD, Rutgers University
Expertise: Sustainable Engineering



Absar Alum

Assistant Research Professor
PhD, University of Arizona
Expertise: Pollution Science, Biotechnology



Anca Delgado

Assistant Professor
PhD, Arizona State University
Expertise: Soil Microbial Processes



Ricardo Eiris

Assistant Professor
PhD, University of Florida
Expertise: Construction Work and Education
❖ **New Faculty**



Mounir El Asmar

Associate Professor
PhD, University of Wisconsin
Expertise: Construction, Infrastructure



Jirapat Ananpattarachai

Assistant Research Professor
PhD, King Mongkut's university of Technology Thonburi
Expertise: Environmental Engineering



Samuel Ariaratnam

Professor and Construction Engineering Programs Chair and Sunstate Chair
PhD, University of Illinois at Urbana-Champaign
Expertise: Underground Construction



Gary Barras

Assistant Teaching Professor
MS, Arizona State University
Expertise: Project Management of Heavy Construction



James Ernzen

Associate Professor
PhD, University of Texas at Austin
Expertise: Concrete Materials



Gamze Ersan

Research Assistant Professor
PhD, Istanbul University
Expertise: Statistical Modeling
❖ **New Faculty**



Mahmut Ersan

Assistant Research Professor
PhD, Clemson University
Expertise: Water Treatment



Irfan Batur

Research Assistant Professor
PhD, Arizona State University
Expertise: Travel Behavior, Sustainable and Equitable Transportation



Tim Becker

Interim Programs Chair, Del E. Webb School of Construction, Eminent Scholar
PhD, North Carolina State University
Expertise: Construction Engineering and Management
❖ **New Faculty**



Mackenzie Boyer

Assistant Teaching Professor
PhD, University of Florida
Expertise: Water Conservation



Elham (Ellie) Fini

Associate Professor
PhD, University of Illinois at Urbana-Champaign
Expertise: Sustainable Materials



Peter Fox

Professor
PhD, University of Illinois at Urbana-Champaign
Expertise: Groundwater Recharge



Matthew Fraser

Professor and Associate Director
PhD, Caltech
Expertise: Air Quality



Treavor Boyer

Professor and Environmental Engineering Programs Chair
PhD, University of North Carolina at Chapel Hill
Expertise: Water Treatment



Efthalia (Thalia) Chatziefstratiou

Assistant Teaching Professor
PhD, The Ohio State University
Expertise: Engineering Education



Mikhail Chester

Professor and Director, Metis Center for Infrastructure and Sustainable Engineering
PhD, University of California, Berkeley
Expertise: Sustainable Infrastructure



Margaret Garcia

Assistant Professor
PhD, Tufts University
Expertise: Water Resources



Sergio Garcia-Segura

Assistant Professor
PhD, University of Barcelona, Spain
Expertise: Electrochemical Water Treatment



David Grau

Associate Professor and Sundt Professor of Alternative Delivery Methods and Sustainable Development
PhD, The University of Texas at Austin
Expertise: Systems Engineering



Oswald Chong

Associate Professor
PhD, University of Texas at Austin
Expertise: Energy and Resource Management



Otakuye Conroy-Ben

Associate Professor
PhD, University of Arizona
Expertise: Endocrine Disruption



Paul Dahlen

Assistant Research Professor
PhD, Arizona State University
Expertise: Hydrocarbon Remediation



Udaya B. Halabe

Teaching Professor
PhD, Massachusetts Institute of Technology
Expertise: Nondestructive Testing of Structures and Materials
❖ **New Faculty**



Rolf Halden

Professor and Director of the Center for Environmental Health Engineering
PhD, University of Minnesota
Expertise: Water and Health



Kerry Hamilton

Assistant Professor
PhD, Drexel University
Expertise: Microbiology and Risk

Faculty Expertise



Keith Hjelmstad

President's Professor
PhD, University of California, Berkeley
Expertise: Structural Engineering



Christian Hoover

Assistant Professor
PhD, Northwestern University
Expertise: Fracture Mechanics
❖ **FSE Top 5% Teaching Award**



Kristen Hurtado

Assistant Teaching Professor
PhD, Arizona State University
Expertise: Project Management



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Professor
PhD, Purdue University
Expertise: Pavement Materials



Giuseppe Mascaro

Associate Professor
PhD, University of Cagliari, Italy
Expertise: Stochastic Hydrology



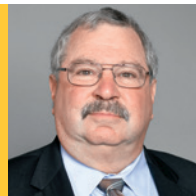
Jose Medina Campillo

Assistant Research Professor
PhD, Arizona State University
Expertise: Transportation and Pavement Materials



Kamil Elias Kaloush

FORTA Professor of Pavement Engineering and Undergraduate Program Chair for Civil Engineering
PhD, Arizona State University
Expertise: Pavements and Materials



Edward Kavazanjian, Jr.

Regents Professor and Director, Center for Bio-mediated and Bio-inspired Geotechnics
PhD, University of California, Berkeley
Expertise: Geotechnical Engineering



Hamed Khodadadi Tirkolaei

Assistant Professor
PhD, Eastern Mediterranean University, Cyprus
Expertise: Sustainable Geotechnics



Barzin Mobasher

Professor
PhD, Northwestern University
Expertise: Composite Materials



Amin Mojiri

Assistant Research Professor
PhD, University of Science Malaysia
Expertise: Treatment of Water and Wastewater
❖ **New Faculty**



Narayanan Neithalath

Fulton Professor of Structural Materials and Graduate Programs Chair
PhD, Purdue University
Expertise: Materials Science



Rosa Krajmalnik-Brown

Professor and Director of the Center for Health Through Microbiomes
PhD, Georgia Institute of Technology
Expertise: Microbial Ecology Management



Saurav Kumar

Assistant Professor
PhD, Virginia Tech
Expertise: Water Resources and Remote Sensing



Barry Kutz

Assistant Teaching Professor
MS, Arizona State University
Expertise: Preconstruction Delivery



Hossein Noorvand

Assistant Research Professor
PhD, Arizona State University
Expertise: Pavement Materials and Characterization



Hasan Ozer

Associate Professor and Director, National Center of Excellence on SMART Innovations
PhD, University of Illinois, Urbana-Champaign
Expertise: Pavements and Sustainability



Kristen Parrish

Associate Professor
PhD, University of California, Berkeley
Expertise: Construction Management



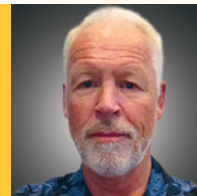
Klaus Lackner

Research Professor
PhD, Heidelberg University, Germany
Expertise: Carbon Sequestration



Anthony J. Lamanna

Associate Professor and Penta Building Group Professor
PhD, University of Wisconsin
Expertise: Sustainable Construction



Peter Lammers

Research Professor
PhD, Portland State University
Expertise: Biotechnology and Bioenergy



Monica Perrin

Assistant Teaching Professor
MS, Arizona State University
Expertise: Sustainability Design and Construction Trends
❖ **New Faculty**



Ram Pendyala

Professor and Director of SSEBE Director, TOMNET University Transportation Center
PhD, University of California, Davis
Expertise: Transportation Systems



Steven Polzin

Research Professor
PhD, Northwestern University
Expertise: Transportation Policy Analyses



Jean Larson

Associate Research Professor and Education Director, CBBG
PhD, Arizona State University
Expertise: Engineering Education



Christopher Lawrence

Associate Teaching Professor
PhD, Arizona State University
Expertise: Geotechnical Engineering



Nariman Mahabadi

Assistant Professor
PhD, Arizona State University
Expertise: Geotechnical Engineering



Subramaniam (Subby) Rajan

Professor
PhD, University of Iowa
Expertise: Finite Element Analysis Computational and Experimental Solid Mechanics



Dwarak Ravikumar

Assistant Professor
PhD, Arizona State University
Expertise: Energy Systems, Multi-Criterial Decision Analysis
❖ **New Faculty**



Jafar Razmi

Associate Research Professor
PhD, University of Maryland
Expertise: Structural Mechanics and Geotechnical

Faculty Expertise



Bruce Rittmann

Regents Professor and Director, Biodesign Swette Center for Environmental Biotechnology
PhD, Stanford University
Expertise: Environmental Biotechnology



Emmanuel Salifu

Assistant Professor
PhD, University of Strathclyde
Expertise: Bio Geotechnical Engineering
❖ **New Faculty**



Thomas Seager

Associate Professor
PhD, Clarkson University
Expertise: Infrastructure Systems



Claudia Zapata

Associate Professor
PhD, Arizona State University
Expertise: Unsaturated Soils



Ruijie Zeng

Assistant Professor
PhD, University of Illinois at Urbana-Champaign
Expertise: Hydrologic Modeling



Xuesong Zhou

Associate Professor
PhD, University of Maryland
Expertise: Multimodal Network Planning



Shahnawaz Sinha

Associate Research Professor
PhD, University of Colorado
Expertise: Drinking Water Treatment



Richard Standage

Assistant Teaching Professor
PhD, Arizona State University
Expertise: Concrete Specialist



Peter Stopher

Research Professor
PhD, University of London
Expertise: Transportation Planning

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Howard H. Bashford, PhD

Allan Chasey, PhD

Apostolos Fafitis, PhD

G. Edward Gibson, Jr., PhD

Sandra Houston, PhD

William Houston, PhD

Paul Johnson, PhD

Larry Mays, PhD

T. Agami Reddy, PhD

Avinash Singhal, PhD

Matthew Witczak, PhD

Farewell: We thank the following faculty for their service and wish them well.

Rebecca Muenich – Assistant Professor, left August 6, 2023 after six years at ASU.

Francois Perrault – Associate Professor, left May 28, 2023 after eight years at ASU.

Steven Ayer – Associate Professor, left August 6, 2023 after nine years at ASU.

Thomas Czerniawski – Assistant Professor, left August 6, 2023 after three years at ASU.



Kenneth Sullivan

Professor
PhD, University of Wisconsin
Expertise: Procurement and OCM



Junliang (Julian) Tao

Associate Professor
PhD, Case Western Reserve University
Expertise: Bioinspired Geotechnics



Leon van Paassen

Associate Professor
PhD, Delft University of Technology
Expertise: Geotechnical Engineering



Enrique Vivoni

Fulton Professor of Hydrosystems Engineering
PhD, Massachusetts Institute of Technology
Expertise: Hydrologic Science



Zhihua Wang

Associate Professor
PhD, Princeton University
Expertise: Urban Environment



Paul Westerhoff

Regents Professor and Fulton Chair of Environmental Engineering
PhD, University of Colorado
Expertise: Water Treatment



Avi Wiezel

Associate Professor
PhD, Technion-Israel Institute of Technology
Expertise: Human Aspects of Management
❖ **FSE Top 5% Teaching Award**



Tianfang Xu

Assistant Professor
PhD, University of Illinois at Urbana-Champaign
Expertise: Groundwater Sustainability



Ravi Kiran Yellavajjala

Associate Professor
PhD, University of Notre Dame
Expertise: Data-Driven Structural Engineering
❖ **New Faculty**



FSE Values

At the Fulton Schools, we:

Cultivate excellence.

Deliver innovation that matters.

Encourage bold thinking.

Foster a community of learning and collaboration.

Build a foundation for all to be successful.

SCHOOL OF Sustainable Engineering and the Built Environment

The Spectrum of Sustainable Engineering: from Classroom to Community

Fulton Schools of Engineering up 8 spots in 3 years in US News rankings

Out of 208 universities included in a survey by U.S. News & World Report, the Fulton Schools of Engineering now ranks No. 34 overall, and No. 20 among public universities — ahead of the University of Florida, the University of California, Santa Barbara, and the University of California, Irvine — across undergraduate engineering programs.

Eight areas of study in the Fulton Schools of Engineering now rank among the top 30 undergraduate engineering areas in the nation, according to U.S. News & World Report. ASU's undergraduate areas of civil engineering, cybersecurity, computer engineering, electrical engineering, artificial intelligence, environmental engineering, mechanical engineering and biomedical engineering are rated among the best nationally:

#16 Civil engineering

#16 Cybersecurity

#16 Computer Engineering

#17 Electrical Engineering

#21 Artificial Intelligence

#24 Environmental Engineering

#29 Mechanical Engineering

#30 Biomedical Engineering

8 Fulton Schools
undergraduate areas
of focus ranked in the
Top 30

— U.S. News & World Report, 2023–24



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