

SCHOOL OF Sustainable Engineering
and the Built Environment






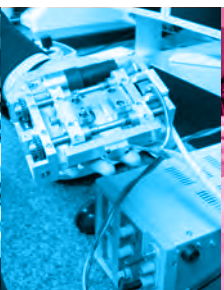



Building A More
**SUSTAINABLE
TOMORROW**
For All...*today*

The Year in Review
2022

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



**25 undergraduate programs and
50 graduate programs in its seven schools**

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

**ASU named #1 in innovation
for 8th consecutive year.**

**#1 in the U.S.
for innovation**
ASU ahead of MIT and Stanford
— U.S. News & World Report, 8 years, 2016–2023



Research Centers



**National Science Foundation
Engineering Research
Centers (ERCs)**



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



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

Additional Research Centers

Arizona Center for Algae Technology and Innovation (AzCATI)

Biodesign Center for Environmental Health Engineering

Biodesign Center for Health Through Microbiomes (BCHTM)

Center for Environmental Security (CES)

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 of Excellence on SMART Innovations

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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ssebe.engineering.asu.edu

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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**

The Numbers 2022

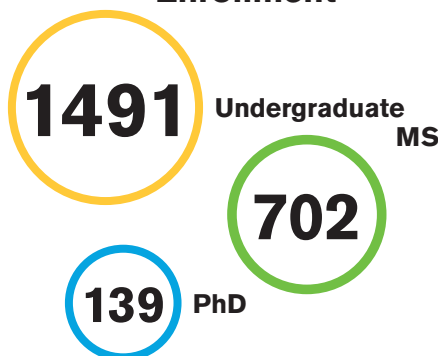
Undergraduate Degrees Conferred



Graduate Degrees Conferred



Enrollment



Faculty



Total Scholarships and Fellowships Awarded 2022

\$330,002

SSEBE Research Expenditures

\$26,457,863

National Academy of Engineering Members

Edward Kavazanjian, Jr.
Bruce Rittmann
Paul Westerhoff

National Academy of Construction Members

Samuel T. Ariaratnam
William Badger (emeritus)
G. Edward Gibson, Jr.

ASCE Distinguished Members

Samuel Ariaratnam
G. Edward Gibson, Jr.
Edward Kavazanjian, Jr.
Bruce Rittmann

Canadian Academy of Engineering Member

Samuel T. Ariaratnam

I am very pleased to present the 2022 annual report of activities and accomplishments for the **School of Sustainable Engineering and the Built Environment (SSEBE)**, one of the seven Ira A. Fulton Schools of Engineering at Arizona State University. The past year saw us return in many ways to normalcy following a period of significant disruption due to the pandemic. In keeping with the ASU Charter, we are working together with our partners and stakeholders to advance use-inspired research and discovery, student success, and impactful activities that advance the health, wellbeing, and vitality of the communities we serve. With an enrollment of 2200 students and annual sponsored research expenditures in excess of \$25 million, we are experiencing impressive growth on all fronts and developing a workforce capable of leveraging the latest technologies, tools, and analytics for social good. Infrastructure resiliency, climate change, energy and environmental sustainability, economic development and prosperity, water resource management, and public health are key areas of critical importance that our faculty, staff, and students are addressing through their work.



In this annual report, you will see the many awards and accolades that our faculty, students, and alumni have won, the groundbreaking research that they are undertaking, and the various ways in which our school is contributing to enhancing community vitality and health. Our faculty are leveraging breakthroughs in wastewater-based epidemiology to monitor public health indicators in tribal nations. They are developing and installing systems in the Navajo Nation to ensure clean and continuous water supplies for communities that have not had access to water in the past. They are developing new low-cost water purification and treatment systems through activities underway in the National Science Foundation sponsored **Engineering Research Center on Nanotechnology Enabled Water Treatment**. **The Center for Bio-mediated and Bio-inspired Geotechnics** is advancing nature inspired solutions to advance a more durable and sustainable built environment, the Metis Center is addressing cybersecurity challenges confronting our critical infrastructure systems, and the **TOMNET** university transportation center is advancing sustainable pathways for the advent of shared, electrified, connected, and automated transportation systems. We are launching new centers on vitally important topics related to additive manufacturing of structures and decarbonization of our built environment, hydrologic modeling and water resource management, and innovations in pavement technologies and materials. Our **Algae Technology and Innovation Center (AzCATI)** is harnessing algae technology to produce renewable energy, food, feed and other valuable products. Our top-ranked **Del E Webb School of Construction (DEWSC)** has experienced a surge in enrollment at both undergraduate and graduate levels over the past few years, helping to grow a diverse and inclusive talent pipeline for an industry that is at an inflection point. Our construction faculty are using virtual and augmented reality platforms to enhance construction workflow, site safety, and workforce training. Read all about these developments and more in the pages that follow.

I would like to take this opportunity to thank our stakeholders and partners, with a special note of gratitude for our many university collaborators, and to the members of the **DEWSC Industry Partner Circle**, industrial advisory boards, and **Friends of Civil and Environmental Engineering**. Their generous support provides critical resources necessary for us to deliver on our mission and help our students achieve their goals. In 2022, we received official word that all of our undergraduate programs – civil engineering, environmental engineering, construction engineering, and construction management and technology – received a full six-year accreditation from ABET, the **Accreditation Board for Engineering and Technology**. The strong support and engagement of our industry partners and stakeholders is consistently identified as a major strength of our academic programs. We look forward to growing these partnerships in the years ahead as we work together to build a more sustainable tomorrow...today.

A handwritten signature in blue ink that reads "Ram Pendyala".

Ram M. Pendyala, PhD

Professor and Director

School of Sustainable Engineering and the Built Environment

Civil, Environmental, and Sustainable Engineering (CESE)

Keith D. Hjelmstad, PhD

President's Professor • CESE Undergraduate Program Chair

This past year looked a bit more like the pre-pandemic days, with classrooms full of students and campus walkways teeming with people with places to go. We had a lot more direct engagement with our stakeholders. Perhaps the most important lesson we have learned from these past few years is how important authentic human interaction is to the learning environment. Technology continues to change how we teach and learn, but the motivational boost that we can generate in community is hard to replicate.

I am pleased to report that our ABET accreditation visit last year was successful, earning the maximum six-year term of accreditation. Our program evaluator was particularly impressed with our strong connection to our professional community, mentioning the unique value that we get from our *Friends of Civil and Environmental Engineering* (FOCE²) group that helps us in multiple ways from participating in career enhancement events for our students to spearheading fundraising efforts for our initiative to enhance our senior capstone design experience. This year we were saddened to learn of the passing of Jim Geiser, a long-time member of the FOCE² steering committee, member of the Civil Engineering Academy of Distinguished Alumni, and great friend of our program.

Each year we find new ways to bring significant impact to the world around us. I am confident that the coming year will be another great one!



Construction Engineering (CNE)

Samuel T. Ariaratnam, PhD, PE, PEng, FCSCE, FISTT, FCAE, NAC, Dist.MASCE

**Professor • Beavers-Ames Chair in Heavy Construction
CNE Programs Chair**

This past year seemed to fly by quickly. It feels like it was only yesterday that we went through our ABET accreditation site visit process. I am pleased to announce that the official word regarding our successful six-year accreditation for the Construction Engineering Program came this past Fall. Congratulations to all those stakeholders that played a role!

We are finally back to normal in terms of teaching, research, and student activities. It is great to see our students back on campus with in-person classes and club activities. It is refreshing to hear the sounds of students walking between classes or interacting with their peers.

The Construction industry continues to be strong as evident by the fact that our students were once again able to find excellent internships and full-time jobs upon graduation this past year. Furthermore, our SSEBE career fairs were full of many companies meeting face-to-face with our students for the first time in a few years.

Investments from the Infrastructure Investment and Jobs Act are expected to increase 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 looking forward to continuing to grow our nationally and internationally recognized Construction Engineering Program at both the undergraduate and graduate levels. Our enrollment trajectory is upwards, and we will continue to deliver a world-class educational experience to our students.



Environmental Engineering (EVE)



Treavor H. Boyer, PhD
Professor • EVE Programs Chair

I am excited to share the good news on our official ABET accreditation. The Environmental Engineering (EVE) undergraduate program was accredited for a full six years and accreditation is retroactive to our first graduating class in December 2019. ABET accreditation is an important quality check for engineering programs. Student interest in the EVE program continues to grow with enrollment approaching 200 students. In September 2022, we held our first in-person external advisory board meeting since December 2019. A highlight of the meeting was a networking lunch between advisory board members and EVE students. Everyone left the meeting enthusiastic about the interactions and looking forward to the next meeting. We recently celebrated December graduations with the EVE program recognizing Sydney Wickman as Most Outstanding Graduate and Hannah Collins receiving the Leadership and Service Award. Sydney and Hannah represent the exceptional students

in the EVE program who will be making a positive impact on the Environmental Engineering field. Finally, the educational objectives of the EVE program are listed below, and I welcome your feedback on these objectives:

1. Comprehend the scope of complex environmental problems and participate in developing solutions
2. Establish a career based on technical competence, integrity, and passion
3. Incorporate industry or educational experiences to advance the field and contribute to the well-being of society and the environment and
4. Work cooperatively and effectively with culturally diverse colleagues.

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)



Anthony J. Lamanna, PhD, PE, FACI, FASCE
Associate Professor • Sundt Professor of Alternative Delivery Methods and Sustainable Development • DEWSC Programs Chair

We've had another spectacular year for student enrollment! With the growth in enrollment we look to add two more teaching faculty and one more tenure/tenure track faculty in the next year or two. Our undergraduate program is now both American Council for Construction Education (ACCE) and ABET Applied and Natural Science Commission (ANSAC) accredited. This dual accreditation opens up more opportunities for our graduates during their academic and professional careers, so a special thanks to all faculty, industry partners, staff, and students that made these accreditations happen.

Our Industry Partner Circle (IPC) continues to expand. It is a convenient way for our industry supporters to contribute to all aspects of the operations of our school. A financial contribution coupled with the gift of time is a great way to impact the next generation of construction leaders; come guest lecture, recruit from our career fairs, or even offer to teach an entire 3 credit hour course for our growing student population! Our students are once again competing in student competitions and attending industry events in person! Please reach out if you would like to sponsor a student competition team, or if you have an event and would like construction students or faculty to attend.

Our Construction Alumni Chapter is becoming more and more active; please follow at <https://www.linkedin.com/showcase/del-e-webb-school-of-construction> to stay engaged. This is where we post events such as our Alumni Family Picnic, Student Scholarship Golf Tournament, and our upcoming Del E. Webb School of Construction Block Party!

Program Chair Updates

Graduate Programs

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

The graduate degree programs in the School of Sustainable Engineering and the Built Environment (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. Our graduate enrollment has been rising, attributable to a significant growth in the construction management Masters program. The PhD programs are also experiencing robust growth – we have a total of 120+ PhD students in the school - thanks to the large number of research-active faculty in SSEBE, new hires in thematic areas, increased funding success, and a number of research centers that are part of SSEBE.

We continue to recruit talented graduate students from all parts the globe, engage alumni and industrial partners, and contribute to research endeavors around key aspects of national and global interest including climate change, food-water-energy nexus, and infrastructure. We have continued to engage in efforts to increase the number of students from under-represented groups in our graduate program. In the past year, we have gained momentum in our post-pandemic efforts in recruiting and in-person student engagement, ensuring a valuable experience to our students.

The new MS program in Environmental Engineering is growing, and complements our growing undergraduate Environmental Engineering degree program. We have online Masters programs in Construction Management and Sustainable Engineering, and are working on developing targeted online degree programs that fill critical niche in the areas of construction engineering, infrastructure, and sustainability. Our aim is to make SSEBE online programs the preferred choice for students and professionals seeking advanced education and credentialing.

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 continue to grow, as we enrolled our largest graduate class to date in the fall of 2022. This growth allows us to serve the needs of the construction industry in Arizona and beyond. In 2022, we continued 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 Roofing Systems and Technology, Building Codes, and Optimizing Construction Company Performance. 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 PhD continues to develop future faculty and industry leaders, and we are proud to have graduated the Nation's first Native American Construction Management PhD this Spring.

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!





Samuel Ariaratnam

Samuel Ariaratnam was named a **Distinguished Member of ASCE** in 2022. The title of Distinguished Member is an honor reserved only for the most eminent professionals in the American Society of Civil Engineers, or ASCE. Being recognized requires years of service to the industry and the recommendation of peers. No more than 12 members across the country can be selected in a single year and fewer than 300 have been selected since the title was established by ASCE in 1853. Ariaratnam, the Beavers-Ames Chair in Heavy Construction in the School of Sustainable Engineering and the Built Environment, has stood out among the membership body. In addition to this honor of becoming a Distinguished Member of ASCE, Ariaratnam has earned the John O. Bickel Award, Arthur M. Wellington Prize, Award of Excellence of the Pipeline Division and the Stephen D. Bechtel Pipeline Engineering Award from the society. He was also elected to the National Academy of Construction in 2019 and the Canadian Academy of Engineering in 2018. Ariaratnam has been appointed by United States Secretary of Transportation Pete Buttigieg to the Technical Pipeline Safety Standards Committee, also known as the Gas Pipeline Advisory Committee, or GPAC.



Otakuye Conroy-Ben

SACNAS Selects Distinguished Awardees for Excellence in Science and Mentoring for the 2022 SACNAS National Diversity in STEM Conference

Awardees to be honored at 2022 SACNAS National Diversity in STEM Conference in San Juan, Puerto Rico.

SACNAS (Society for Advancement of Chicanos/Hispanics and Native Americans in Science) is pleased to announce the winners of the 2022 SACNAS Distinguished Awards. These outstanding individuals were nominated by those who have been touched by their work and selected by a committee of their peers.


Dr. Otakuye Conroy-Ben, Assistant Professor, Environmental Engineering, School of Sustainable Engineering and the Built Environment has been honored as one of the two **2022 recipients of the SACNAS Distinguished Awards**.

Conroy-Ben is also the recipient of the **2022 Indigenous Resilience Leadership Award** from the Indigenous Resilience Center (IRes) at the University of Arizona. This prestigious new honorary award recognizes outstanding individuals making a positive impact in tribal communities to create healthy environments.



Edd Gibson

George Edward “Edd” Gibson, professor and Sunstate Chair was recognized by the Construction Industry Institute with the **2022 Richard L. Tucker Leadership and Service Award**. The Construction Industry Institute, or CII, is a research consortium of more than 120 companies that own and construct facilities globally, including widely known organizations. “The Tucker Award is a recognition by peers that my leadership and contributions to CII have added tremendous value toward improving capital effectiveness in the national construction industry—it is a great honor,” Gibson says. Even more impressive, this is not the first Tucker Award granted to Gibson. In 2020, he was selected by the National Academy of Construction, or NAC, to be the first recipient of the Richard L. Tucker Outstanding Service Award, named after the same individual as CII’s Tucker award. He is one of only two individuals to receive both recognitions.



Christian Hoover

Christian Hoover, an assistant professor in the School of Sustainable Engineering and the Built Environment, says he will be applying the concepts he learned from his doctoral and postdoctoral work as he moves forward with a five-year research project focusing on glassy metallic organic frameworks, or gMOFs. The project is supported by Hoover's **2022 National Science Foundation Faculty Early Career Development Program Award**, or **CAREER Award**, which comes with \$600,000 in funding. The CAREER Award program supports university faculty members who are early in their careers and show leadership potential as researchers and educators. They are selected to serve as role models in their academic departments and to help advance research in their field.



Ed Kavazanjian

Edward Kavazanjian, Jr., Regents Professor and Director, Center for Bio-mediated and Bio-inspired Geotechnics delivered the **58th Terzaghi Lecture at Geo-Congress 2022** in Charlotte, NC. His lecture was titled "Bio-mediated Geotechnics for Hazard Mitigation, Environmental Protection, and Infrastructure Construction." The 2022 Karl Terzaghi Lecture is awarded to Edward Kavazanjian, Jr., PhD, PE, D.GE, Dist. M. ASCE, NAE, for significant contributions to earthquake engineering, the design of waste containment systems, and in leading the emerging field of biogeotechnical engineering.

Hasan Ozer

Hasan Ozer is the **2022 winner of the Wilber S. Smith Award**. This award was established by The Transportation and Development Institute of ASCE to honor contributions to the enhancement of the role of the civil engineer in highway engineering. Ozer is an **associate professor and Director of the National Center of Excellence on Smart Innovations** and **Founding Director of the Southwest Pavement Technology Program** at ASU. Ozer has more than 15 years of experience in teaching and research in airfield and highway pavement materials characterization, computational modeling, and sustainability assessment of transportation infrastructure.



Jirapat Ananpattarachai

Assistant Research Professor

Degree: PhD, King Mongkut's University of Technology Thonburi (Thailand) 2009

Expertise: Environmental engineering, development of a greywater treatment system



Gary Barras

Beavers – Ames Lecturer in Heavy Construction

Degree: MS, construction management, Arizona State University, 1994

Expertise: Project management of heavy construction projects, heavy construction equipment, construction methods and materials, microcomputer applications for construction



Kristen Hurtado

Assistant Teaching Professor

Degree: PhD, construction management, Arizona State University, 2018

Expertise: Construction management, project management, project planning, software and optimization



Saurav Kumar

Assistant Professor

Degree: PhD, civil engineering, Virginia Tech, 2012

Expertise: Hydrology, water system modeling, hydroinformatics, aerial and satellite remote sensing



Jose Medina Campillo

Assistant Research Professor

Degree: PhD, civil, environmental and sustainable engineering, Arizona State University 2018

Expertise: Transportation and pavement materials and management



Hossein Noorvand

Assistant Research Professor

Degree: PhD, civil, environmental and sustainable engineering, Arizona State University, 2020

Expertise: Pavement materials and characterization



Mohammad Wasim Iqbal

Assistant Research Professor

Degree: PhD, Water engineering and management, Kasetsart University, Thailand 2018

Expertise: Water engineering and management

Faculty Honors and Awards



Enrique Vivoni

Enrique Vivoni has been elected to the newest class of fellows of **The American Association for the Advancement of Science (AAAS)**.

For outstanding achievements integrating scientific, engineering and sustainability principles in water resources management.

Vivoni's research focuses on hydrologic processes and their interactions with ecologic and atmospheric phenomena, with an emphasis on semiarid and arid regions of North America.

Over the course of his career, he has pursued fundamental research in the hydrology of natural and urban systems and linked the work to sustainability and resource management. In addition, his work on the U.S.-Mexico border region has led to sustained binational collaborations.

Vivoni has won a number of local and national awards in recognition of the interdisciplinary nature of his work on water, climate and landscapes of North American deserts. These awards include serving twice as the Fulbright-Garcia Robles Scholar, the Leopold Leadership Fellowship, the Huber Prize for Civil Engineering Research, the Quentins Mees Research Award from the Arizona Water Association and the Presidential Early Career Award for Scientists and Engineers.

Edd Gibson, Avi Wiezel, Richard Standage, Barry Kutz, Jeffry Van

Five Del E. Webb School of Construction faculty receive the Ira A. Fulton Schools of Engineering Top 5% Teaching Award

Each year the Ira A. Fulton Schools of Engineering recognizes excellence in instruction through selection of faculty to its annual Top 5% Teachers list. This list is generated based on consideration of student feedback for all engineering instructors and courses.



Edd Gibson



Avi Wiezel



Richard Standage



Barry Kutz



Jeffry Vann

Ram Pendyala, professor and SSEBE director, has been awarded the **2022 Pyke Johnson Award** on behalf of the Transportation Research Board Executive Committee for best paper in the area of planning and environment "The Influence of Mode Use on Level of Satisfaction with Daily Travel Routine: A Focus on Automobile Driving in the United States." The Certificate of Award was presented at the Thomas B. Deen Distinguished Lecture and Presentation of Awards on January 9, 2023 in Washington, D.C., during the TRB 102nd Annual Meeting.



Ram Pendyala



Paul Westerhoff, Regents Professor and Fulton Chair of Environmental Engineering

The **Westerhoff lab** was recognized in 2022 for the 8th consecutive year as having research papers in the top 1% globally most highly cited journal papers in the environment & ecology fields. Specific papers in 2022 received the **ES&T Engineering Best Paper of the Year award** for *"A Review of Advances in Engineering Nanomaterial Adsorbents for Metal Removal and Recovery from Water: Synthesis and Microstructure Impacts"* and **AWWA Membrane Treatment Best Paper award** for publication (*Managing and treating per- and polyfluoroalkyl substances (PFAS) in membrane concentrates*) published in AWWA Water Science. Overall, the Westerhoff group has published over 375 journal papers, with over 100 papers having been cited > 100 times each and several more than 1,000 times and referenced in major US and EU regulatory actions. Westerhoff developed several patents in 2022 based upon use of nanomaterials to purify water. Publications and patents are two ways his group is impacting the water field.



Rebecca Muenich

Rebecca Muenich, assistant professor, was invited to speak at the **2022 China-America Frontiers of Engineering Symposium**. Her presentation was titled *"Pushing the Frontiers in Food-Energy-Water Systems Understanding and Management."* The 2022 China-America Frontiers of Engineering symposium was held July 18-20 as a point-to-point meeting. Sixty highly accomplished early-career engineers from China and the United States met for an intensive 3-day symposium on developments at the cutting edge of engineering technology in four areas: Wearable Electronics and Human Health, Additive Manufacturing and Beyond, Water Sustainability, and Food Safety in the Context of Big Data and Genomics. The event is 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 transpacific network of world-class engineers. CAFOE is carried out in cooperation with the Chinese Academy of Engineering and supported by The Grainger Foundation and the National Science Foundation.

Rosa Krajmalnik-Brown, professor, has been selected as a **Fulton Entrepreneurial Professor** for a one-year period April 1, 2022-March 31, 2023. The Fulton Schools of Engineering seeks to build a culture amongst its faculty that enhances the translation of its innovations and the impact of its creative activities on the economy. To this end, this competitive appointment supports faculty members' efforts as they relate to technology and product commercialization and the start-up of new companies. Fulton Entrepreneurial Professors are appointed for one- to two-year terms and may re-compete for subsequent appointments.



Rosa Krajmalnik-Brown

Advancing Our Students



Constructing a legacy

Core values of collaboration, partnership and entrepreneurship drive the success of the Del E. Webb School of Construction

The construction industry is poised to grow dramatically during the next decade. In Arizona, there is demand for every type of structure from affordable houses to large industrial complexes, not to mention roadways and bridges needed to serve everyone now calling Arizona home. For those buildings to take shape, there is a connected demand for skilled trade workers and construction management personnel who are vital to each project's success.

Anthony Lamanna, the **Del E. Webb School of Construction Programs Chair** and Sundt Professor of Alternative Delivery Methods and Sustainable Construction, says the unique collaboration between the School of Sustainable Engineering and the Built Environment and the Del E. Webb School of Construction enables faculty, students, alumni and industry partners to address and solve issues related to the construction and sustainability of the built environment in our communities, both locally and globally.

Since accepting the position with the Del E. Webb School of Construction, he has seen a tremendous amount of growth in the program and has led the effort for the programs to gain accreditation through the American Council for Construction Education, or ACCE, and the Accreditation Board for Engineering and Technology, or ABET — A meticulous process that he says he has grown to understand while serving as an external program evaluator for both organizations.

The Del E. Webb School of Construction has seen thousands of students graduate from its construction management and technology program since it was established under that name in 1992. Arizona State University has offered construction management classes dating back more than 50 years.



Anthony Lamanna

Advancing Our Students



Civil engineering junior **Susanna Westersund** is making concrete more sustainable and reducing plastic in landfills by developing a method to replace some of the carbon-emitting cement with plastic waste. Westersund is conducting this research with her faculty mentor, Assistant Professor **Christian Hoover**.

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



Dominic Varda is an environmental engineering senior and FURI researcher studying electrochlorination with **Sergi Garcia-Segura**, an assistant professor of environmental engineering. This water disinfection method can be used on-site for long-term use in residential areas that lack access to fresh water. Varda is investigating how different materials affect decontamination performance.

Student Honors and Awards



Zhaocheng Wang

Monitoring the impacts of Arizona's drought

Babbitt Center for Land and Water Policy awards fellowship to ASU student to support research

Entering 2022, more than half of the state remains in severe drought status and another 10% is enduring extreme drought.

These conditions drive the research of doctoral student Zhaocheng Wang, who is studying hydrosystems engineering in the School of Sustainable Engineering and the Built Environment.

Wang's dissertation research focuses on combining modeling tools and earth observation products to better understand hydrological processes in the Southwestern United States. He has dedicated part of his dissertation research to determine the impact of the Colorado River drought on the people who live and work in Arizona.

Wang was one of four students from across the U.S. and Mexico named as a 2022 Babbitt Center Dissertation Fellow by the Lincoln Institute's Babbitt Center for Land and Water Policy, a leading nonprofit foundation supporting research and preservation of the Colorado River Basin.

The Babbitt Center Dissertation Fellowship recognizes the work of outstanding doctoral students, provides a \$10,000 stipend and allows access to a wealth of resources including collaboration with other researchers to support their efforts.

International ASU grad uses experiences to undo waste

During her time at Arizona State University, **Nivedita Biyani** won a \$150,000 award with her principal investigator **Rolf Halden** for the nonprofit startup OneWaterOneHeath, which tested for COVID-19 in wastewater. This led to a \$1 million award from the Rockefeller Foundation to help the Navajo Nation deal with COVID-19.

Following graduation, Biyani plans on pursuing her dream of undoing waste and landfills by working in the recycling industry.



Nivedita Biyani

Annual ASCE Intermountain Southwest Symposium Student Conference



On April 13th, 33 members of **ASU's ASCE student chapter** departed to the University of Nevada, Las Vegas to participate in the annual **Intermountain Southwest Symposium** to compete against 12 other universities from AZ, UT, NV, ID.



Photo:
Adobe
Stock

The **steel bridge team** displayed their rainbow prototype, keeping to the theme-the most visually interesting of the competing bridges by far.



The concrete canoe teams traveled to Lake Mead for the day's events. In the **women's slalom** and **women's speed events**, the team **placed second** of nine teams. In the **men's slalom** and **men's speed** events as well as the **four-person co-ed**, the teams **placed first in all three**.



The Timber-Strong team built the structure in just 1.5 hours. Prior to the conference, the team pre-fabricated and painted the walls.

ASU received the following awards:

- Concrete Canoe, 3rd place Overall
- Timber-Strong, Best BIM Model
- Sustainable Solutions, 2nd Place Overall
- Best Chant ("ASU! ASU!")
- See the [linked video](#), filmed and edited by Jo Miguel, for a race day recap.

Student Honors and Awards

2022 Outstanding Graduates



Marshall Decker
*BSE construction
engineering*



Alexander Owen
BSE civil engineering



Smith Pittman
*BSE environmental
engineering*



Gabriel Roman
BSE civil engineering



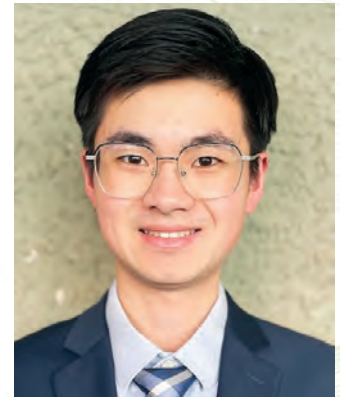
Connor Semenko
*BS construction
management and
technology*



Sydney Wickman
*BSE environmental
engineering*



Brenna Windish
*BS construction
management and
technology*



Yizhou Xiao
*BSE construction
engineering*

Leadership and Service Awards

Jill Barcena
Hannah Collins
Brandon Cruz
Alison Gieselman
Kevin Perreault
Suraya Sidique
Maxwell Silvermann
Sophia Smith
Boderik Thorson
Joseph Todsen
Morgan Wilson

4.0 Awards

Coleen Jillian Barcena
Grant Brown
Percy Escobar Coppia
Brandon Cruz
Veronika Dreeva
Jacob Moore
Alexander Owen
Kevin Perreault
Connor Semenko
Joseph Todsen
Sydney Wickmann
Morgan Wilson
Benna Windish
Wyatt York

Engineer-in-Training Certification

Andrea Amavisca
Coleen Jillian Barcena
Ryan Candell
Claire Casebolt
Adam Daigle
Ryan Dees
Nicholas Eddington
Alison Gieselman
Emmanuel Gozah
Tessa Hannah
Kyle Janes
Kyle Johnson
Morgan McRae
Nathan Morriston
Alexander Owen
Wyatt Reinke
Valentina Rivera
Brandon Rudolph
Steven Sanders
Andrew Thran
Joseph Todsen
Hannah Van Gerpen
Jack Whitley
Morgan Wilson
Cutter Zaugg

Amber Neal

Microbial Induced Corrosion of Various Materials in a Reclaimed Water System

Chair: Morteza Abbaszadegan

Bitu Kolahi Kouchaki

Temperature on Biofilms and Legionella Growth and Electrochlorination in Different Pipe Materials

Chair: Morteza Abbaszadegan

Rayanna Pearson

Measurement and Variability of Crude Urease Enzyme for Enzyme Induced Carbonate Precipitation (EICP) Applications

Chair: Edward Kavazanjian

Ethan Howley

Function, structure, and gene expression in electroactive bacteria

Chair: Cesar Torres & Rosa Krajmalnik-Brown

Jiawei Lu

Connected and Automated Mobility Modeling on Layered Transportation Networks: Cross-Resolution Architecture of System Estimation and Optimization

Chair: Xuesong Zhou

Yuta Kaneko

Moisture-Controlled CO₂ Sorption and Membranes Actively Pumping CO₂

Chair: Klaus Lackner & Matthew Green

Vinaykrishnan

Lakshminarayanan

Fundamental Studies on Enzyme Induced Carbonate Precipitation

Chair: Edward Kavazanjian

Austin Olaiz

A Bayesian Forecast Model for the Climatic Response of Unsaturated Soil

Chair: Claudia Zapata

Nivedita Biyani

Solutions for Sewage Sludge Reclamation and Plastic Pollution Reduction

Chair: Rolf Halden

Srivatsan Mohana Rangan

The Chemical and Microbial Interface of Bioremediation of Organic and Inorganic Pollutants

Chair: Anca Delgado & Rosa Krajmalnik-Brown

Carlos Javier Obando Gamboa

Development of a Novel Aerogel-Based Modified Bituminous Materials

Chair: Kamil Kaloush

Seng Hkawn N-Sang

Evaluating the Effectiveness of a Pavement Preservation Program: A Case Study

Chair: Kamil Kaloush

Vartenie Aramali

Improving the Maturity and Environment of Earned Value Management Systems (EVMS) Leading to Enhanced Project and Program Management Integration and Performance

Chair: Edd Gibson

Yihao Luo

Catalytic and Biological Synergistic Treatments of Persistent Halogenated Organic Pollutants (HOPs)

Chair: Bruce Rittmann

Michael Edgar

Phosphate and Nitrate Removal from Impacted Water by Combined Physical-Chemical and Microbiological Transformations

Chair: Treavor Boyer

Kieren McCord

Augmented Reality for Simulating Authentic Learning in Construction Education

Chair: Steven Ayer

Sangeet Adhikari

Tracking Chemical Markers to Inform Population Health using Wastewater-based Epidemiology

Chair: Rolf Halden

Xin Guan

Defining a roadmap towards a more sustainable food-energy-water (FEW) nexus in the Phoenix Metropolitan region through integrated modeling

Chair: Giuseppe Mascaro

Joshua Steele

End of life analysis and solutions for dealing with sewage sludge and plastic waste

Chair: Rolf Halden

Mohammad Mosawi

Improved Analysis of the Influence of Subgrade Soils Susceptible to Shrink/Swell on Pavement Performance

Chair: Claudia Zapata

Adil Mounir

Quantifying the Synergies in the Water-Energy Nexus Generated by Renewable Energy in a Water-Limited Metropolitan Region through Integrated Modeling

Chair: Giuseppe Mascaro

Ashish Shrestha

Advances in Urban Flood Management: Addressing Data Uncertainty, Data Gaps and Adaptation Planning

Chair: Margaret Garcia

Derek Hillestad

Building Owners and Managers Organizational Maturity Self-Assessment for a Facility Condition Assessment Program

Chair: Kenneth Sullivan

2022 Scholarships and Fellowships

Abdelkarim, Kareem Moawia

Robert H. Johnson
Scholarship

Aden, Katelin

Martin H. Rosness
Memorial Scholarship

Allison, Shalee Elaine

Advancing Women in
Construction, Daniel
Mardian Sr., Native
American Construction
Scholarship

Allred, Derek Cordon

DI Withers Scholarship

Alothman, Saleh Ibrahim

Matthew Witczak
Scholarship

Andaya, Cleo

CEAS-DEW
Construction, Opus West
Scholarship

Askren, Avery Anne

Jan Tuma Scholarship,
Kaloush Family
Scholarship

Barrington, Zachary Scott

Desert Start Luxury
Home Scholarship

Batarseh, Sana

Betty Hum Graduate
Assistant Scholarship

Beheshti, Masih

Matthew Witczak
Scholarship

Bhavaraju, Pranav Anandasai

W.L. Gore
Undergraduate
Scholarship

Birker, Caleb Patrick

Jerry King Memorial
Scholarship

Blakley, Colton

AGC Student Chapter

Borgman, Harrison James

John G. Colton
Construction

Bowler, Zachary Lee

Briston Veteran
Advancement

Broughtonmoore, Janae Michelle

Olsson Scholarship

Chapin, Olivia Ann

CEAS-DEW
Construction, Terry
Bourland NAMU
Scholarship

Chretien, Heidi A

Advancing Women
in Construction
Scholarship, Del E. Webb
Foundation Women,
Edd & Gail Gibson M&G
Leaders

Cruz Hernandez, Amadeus

Del E. Webb Foundation
Graduate

Curry, Sara Rose

Carl and Jean Wolcott
Scholarship, Stantec
Scholarship

D'Ambrosio, David Ricardo

CEAS-DEW
Construction, DEWSC
Alumni Scholarship

Dangi, Rajesh

Kavazanjian Fellowship

Dharan, Ruhi Lakshmi

W.L. Gore
Undergraduate
Scholarship

Dober, Coral Marie

Charles & Nancy
O'Bannon Scholarship,
Elyse & Paul Johnson
M&G Scholarship

Ellison, William

Native American
Construction Scholarship

Fajen, Patrick

Ben C. Griggs
Memorial, CEAS-DEW
Construction

Flores, Andrea

AGC Student Chapter,
Dennis Conway
Scholarship

Fu, Tiffany Andrea

Olsson Scholarship

Garcia, Erica Eliana

Anderson Family
Scholarship

Gardnerjordan, Olivia Agnes

Advancing Women in
Construction Scholarship

Gastelum, Hernan J.

Aspe/David Clifton
Memorial Scholarship

Goodin, John Lawrence

Robert H. Johnson
Scholarship

Hall, Ashley Nicole

Rod J. McMullion
SRP Water Resource
Scholarship

Hampton, Brooke

Advancing Women in
Construction, Marvin
Sheldon Memorial

Hannah, Tessa J

Amy Geiser and Kent
Geiser Honorary
Scholarship

Haslett, Andrew Rainier

Frank Chandler
Memorial Scholarship

Hinsberg, Katrina

L.C. Jacobson Grad
Fellowship

Huerta McWhirter, Robert Anthony

Jan Bennett Endowed
Scholarship

Huerta, Aaron Micheal

Associated Minority
Contractor

Jablonsky, Matthew Jason

Jim Bebout Memorial
Scholarship

Jigayo, Robsan Tashome

Ames Family Scholarship

Jurczak, Edward Alois

Matthew Witczak
Scholarship

Keith, Aidan James

Pisarcik Scholarship

King, Jacqueline K

Advancing Women
in Construction
Scholarship, Robert H.
Johnson Scholarship

Klunker, Madison Helen

Frank Chandler
Memorial Scholarship

Knape, Mason

CEAS-DEW
Construction, FNF
Construction Award

Kopitske, Jacob Ryan

Jason Mc Elroy
Memorial, Kitchell
Leadership Award

2022 Scholarships and Fellowships

Kronert, Nathaniel Jack

Andrew Hanneman
Scholarship

Laplace, Cecilia A.

Peter E. Crouch
Excellence Fund

Lima, Karen Janira

CFMA / Joseph J
Quigley Memorial
Scholarship

Long, Leonard

Del E. Webb Foundation
Scholarship, Native
American Construction
Scholarship

Lucas, Kevin Benjamin

CEAS-DEW
Construction
Scholarship, Eric
and Kristina Petrie
Scholarship

**Magallanes Levano,
Julio Cesar**

Mettler Residential
Award

Manago, Lily Elizabeth

Robert H. Johnson
Scholarship

Martinez, Raymond

The Beavers Scholarship

Mata Ortiz, Eder J

The Beavers Scholarship

Medeiros, Rion

DeTommaso Endow/
Eng NAMU, William A.
Pulice Scholarship

Meier, Lukas Donald

The Beavers Scholarship

Mendez, Carlos

Matthew Witczak
Scholarship, Terry
Bourland NAMU
Scholarship

Noel, Abby R.

Anderson Family
Scholarship

Olaiz, Austin H.

Matthew Witczak
Scholarship

Ott, Cameron Jon

Robert J. Wheeler
Memorial Scholarship

**Owen, Alexander
William**

Structural Engineers
Assoc AZ Scholarship

Owusu Sarpong, Eric

Ames Family Scholarship

Page, Boaz David

Team DSC Scholarship

**Perez, Drew
Christopher**

Robert J. Wheeler
Memorial Scholarship

Perry, Aiden Michael

Charles & Nancy
O'Bannon Scholarship

Prey, Haley Lisa

Paragon Structural
Design Scholarship

**Putnam, Marcos
Vincente**

James Grose NAMU
Scholarship

Ramachandran, Sumi

Elyse & Paul Johnson
M&G Scholarship

**Rincon Ramirez,
Benito**

W.L. Gore
Undergraduate
Scholarship

**Roberts, Keaton
Christopher**

Ron Pratte Memorial
Scholarship

Russo, Matthew John

CEAS-DEW
Construction, Pulte
Home Corporation

Saegert, Matthew Ryan

Jan Bennett Endowed
Scholarship

**Sanchez, Meyah
Princess**

Associated Minority
Contractor

**Schmader, Mackenzie
Elyse**

Advancing Women
in Construction
Scholarship, Penta
Building Group
Scholarship

Schranz, Karl Josef

Del E. Webb Finance &
Acct Scholarship

**Schroth, Shelby
Morgan**

Del E. Webb Foundation
Scholarship

**Semenko, Connor
Joshua**

Del E. Webb Memorial
Scholarship

Sheppard, Isaac D.

AGC Student Chapter
Scholarship

Siff, Caleb Hunter

AZ Society of Civil Eng
(AZSCE) Scholarship

Smith, Sophia Kalah

Robert H. Johnson
Scholarship

**Sullivan, Jacob
Michael**

Del E. Webb Memorial
Scholarship

Thomas, Joshua A.

Ben C. Griggs Memorial,
DeTommaso Endow/
Eng NAMU

Thompson, Ryan A.

AGC Student Chapter
Scholarship

**Thorson, Boderik
Krishna**

Advancing Women in
Construction, Kitchell
Leadership Award

Torres, Christian

CFMA / Joseph J.
Quigley

Tripathi, Vedika Haresh

Terry Bourland NAMU
Scholarship

Trommler, Aidan Grant

Rod J. McMullion
SRP Water Resource
Scholarship

Truitt, Cole Andrew

Andrew Hanneman
Scholarship, CEAS-DEW
Construction Scholarship

Vass, Shane

R. Glen Schoeffler
Memorial Scholarship

Warren, Noah Scott

AGC Student Chapter

Wells, Aubrey Lin

CEMEX Scholarship
for AWIC, Dr. Sandra
L. Weber Memorial
Scholarship, James
Grose NAMU
Scholarship

**Westerheide, Joseph
Matthew**

Del E. Webb Memorial
Scholarship

**Williams, Mikaila
Lynne**

Del E. Webb Memorial
Scholarship

Wilson, Emily Marie

Advancing Women in
Construction Scholarship

**Woodford, Makayla
Shea**

Advancing Women in
Construction, Robert H.
Johnson Scholarship

Yazzie, Kaley

PHX/Scottsdale
Groundwater
Scholarship

Research and Innovation

Right: Technicians run pressure checks on the MechanicalTree on March 8 during its installation near the Biodesign C building on ASU's Tempe campus. The large canister forms the base of the tree; when it is fully extended, a column of disks holding "leaves" of a special sorbent material will remove carbon dioxide from passing air to combat global warming at scale. Photo by Charlie Leight/ASU News



Klaus Lackner

Left: MechanicalTree fully extended. Photo by Charlie Leight/ASU News

Right: The blue gantry stands above the base of the MechanicalTree. Photo by Charlie Leight/ASU News



First 'MechanicalTree' installed on ASU's Tempe campus

MechanicalTree, based on the research of ASU engineer Klaus Lackner, will collect carbon from the atmosphere and help fight climate change

Nestled among the sun-lit trees on the east side of Arizona State University's Tempe campus is a different kind of tree. It's a first-of-its-kind mechanical tree, primed to become a major technology in the global fight against climate change. The tree features a metal column and 5-foot diameter disks, with each disk holding six "leaves." If widely deployed, many of these trees could have a positive impact on our planet by mitigating the carbon dioxide in the atmosphere.



The tree is based on the research of **Professor Klaus Lackner**, a founder of the idea of direct air capture for the removal of carbon dioxide from Earth's atmosphere.

When completed and operational, the MechanicalTree at ASU will rise to a height of 33 feet (10 meters) to collect carbon from ambient air. Once loaded with carbon, it will retract into a canister that is 9 feet (2.7 meters) tall, where it gives up the carbon drawn from the air.

Unlike other carbon-capture technologies, this technology can remove CO₂ from the atmosphere without the use of blowers or fans.

This makes it a passive, lower cost and scalable solution that is commercially viable. When deployed at scale, the technology could help humans curb the growing amount of greenhouse gases in Earth's atmosphere and, thus, help to combat the effects of global warming.

The tree on ASU's campus, when operated continually, is expected to remove up to 200 pounds (90 kg) of carbon per day.

ASU researchers raising the quality of recycled steel

Energy conservation and emissions reduction have received increased national and international attention since the **COP26 climate conference** in November. Industrial development and manufacturing are significant contributors to climate change, particularly in the United States where industry and its energy consumption are the largest greenhouse gas emitters.

To help reduce industry's impact, researchers from the **Ira A. Fulton Schools of Engineering** are developing an innovative process to manufacture high-quality steel wires from recycled iron feedstock.

Improving recyclability is one step forward on this path. While a vast majority of the steel in the U.S. is recycled, it is inferior in quality to “virgin” steel from freshly mined materials. Recycled steel often comes from automotive scrap, which contains copper impurities that cause cracking when reused. This can be a problem for certain steel applications, such as the wires used in tires to provide structural strength and support.

Arizona State University researchers are developing an innovative process to manufacture high-quality steel wires from recycled iron feedstock in a project supported by the REMADE Institute, a public-private partnership established by the U.S. Department of Energy dedicated to helping the nation transition to a circular economy. Image courtesy of Shutterstock



Subramaniam Rajan



Narayanan Neithalath

Sridhar Seetharaman, vice dean for research and innovation in the Fulton Schools is developing this process with **Narayanan Neithalath**, a professor of civil engineering whose research focuses on sustainable materials for buildings and infrastructure, and **Subramaniam Rajan**, a professor of civil engineering who works on composite materials and modeling.

Since 2017, REMADE has launched or selected 84 projects, representing \$85.6 million in funding. This project has been allocated \$1.25 million in funding that is cost-shared between REMADE and ASU.



Associate Professor Hasan Ozer is leading the Southwest Pavement Technology Initiative at ASU to connect research faculty and students with industry and agency partners to create the nation's roadways of the future. Photo by Monica Williams/ASU



Doctoral student Nafiur Rahman mixes an aggregate blend with a petroleum-based asphalt in a process that must be performed while a specific temperature is maintained for all ingredients and tools. The blend will then be formed into a compacted cylindrical specimen for testing. Photo by Monica Williams/ASU

Building stronger, more cost-efficient roads

ASU initiative connects faculty and students with industry and agency partners to transform infrastructure costs

Motivated to make a difference, **Hasan Ozer**, an associate professor of civil, environmental and sustainable engineering led the creation of the **Southwest Pavement Technology Initiative**, a pavement research and education alliance headquartered at the Fulton Schools' Pavements Analysis Laboratory. The initiative brings university students and faculty together with industry and agency partners with the goal of creating stronger, more cost-efficient roadways.

"Our nation's highway infrastructure is aging, under stress and having to withstand extreme events of ever-increasing intensity and frequency," says Ram Pendyala, director of the School of Sustainable Engineering and the Built Environment. "Dr. Ozer's visionary leadership in establishing the Southwest Pavement Technology Initiative is commendable and will help engineer more sustainable and durable pavements of the future."

Projects taken on by the initiative follow a three-step process. First, researchers and industry partners identify a problem. Second, faculty members guide research conducted by students to address the problem before they present the results to partners so that it can be used in the real world.

"The dynamic and collaborative environment fostered by the initiative has already started having a direct impact on students' learning and research experience," Ozer says. "There have been many opportunities for active involvement of undergraduate and graduate students in the initiative while interacting with industry and government agency partners."

What will it take to grow food on Mars?

Anca Delgado says microorganisms and bioremediation could make the red planet's soil usable

From a sci-fi novel to a research reality, Anca Delgado says her newest project could change the course of space exploration by human astronauts.

Delgado, an assistant professor of environmental engineering in the School of Sustainable Engineering and the Built Environment, recently earned a \$1.9 million **Emerging Frontiers in Research and Innovation Grant**, or EFRI grant from the **National Science Foundation** with co-funding from **NASA**. The project looks to address a critical aspect of traveling to far-off planets: a sustainable food source.

With travel to Mars becoming a possibility in the next decade or two, Delgado says her focus has landed on a major issue scientists face.

"The soil-like material right now on Mars contains a chemical called perchlorate, which on Earth is a contaminant," says Delgado, who also holds a faculty appointment in the Swette Center for Environmental Biotechnology in ASU's Biodesign Institute.

"The concentration of perchlorate in Mars' soils is of a magnitude higher than anywhere on Earth. So, this chemical can have a substantial negative effect on human health if food is grown in it and consumed."

"On Earth, microorganisms have no problem taking perchlorate and using it for their metabolism to grow and get energy," Delgado says. "They are doing what is called a respiration reaction which leads to remediation of perchlorate because the microorganisms convert that perchlorate to non-toxic byproducts."

In the case of remediating Mars' soil, she says the microorganisms would use perchlorate as a resource, producing water and chloride from it. Compared with other food growing operations, the bioremediation process being tested does not require extra resources that are either scarce on Mars or would be a burden to transport there.

Photo: Adobe Stock

Anca Delgado (left) has a background in researching effective ways of removing contaminants from soils and water using microorganisms. Photographer: Roman Synkevych/Unsplash



The project will use a Martian regolith simulant and then perchlorate salts will be added to replicate the chemical composition of the ground covering found on Mars.

A team of experts

Partnering with Delgado is a team of interdisciplinary researchers from around the country. They include **Andrew Palmer**, an associate professor in ocean engineering and marine sciences at the Florida Institute of Technology, **Malak Tfaily**, an associate professor in environmental science at the University of Arizona, and **Timiebi Aganaba**, an assistant professor of space and society in the **School for the Future of Innovation in Society** at ASU.

Jean Larson, an associate research professor in the School of Sustainable Engineering and the Built Environment, will also be providing support to advance education and outreach activities related to the project. One postdoctoral researcher, three graduate students and several undergraduate students from all three participating universities will engage in the Mars soil-growing mission.



Anca Delgado graduated from ASU with her doctorate in microbiology. After spending time as a postdoctoral research associate she became an assistant professor in 2017.



Thinner, lighter, cleaner

The Walton Center's specialized concrete “shell” provides sustainable, energy efficient research facilities

The ***Rob and Melani Walton Center for Planetary Health's*** mission is reflected in its building: a purposeful integration of innovative and sustainable design, architecture, engineering and construction. One of the most specialized components is the building's visually compelling edifice. Covered with hundreds of large, overlapping, asymmetrical chevron shapes made of specialized concrete, the “shell” resembles a pattern one might see in nature, such as an exoskeleton or scales.



Barzin Mobasher

Barzin Mobasher, a professor of civil and environmental engineering, is one of the skilled professionals who helped create the Walton Center's impressive building. Mobasher had a role in selecting the glass-fiber-reinforced concrete panels that form the building's shell and help to make it energy efficient. Other contributions by Mobasher became key components of the building's structural resilience and overall environmental sustainability.

The Walton Center, previously known as ***Interdisciplinary Science and Technology Building 7 (ISTB7)***, was designed to meet LEED Gold standards, and will house a few sustainability-related units from across ASU. Several Fulton Schools engineers who hold dual appointments with the School of Sustainability, the Global Institute of Sustainability and Innovation and the College of Global Futures will conduct research in this advanced multidisciplinary center.



Subramaniam "Subby" Rajan, a civil engineering professor has conducted a number of material testing studies on items such as jet engines and bulletproof vests. Now he is turning that attention to human bones.

Fracturing bones and traditional views of civil engineering

Ira A. Fulton Schools of Engineering researchers and graduate students assist Mayo Clinic in studying fracture patterns in human femurs

When most people think of civil engineering, images of construction sites, bridges and tunnels will likely come to mind. However, a recent collaboration between Arizona State University and Mayo Clinic is placing civil engineers in a new light.

"There is a huge world out there where engineers can use their skills in areas that are traditionally not associated with civil engineering," says **Subramaniam "Subby" Rajan**, a civil engineering professor in SSEBE.

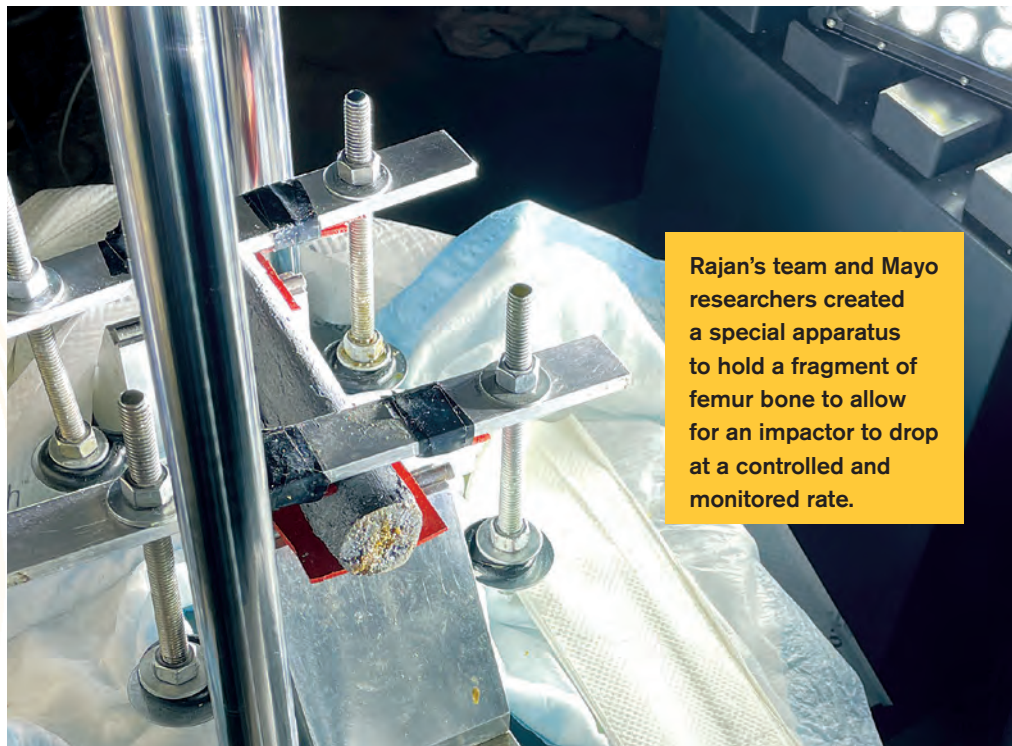
Putting that concept to the test, Rajan has spearheaded a number of projects in the School of Sustainable Engineering and the Built Environment, with private companies such as Honeywell and Raytheon, and government organizations such as the Federal Aviation Administration and NASA. He has aided in the materials testing of everything from jet engines to bulletproof vests — efforts that have not only expanded his knowledge of civil engineering, but also that of his students and research assistants who get to participate in the studies as well.

In his latest research project, Rajan is using his civil engineering expertise to help forensic researchers draw more accurate conclusions about the impact of trauma made on the human body.

Interdisciplinary research

With a long track record of applying civil engineering mechanics to diverse research projects, Rajan was contacted by researchers at Mayo Clinic in Arizona. The team is actively working on a project that could redefine the process for identifying trauma made to human remains.

More specifically, the research could allow forensic anthropologists to determine the time at which blunt force trauma may have occurred to a human body with greater precision and, ultimately, if the trauma played a role in a person's death.



Rajan's team and Mayo researchers created a special apparatus to hold a fragment of femur bone to allow for an impactor to drop at a controlled and monitored rate.



What's in wastewater can point the way to better protecting public health, say environmental engineers and scientists who have been advancing the field of wastewater epidemiology. Experts emphasize how meticulous monitoring and testing of wastewater is helping communities detect the outbreak and spread of disease and reveal other information about potential health threats among local populations. Photo: Pixabay

Urging universal use of wastewater surveillance

The Rockefeller Foundation, a supporter of ambitious efforts to promote “the well-being of humanity throughout the world,” is already convinced of the potential for wastewater research, monitoring and analysis to make our future healthier and safer.

The philanthropic organization has kicked off a major advocacy campaign to help trumpet a recent call from top researchers to bring the growing benefits of wastewater surveillance to all of the planet's population.

In a recently published commentary in the research journal *Nature Medicine* the researchers explain how wastewater surveillance can aid the cause of public health. They describe how it can reveal the presence and track the accumulation and spread of pathogens — microorganisms like bacteria and viruses that can cause disease.

Among the authors are three Arizona State University researchers, Professor **Rolf Halden** and Assistant Professor **Otakuye Conroy-Ben**, both members of the faculty of the School of Sustainable Engineering and the Built Environment, and Assistant Research Scientist **Erin Driver** with the Center for Environmental Health Engineering, directed by Halden, in ASU's Biodesign Institute.



Rolf Halden



Otakuye Conroy-Ben



Rosa Krajmalnik-Brown, Professor and Director Biodesign Center for Health Through Microbiomes.

Research has implications for improving gut-brain communication

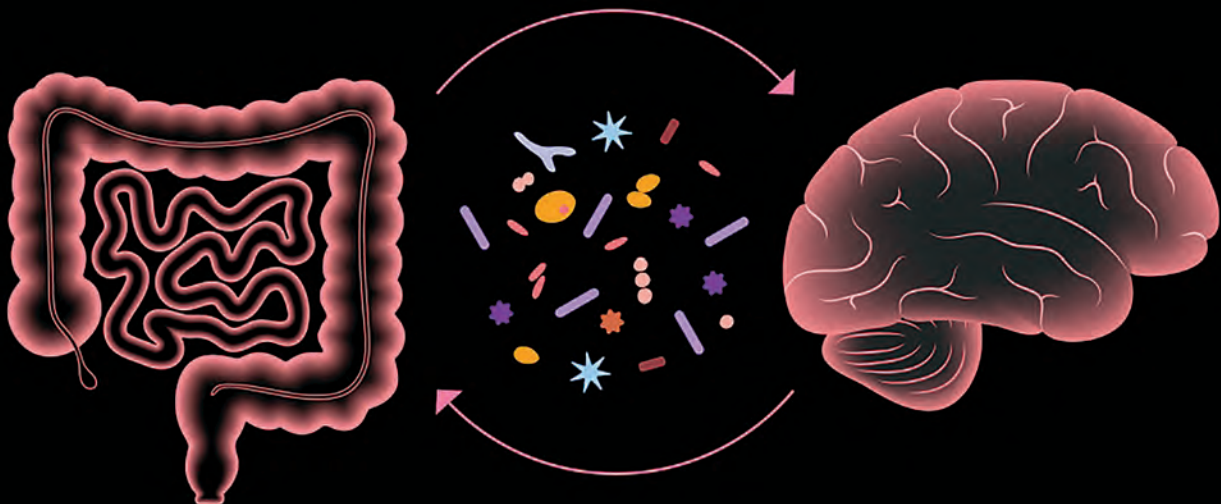
Autism spectrum disorder currently affects one in 44 children in the U.S., according to the Centers for Disease Control and Prevention. For reasons that remain murky, these numbers appear to be trending upwards as researchers and clinicians struggle to find effective treatments.

Recently, a new approach to treat symptoms associated with this disorder has emerged, thanks to the explosion of research on the trillions of nonhuman cells inhabiting the gastrointestinal tract — collectively known as the gut microbiome. The treatment, called microbiota transfer therapy, is a process where healthy gut bacteria are transferred to children with autism.

In a new study, Arizona State University researchers and their colleagues deeply explore changes in the gut microbiota following microbiota transfer therapy.

The results showed considerable improvement in overall abundance of bacteria following the microbiota transfer therapy, and this confirmed previous findings. Also, there were substantial increases in populations of beneficial bacterial species typically found in lower numbers in children with autism.

The findings are encouraging because the severity of gastrointestinal dysfunction in autistic children appears proportional to the degree of behavioral and cognitive issues, highlighting the importance of the gut-brain axis — a topic of intense interest in the world of microbiomics. The gut-brain axis is the communication system between your brain and your gut.





Matthew Fraser

Photo: Adobe Stock

ABOR funds to support new research into Valley fever detection technology, genomics, seasonal outbreak patterns in tri-university partnership

The Valley Fever Collaborative, a University of Arizona Health Sciences-led partnership with Arizona State University and Northern Arizona University, was awarded \$3.1 million in funding by the Arizona Board of Regents to start an integrated, statewide research project to identify, characterize and map hot spots and routes of exposure for Valley fever.

The funding is part of several Regents Grants announced April 8 by ABOR, for universities and state agencies to work together to unlock solutions to pressing challenges in Arizona.

Valley fever is an infectious disease that affects thousands of people in Arizona every year. It is caused by *Coccidioides posadasii*, a fungus that lives in the soil of areas with hot summers, mild winters and little rainfall, such as the Southwest. Fungal spores can be readily inhaled, which is how most Valley fever infections are believed to occur. Yet the amount of fungal burden in the soil and air, the degree to which these fungal spores travel, and the potential for new areas to be colonized with the organism are currently unknown.

Six individual projects will take place using funding provided through Arizona's Technology and Research Initiative Fund.

One of those projects **"Environmental detection, modeling and genomics of Valley fever in Arizona"** will be led by **Matthew Fraser**, a professor in the School of Sustainable Engineering and the Built Environment and **Pierre Herckes**, a professor in the School of Molecular Sciences. Fraser and Herckes will lead a project to collect and analyze particles in the air at locations near Valley fever hot spots to determine the physical and biological characteristics of particles and understand the nature of airborne transmission.

The projects are funded for three years as part of the Valley Fever Collaborative, a statewide network designed to facilitate collaboration and solve what is an important public health and economic problem in the Southwest.



Ram Pendyala

What will it take for people to choose sustainable modes of transportation?

In the recently enacted **Bipartisan Infrastructure Law** more than \$550 billion has been earmarked for transportation infrastructure projects across the United States. That includes a large portion for the improvement and development of new transportation modes that are more sustainable — such as mass transit.

Currently, travelers spend multiple hours per week in their personal vehicles driving to and from work, school or other locations. The goal of the planned investments in new transportation modes is to reduce the number of personal vehicles on the road to alleviate their environmental impact.

Ram Pendyala, professor and director of the **School of Sustainability and the Built Environment**, teamed up with professor **Chandra Bhat** and his research group at the **University of Texas at Austin**, to investigate why

people travel the way they do and what it would take to get them to choose public transportation and other alternative modes instead of driving themselves.

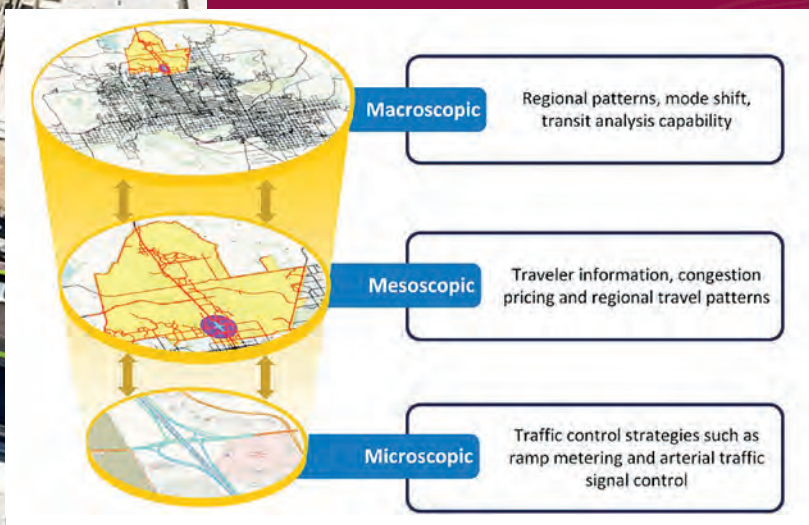
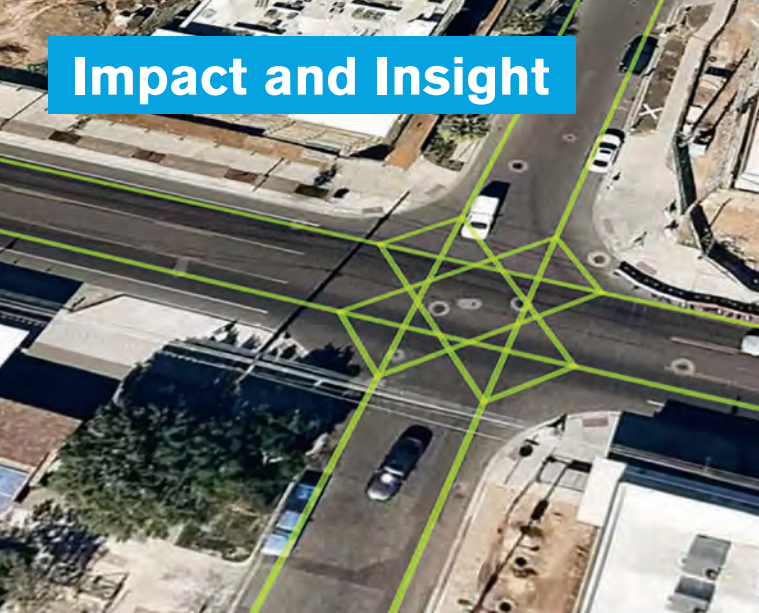
The results of their investigation are documented in **“The Influence of Mode Use on Level of Satisfaction with Daily Travel Routine: A Focus on Automobile Driving in the United States,”** a refereed article that was published in *Transportation Research Record: The Journal of the Transportation Research Board*, by SAGE Publishing.

Based on the study and evidence to date, it is clear that two conditions have to be met for significant shifts in mode use to occur. First, transportation alternatives need to be super competitive and comparable to the automobile in terms of level of service. Second, the use of automobiles needs to be made burdensome through restrictive and punitive measures such as tolls and fees, parking restrictions and limiting roadway capacity.

The group felt greater progress in reducing vehicle use can be achieved through coordinated land use — transport planning and zoning policies that promote high density, mixed-use developments characterized by walkable, transit- and bicycle-friendly environments. This will allow people to reach a large variety of destinations without having to travel by car. Also, the carbon footprint of personal automobile travel can and should be reduced through an aggressive campaign to accelerate transportation electrification, enabled by incentives and the widespread deployment of electric vehicle charging infrastructure.

Hundreds of billions of dollars are set to be spent building up existing infrastructure across the United States including mass transit systems in hopes of providing more sustainable transportation options. Photographer: Aleksejs Bergmanis/Pexels

Impact and Insight



Xuesong Zhou, an associate professor of civil and environmental engineering, has spent a majority of his career working to create a universal mapping system for transportation researchers to use to look at the multiple levels of interaction that happen between cars, bikes and pedestrians in complex networks. Image courtesy of Xuesong Zhou/ASU

Zhou's universal mapping system allows researchers to model transportation systems at multiple scales. Graphic courtesy of Xuesong Zhou

The transportation equation

ASU researcher Xuesong “Simon” Zhou creates an open-source mapping system to streamline transportation modeling research

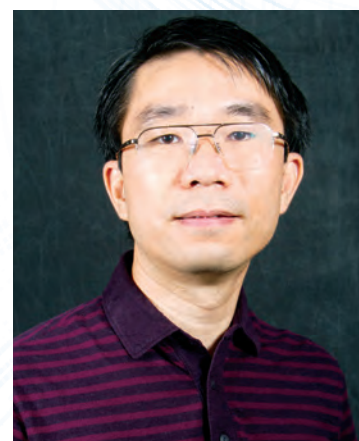
Xuesong “Simon” Zhou says there are several variables that make up his vision for an ideal transportation system of the future. First is creating a carbon neutral environment by 2050. The second involves improving access to transportation for disabled, low-income and other minority groups to create equity with the driving population. These are not easy feats on their own and for these changes to be effective, they must happen at the same time. This presents even more of a challenge for transportation researchers like Zhou.

Before 1940, walking, bicycling and public transit were recognized as important travel modes, but for most of the last century, transport planning has been automobile oriented. As a result, most communities now have well-developed road systems that allow motorists to drive to most destinations safely and with relative convenience; at worst they may be delayed by peak period congestion or pay tolls and parking fees at some destinations. However, such planning ignored the needs of people who use non-automobile travel modes.

Zhou was recently elected to the national executive board of the Zephyr Foundation for Advancing Travel Analysis, a non-profit organization dedicated to advancing the science of transportation modeling in an open and collaborative ecosystem.

Zhou's multimodal transportation research investigates how various transportation options play an integral role in meeting the mobility needs of the populations that rely on them, how each transit option impacts the usage of other modes of transportation as well as the infrastructure needed to support the multiple transportation options.

The project is called osm2gmns, and is available to professionals around the world at no cost. This is a joint effort with Jiawei “Jay” Lu, a civil, environmental and sustainable engineering doctoral student at ASU, and many others. In addition to creating a standard map for network analysis, Zhou's work allows researchers to model at a more in-depth level than before with multi-level resolution. Using ASU research computing facilities, Zhou's team also created an entire U.S. driving network from OpenStreetMap with 20 million nodes, and the related Python package has been downloaded more than 40,000 times.



Zhou was recently elected to the national executive board of the Zephyr Foundation for Advancing Travel Analysis, a non-profit organization dedicated to advancing the science of transportation modeling in an open and collaborative ecosystem.

Construction management doctoral student Kieren McCord can be seen wearing virtual reality and haptic devices that Associate Professor Steven Ayer utilizes in his classroom to teach students visualization and job safety skills. Photo courtesy of Karan Patil.



Steven Ayer



Using augmented reality to teach real construction

Steven Ayer, an associate professor of construction engineering, found a passion for introducing technologies such as augmented and virtual reality into his construction engineering classwork and even the construction industry. While he started with a backward approach of looking for problems the technologies could solve, his innovative teaching techniques could now lead to a more impactful way of educating the next generation of construction industry professionals.

Augmented reality, or AR, is a way of adding digital elements to a live view, often by using the camera on a smartphone. While it's been available for years, it became popular with the creation of social media tools such as Snapchat filters and mobile device games like Pokemon Go.

On the other hand, virtual reality, or VR, is an experience that seeks to place an individual in an entirely virtual world. This immersion is typically accomplished through the use of VR goggles or a headset.

Over the years, Ayer has come to identify two major challenges AR and VR technology can help students face when it comes to construction education and entering the workplace.

The first is visualizing design concepts from two-dimensional plans that represent a three-dimensional space. The second challenge Ayer says he wants to improve is job site safety.

Ayer sought to create an experience for students that balanced real-life decisions with the dangerous outcomes created by mistakes.

He says showing the impact is accomplished through the use of slow-motion video or animations. In addition, the negative effects never impact the AR user, but another character within the virtual environment.



Brianne Arviso (at right) is a member of the Navajo Nation, originally from Iyanbito, New Mexico. She is Tabaaha (Waters Edge Clan) born from the Kinyaa'aanii (Towering House People). Arviso is pictured at the Ira A. Fulton Schools of Engineering Spring 2022 Convocation ceremony with her doctoral studies advisor, Associate Professor Kristen Parrish, the construction graduate studies program coordinator in the Del E. Webb School of Construction. Photographer: Erika Gronek/ASU

Breaking new ground

One of few Native American women with an advanced construction degree could help enrich the industry's cultural landscape

Brianne Arviso signed up as a business management major, with the idea of seeking a career in leadership positions. But after a year in the program an academic advisor talked to her about something she had somehow remained unaware of — specifically, the **Del E. Webb School of Construction** within the **School of Sustainable Engineering and the Built Environment**.

A few years later, Arviso had both a bachelor's degree in construction management and on-the-job experience working part-time for a few Phoenix-area building contractors. After graduation, she got a full-time position with a leading construction company in the Southwest, **Kitchell Corporation**.

Arviso recalls how a former teacher, **William Badger**, today a Fulton Schools emeritus professor, encouraged her to pursue a doctoral degree. She graduated this past spring as one of the Fulton Schools' honored doctoral degree recipients — and more significantly as one of the very few Native American people to attain such a high level of academic achievement in the construction field.

Now, in her work for Arviso Construction's commercial ventures, she can contribute to planning, budgeting, cost projection, labor management, design and related architectural styling, as well as scheduling and overseeing day-to-day building operations.



Isha Mehta-Mora, a 2012 SSEBE graduate, appeared on the Fall 2022 cover of Woman Engineer.

Isha Mehta-Mora, PE, is a senior project engineer with a focus in design integration for general field operations at DPR Construction where she is also a member of the Southwest Design Integration Management group and the DPR Southwest Women's Group.

Her path to DPR and her current position began in 2012 when she first learned about the company and its new environmentally friendly building via the U.S. Green Building Council (USGBC). Now in her current role as a senior project engineer at DPR Construction, Mehta-Mora meets with design partners to make certain of projects' design intent and collaborates with trade and design partners to support construction activities.

Outside of DPR, Mehta-Mora is a member of the Structural Engineering Association (SEA), National Organization of Minority Architects (NOMA), and American Institute of Architects (AIA).

A legacy built on love of construction



The late Arizona State University graduate **George J. Graef Jr.** is pictured with two other ASU alumni, his daughters **Jill Graef** (left) and **Julie Golladay** (right). Photo courtesy of the Graef family.

In the more than 50 years since graduating from ASU, **George J. Graef** succeeded as a business owner, community leader, education advocate and family man

George J. Graef Jr., known to friends and business associates by his nickname, Jay, passed away November 17, 2021, at age 74. He began working in his chosen profession at 22, soon after his graduation in 1970 with a degree in construction from Arizona State University.

Graef was actively involved in the construction industry community throughout his career. For 20 years, from 1992 to 2012, he served on the Del E. Webb School of Construction's alumni board, including a

long stint as its president. He also organized the annual golf tournaments, which raised money for the school.

In 2004, he was named to the school's ***Academy of Distinguished Alumni*** for his career achievements and community service. The honor recognizes outstanding alumni who "embody the spirit of the New American University and who show excellence in their professional work as well as compassion and support for their communities."

Graef also served on the board of directors for the Arizona chapter of the **Associated General Contractors**, or AGC, and chaired its education committee for several years.



Throughout their years of academic studies in the Del E. Webb School of Construction, students benefit from what they're taught by faculty associates with extensive industry experience. Pictured left to right: Jesse Pruitt, James Murphy.

Building skills through real-life experience

Construction industry professionals bring industry knowledge to the classroom

The **Del E. Webb School of Construction** has seen tremendous growth in the past five years, both in the number of students seeking a career in the construction industry and in the number of professors and instructors who are teaching the next generation of builders and construction professionals.

In addition to feedback from industry partners on the skills new graduates need to succeed in the construction field, the school has created connections with working professionals. Recognized as faculty associates, they bring tremendous real-world experience to classes in construction management and construction engineering programs.

Two of these faculty associates are **Jesse Pruitt** and **James Murphy**.

Pruitt is a Del E. Webb School of Construction alumnus. He graduated summa cum laude with a construction management degree in 2014 and had the distinction of being selected as the Outstanding Graduate of his construction management class. He currently works as a project manager with **McCarthy Building Companies**. Over his career, Pruitt has had the opportunity to work on 17 different projects, totaling \$650 million.

Murphy started his career with **Willmeng Construction, Inc.** in 1999 after gaining experience with a heavy civil general contractor and a mid-sized commercial contractor. He eventually worked his way up before purchasing the company in 2006. To aid in the management of his company, Murphy earned a master's degree in construction management with the Del E. Webb School of Construction. He now leads a team of more than 300 employees and has guided the firm to tremendous growth through strategic decision-making and a focus on best-in-class culture.



Matt Witczak

1940-2022

"You are indeed the future of the world's infrastructure."

— Matt Witczak,
professor, mentor, consultant

Matthew Witczak was a professor of civil engineering at ASU from 1999 until his retirement in 2011. He came to Arizona after more than a quarter century of teaching and research at the University of Maryland. Earlier in his career, Witczak was a special projects engineer for the Asphalt Institute, an international trade association. He also served as a combat engineer and intelligence officer in the U.S. Army.

Over the course of his career, Witczak received multiple distinguished awards from the Asphalt Institute, the Association of Asphalt Paving Technologists, the National Asphalt Pavement Association, the Transportation Research Board of the National Academies as well as other professional bodies and technical journals.

While at ASU, Witczak founded the Advanced Pavements Laboratory to conduct comprehensive research that has become recognized for its national and international importance. He also led creation of the Arizona Pavements/Materials Conference as a means for academic and industry professionals to discuss advances in design, construction and technology.

In 2017, the Arizona Pavements/Materials Conference organizing committee established the ***Dr. Matthew W. Witczak Endowment*** in his honor to provide scholarships, fellowships and other resources to enhance the academic experiences of those pursuing a career in pavement engineering.

Géza Kmetty

1940-2021

An exemplary engineer and businessman dedicated to nurturing the profession's next generation



In 1965 **Géza Kmetty** earned a degree in civil engineering from Arizona State University. Over the next 50-plus years, until his death on December 12, 2021, at 81, Kmetty would succeed in multifaceted technical and business endeavors and help to make advances in emerging areas of engineering.

He would also nurture new generations of engineers through teaching and mentoring, and through many generous donations to provide resources that have helped to make today's **Ira A. Fulton Schools of Engineering** among the leading engineering schools in the country.

The gifts of his talent, time, mentoring and community leadership had tremendous impact on the future of what today is the **School of Sustainable Engineering and the Built Environment**. Over many years, Kmetty served as an adjunct instructor for civil engineering courses, and many times as guest lecturer in a variety of engineering classes.

He served as president of the Arizona chapter of the American Society of Civil Engineers and on the board of the American Council of Engineering Consultants. He was also a recipient of the Arizona Transportation Legacy award. Kmetty's commitment, combined with his engineering accomplishments, innovations and industry leadership, also made him one of a select few outstanding graduates to be named to the **School of Sustainable Engineering and the Built Environment's Academy of Distinguished Alumni**.

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Friends of Civil & Environmental Engineering

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. Your membership donation and participation in FOCE² will enable the civil engineering program to retain and motivate talented young students to achieve success and further our profession.

2022 FOCE² Members

Alpha Geotechnical, Black & Veatch, Bowman Consulting, Burgess & Niple, Carollo Engineers, CivTech Inc., Coe & Van Loo Consultants, Inc., Dibble Engineering, Entellus, Inc., Gannett Fleming, GHD, HilgartWilson, Kimley-Horn, Olsson, Meyer Borgman Johnson, Prelude Engineering Consultant Services, Speedie & Associates, Terracon, T & S Diversified, Wood, Patel & Associates, Arizona Department of Transportation (ADOT), City of Glendale, City of Phoenix, ASCE (Phoenix Branch).



Major George J. "Jim" Geiser, a long-standing member of FOCE² (Prelude Engineering Consultant Services) and member of the Steering Committee, passed away August 30, 2022. Geiser graduated from Arizona State University in 1977 with a

degree in civil engineering. He also served on the SSEBE Advisory Council and was a Board Member of the Veterans Chapter of the ASU Alumni Association and a driving force behind the installation of the now-dedicated Memorial to Fallen Alumni. In 2018, Geiser received the Distinguished Civil Engineering Alumni recognition from ASU.

We built that.

Del E. Webb
School of Construction



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

As of printing, our IPC consists of:

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Expertise: Health-Related Water
Microbiology



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Allenby**

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PhD, Rutgers University

Expertise: Sustainable Engineering



**Absar
Alum**

Assistant Research Professor

PhD, University of Arizona State University

Expertise: Pollution Science,
Biotechnology



**Jirapat
Ananpattarachai**

Assistant Research Professor

PhD, King Mongkut's university of
Technology Thonburi

Expertise: Environmental Engineering

❖ **New Faculty**



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Ariaratnam**

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Engineering Programs Chair**

PhD, University of Illinois at Urbana-
Champaign

Expertise: Underground Construction



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Ayer**

Associate Professor

PhD, The Pennsylvania State University

Expertise: Visualization Technologies



**Gary
Barras**

**Beavers-Ames Lecturer in Heavy
Construction**

MS, Arizona State University

Expertise: Project Management of Heavy
Construction

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Boyer**

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PhD, University of Florida

Expertise: Water Conservation



**Treavor
Boyer**

**Professor and Environmental
Engineering Programs Chair**

PhD, University of North Carolina at
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Expertise: Water Treatment



**Efthalia (Thalia)
Chatziefstratiou**

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PhD, The Ohio State University

Expertise: Engineering Education



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Chester**

**Professor & Director, Metis Center
for Infrastructure and Sustainable
Engineering**

PhD, University of California, Berkeley

Expertise: Sustainable Infrastructure



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Chong**

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Conroy-Ben**

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PhD, University of Arizona

Expertise: Endocrine Disruption



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Czerniawski**

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modeling of the built environment



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Dahlen**

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Faculty Expertise



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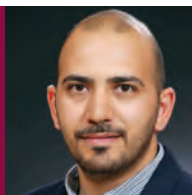


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**Associate Professor and PENTA
Building Group Chair**

PhD, University of Texas at Austin

Expertise: Concrete Materials



**Mahmut
Ersan**

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Expertise: Water Treatment



**Elham
(Ellie) Fini**

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Expertise: Sustainable Materials

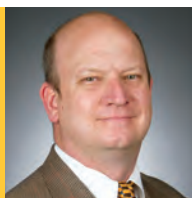


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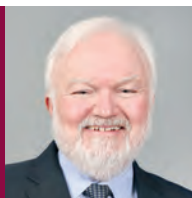


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Expertise: Water and Health



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Industrial Collaboration Director, CBBG**

PhD, Arizona State University

Expertise: Biogeotechnics, Biogeochemistry



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Hamilton**

Assistant Professor

PhD, Drexel University

Expertise: Microbiology and Risk

Faculty Expertise



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Expertise: Fracture Mechanics

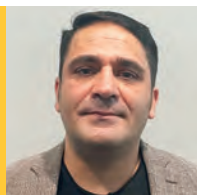


**Kristen
Hurtado**

Assistant Teaching Professor

PhD, Arizona State University

Expertise: Project Management



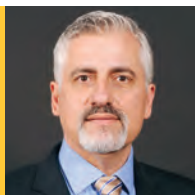
**Mohammad
Wasim Iqbal**

Assistant Research Professor

PhD, Kasetsart University, Thailand

Expertise: Water Engineering

❖ **New Faculty**

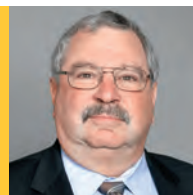


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Kaloush**

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PhD, Arizona State University

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PhD, University of California, Berkeley

Expertise: Geotechnical Engineering

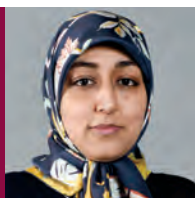


**Hamed
Khodadadi
Tirkolaei**

Assistant Professor

PhD, Eastern Mediterranean University, Cyprus

Expertise: Sustainable Geotechnics

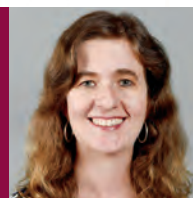


**Sara
Khoeini**

Assistant Research Professor

PhD, Georgia Institute of Technology

Expertise: Transport Modeling



**Rosa
Krajmalnik-
Brown**

Professor and Director, Biodesign Center for Health Through Microbiomes

PhD, Georgia Institute of Technology

Expertise: Microbial Ecology Management



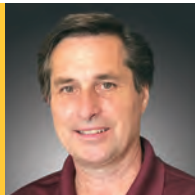
**Saurav
Kumar**

Assistant Professor

PhD, Virginia Tech

Expertise: Water Resources and Remote Sensing

❖ **New Faculty**



**Barry
Kutz**

Assistant Teaching Professor

MS, Arizona State University

Expertise: Preconstruction delivery

❖ **FSE top 5% Teaching Award**

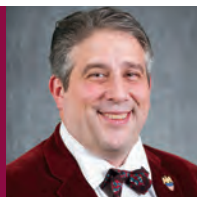


**Klaus
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Professor and Director, Center for Negative Carbon Emissions

PhD, Heidelberg University, Germany

Expertise: Carbon Sequestration

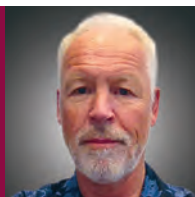


**Anthony
Lamanna**

Associate Professor and Sundt Professor of Alternative Delivery Methods and Sustainable Development, DEWSC Programs Chair

PhD, University of Wisconsin

Expertise: Sustainable Construction

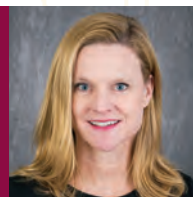


**Peter
Lammers**

Research Professor

PhD, Portland State University

Expertise: Biotechnology & Bioenergy



**Jean
Larson**

Associate Research Professor and Education Director, CBBG

PhD, Arizona State University

Expertise: Engineering Education

Faculty Expertise



**Christopher
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PhD, Arizona State University

Expertise: Geotechnical Engineering



**Yingyan
Lou**

Associate Professor

PhD, University of Florida

Expertise: Transportation Modeling



**Shyamsunder
Loukham**

Assistant Research Professor

PhD, Arizona State University

Expertise: Computational and experimental mechanics



**Michael
Mamlouk**

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

❖ **New Faculty**



**Barzin
Mobasher**

Professor

PhD, Northwestern University

Expertise: Composite Materials



**Rebecca
Muenich**

Assistant Professor

PhD, Purdue University

Expertise: Watershed Modeling



**Narayanan
Neithalath**

Fulton Professor of Structural Materials and Graduate Programs Chair

PhD, Purdue University

Expertise: Materials Science



**Hossein
Noorvand**

Assistant Research Professor

PhD, Arizona State University

Expertise: Pavement materials and characterization

❖ **New Faculty**



**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 and DEWSC Graduate Programs Coordinator

PhD, University of California, Berkeley

Expertise: Construction Management



**Ram
Pendyala**

**Professor and Director of SSEBE
Director, TOMNET University Transportation Center**

PhD, University of California, Davis

Expertise: Transportation Systems



**Francois
Perreault**

Associate Professor

PhD, University of Quebec, Canada

Expertise: Environmental Nanotechnology



**Steven
Polzin**

Research Professor

PhD, Northwestern University

Expertise: Transportation Policy Analyses

Faculty Expertise



**Subramaniam
(Subby) Rajan**

Professor

PhD, University of Iowa

Expertise: Finite Element Analysis
Computational and Experimental Solid
Mechanics



**Jafar
Razmi**

Associate Research Professor

PhD, University of Maryland, College Park

Expertise: Structural Mechanics and
Geotechnical



**Bruce
Rittmann**

**Regents Professor and Director,
Biodesign Swette Center for
Environmental Biotechnology**

PhD, Stanford University

Expertise: Environmental Biotechnology



**Emmanuel
Salifu**

Presidential Postdoctoral Fellow

PhD, University of Strathclyde and
University of Naples Federico II, Italy

Expertise: Biogeotechnical Engineering



**Thomas
Seager**

Associate Professor

PhD, Clarkson University

Expertise: Infrastructure Systems



**Shahnawaz
Sinha**

Associate Research Professor

PhD, University of Colorado-Boulder

Expertise: Drinking Water Treatment



**Richard
Standage**

Assistant Teaching Professor

PhD, Arizona State University

Expertise: Concrete Specialist

❖ **FSE Top 5% Teaching Award**



**Peter
Stopher**

Research Professor

PhD, University of London

Expertise: Transportation Planning



**Kenneth
Sullivan**

Professor

PhD, University of Wisconsin-Madison

Expertise: Procurement and OCM



**Junliang
(Julian) Tao**

Associate Professor

PhD, Case Western Reserve University

Expertise: Bioinspired Geotechnics



**Jeffrey
Vann**

**Beavers-Ames Lecturer in Heavy
Construction**

PhD, Arizona State University

Expertise: Expansive soils, post-tensioned
slabs, unsaturated soil mechanics

❖ **FSE Top 5% Teaching Award**

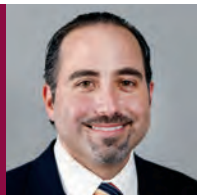


**Leon van
Paassen**

Associate Professor

PhD, Delft University of Technology

Expertise: Geotechnical Engineering



**Enrique
Vivoni**

Fulton Professor

PhD, Massachusetts Institute of
Technology

Expertise: Hydrologic Science



**Kristen
Ward**

Associate Teaching Professor

PhD, University of Arizona

Expertise: Structural Engineering



**Zhihua
Wang**

Associate Professor

PhD, Princeton University

Expertise: Urban Environment

Faculty Expertise



**Paul
Westerhoff**

**Regents Professor and Fulton Chair
of Environmental Engineering**

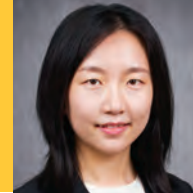
PhD, University of Colorado
Expertise: Water Treatment



**Avi
Wiezel**

**Associate Professor and Assistant Dean
for Facilities**

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



**Tianfang
Xu**

Assistant Professor

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



**Claudia
Zapata**

Associate Professor

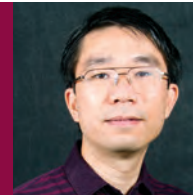
PhD, Arizona State University
Expertise: Unsaturated Soils



**Ruijie
Zeng**

Assistant Professor

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



**Xuesong
Zhou**

Associate Professor

PhD, University of Maryland
Expertise: Multimodal Network Planning

Emeritus Faculty

William W. Badger, PhD

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.

G. Edward Gibson, Jr., professor and Sunstate Chair of Construction Management and Engineering retired December 31, 2022 after 13 years at ASU.

Nasser Hamdan, assistant research professor, left March 25, 2022 after five years at ASU.

Sarah Khoeini, assistant research professor, left August 16, 2022 after five years at ASU.

Yingyan Lou, associate professor, left August 16, 2022 after nine years at ASU.

Jeffrey Vann, Beavers-Ames Lecturer in Heavy Construction, left May 15, 2022 after one year at ASU.

Leon van Paassen, associate professor, left August 16, 2022 after five years at ASU.



SCHOOL OF Sustainable Engineering and the Built Environment

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**SUSTAINABLE
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Fulton Schools of Engineering jumps 9 spots in 2 years in US News rankings

No engineering school in the top 50 of U.S. News & World Report's ranking of undergraduate programs had a more substantial gain in the last two years than the Ira A. Fulton Schools of Engineering at Arizona State University.

Out of 212 universities included in the survey, the Fulton Schools of Engineering now ranks No. 33 overall, and No. 19 among public universities, across undergraduate engineering programs. ASU's engineering school is up three spots from last year's ranking (from No. 36) and has risen nine spots from two years ago (No. 42).

The nation's largest engineering school places 6 undergraduate areas of focus in the top 25

- #18 Civil engineering
- #20 Cybersecurity (computer science specialty)
- #20 Electrical engineering
- #21 Environmental engineering
- #23 Computer engineering
- #23 Mechanical engineering



ASU Ira A. Fulton Schools of
Engineering
Arizona State University

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