



SCHOOL OF Sustainable Engineering and the Built Environment

ASU Ira A. Fulton Schools of
Engineering
Arizona State University

Annual Report
2016

Building A **SUSTAINABLE** Future

Ira A. Fulton Schools Of Engineering

**Dean
Kyle Squires**

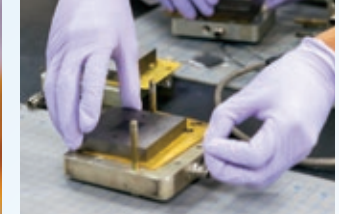
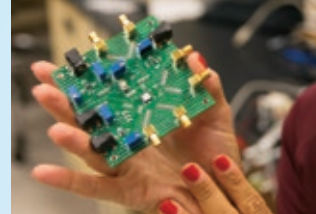
**Transcending
the
traditional**

**Focusing on the
student experience
and student success**

**Inspiring
future
engineers**

**Pursuing
use-inspired
research**

**Attracting
top
faculty**



**school of
sustainable
engineering
and the built
environment**

**School Director
G. Edward Gibson, Jr.**

Biofuels
Waste conversion to energy
Public health-technology-environment interactions
Microorganism-human health connections
Infrastructure and product lifecycle analysis
Earth systems engineering
Water purification
Resource-climate interactions
Indoor air quality
Sustainable Construction
Transportation Materials and Systems
Project Performance
Underground Infrastructure
Construction Management

**school of
computing,
informatics, and
decision systems
engineering**

**School Director
Ronald G. Askin**

Personalized learning
Educational gaming
Energy-efficient data storage and computing
Health informatics
Haptic interfaces
Assisting devices
Health care system logistics
Information assurance
Production logistics
Artificial intelligence
Transportation
Production logistics

**school of electrical,
computer and
energy engineering**

**School Director
Stephen M. Phillips**

Photovoltaics
Power and energy systems
Biosignatures discovery automation
Wireless implantable devices
Sensors and signal processing
Flexible electronics
Power grid management and stability
Sensors and sensing

**school for
engineering of
matter, transport
and energy**

**School Director
Lenore Dai**

Personalized learning
Engineering education
K-12 STEM
Electrical energy storage
Thermal energy storage and conversion
Energy production separations
Therapeutics and bioseparations
Rehabilitation and robotics
Adaptive and intelligent materials
High-performance computing simulations
Atmospheric processes

**school of biological
and health systems
engineering**

**School Director
Marco Santello**

Medical diagnostics
Rehabilitation
Neuroengineering
Biomaterials and therapeutics delivery
Synthetic and systems biology
Healthcare technology

polytechnic campus

**School Director
Ann McKenna**

Air Traffic Management
Air Transportation Management
Applied Science
Environmental Resource Management
Graphic Information Technology
Industrial and Organizational Psychology
Information Technology
Manufacturing Engineering
Professional Flight
Technological Entrepreneurship and Management
Aviation Management and Human Factors
Environmental Technology Management
Global Technology and Entrepreneurship
Management of Technology
Simulation, Modeling, and Applied Cognitive Science, Ph.D.



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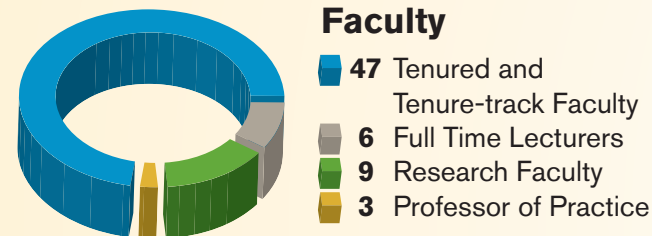
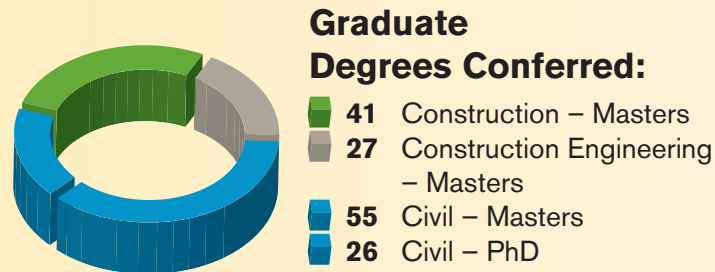
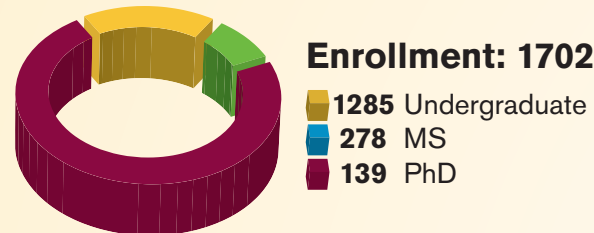
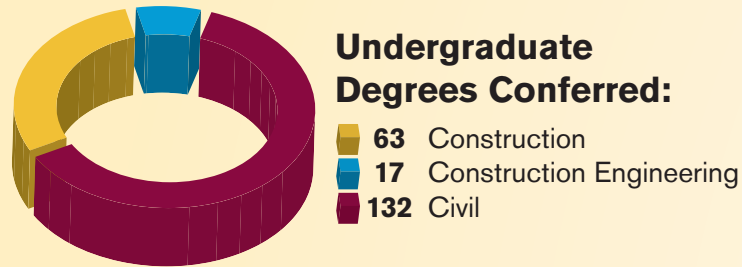
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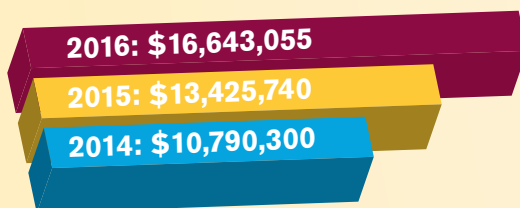
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At A Glance



SSEBE Research Expenditures



Total Scholarships and Fellowships Awarded 2016: \$315,208



National Academy of Engineering Members:

Edward Kavazanjian, Jr.
Bruce Rittmann

National Academy of Construction Members:

G. Edward Gibson, Jr.
William Badger (*emeritus*)

ASU Charter

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**

Greetings! The theme of this year's annual report is **"Building a Sustainable Future."** As you read the articles in this 2016 report, you will see that our faculty, staff and students are truly inventing the future as they pursue many sustainable challenges facing our world. From new sustainable building materials to new ways of creating renewable energy, to improved methods for sustaining business endeavors, to a new discipline called bio-geotechnical engineering, our efforts are making the planet more sustainable. The efforts of our faculty and students outlined in this report are merely a small indication of the many activities that are on-going in our School.

It has again been a successful year for our School. In fall 2016, our enrollment grew to 1702 total students up from 1586 in 2015. Our research expenditures grew to \$16.6 million in 2016 up from \$13.4 million in 2015 and the diversity of our research portfolio continues to grow. We worked hard to develop and deploy a new environmental engineering undergraduate program which will begin offering classes in fall 2017; we feel this is a key factor for our future growth. The number of prestigious awards that our faculty have received in the past year is impressive. None of these accomplishments could have been possible without the great work of our faculty and staff.

Our students continue to demonstrate their prowess, again winning a number of prestigious awards and competing very successfully at regional and national competitions. During 2016, we matriculated 361 graduates with these students going to work for many of the best engineering and construction firms in the country, or opting to attend many outstanding graduate schools nationally and internationally. Our students also engage in helping our local and regional community, and the world in a number of outreach activities.

Our programs attract representatives from many companies locally and nationally as participants in teaching, research and recruiting. As a testament to this interest and involvement, we held several career fairs in 2016, with over 100 companies setting up booths in the new CAVC building, specifically recruiting our students.



Both our civil engineering and construction engineering programs had very good visits with ABET in October 2015 and both were accredited for six years in summer 2016.

Recruiting of outstanding faculty members is a critical success factor for our School, and during 2016 we welcomed Treavor Boyer, Christian Hoover, Ram Pendyala (back from Georgia Tech), Giuseppe Mascaro, and Efthalia Chatziefstratiou to our faculty ranks. The coming year promises more hiring, as we are pursuing faculty members for as many as seven additional positions.

ASU's published Charter and guiding Mission & Goals are provided on the facing page. Our School continues to be aligned with this broad vision as many of the articles in this report attest. Again this year our national reputation for teaching, discovery, research and creativity is leading to many visits from peers representing other universities, research agencies and industry.

I am again very optimistic about the future, and feel privileged to be SSEBE School Director. We have a great faculty and staff, along with wonderful students; please visit if you are in the Tempe area!

A handwritten signature in red ink, reading "G. Edward Gibson, Jr.", written in a cursive style.

G. Edward Gibson, Jr., PhD, PE

Professor and Sunstate Chair

Director, School of Sustainable Engineering and the Built Environment

Civil, Environmental & Sustainable Engineering (CESE)



Keith D. Hjelmstad, PhD
Professor and CESE Program Chair

This year has been an active one for our students, faculty, staff, and external partners. The number of students has grown, we have hired some great new faculty, we had a banner year landing large research projects, and the general buzz around the program is enthusiastic and optimistic.

This past year our Friends of Civil Engineering (FOCE) group has been working diligently to

advance the new vision for the organization that we launched last year. It is a heavy lift, but we can already see some returns on the investment of time and effort that this group has made. FOCE has gained some momentum and we anticipate that more good things will happen in the coming years. It is so important to have the support of our industry partners. We really appreciate it!

This past summer we got final word from ABET that our Civil Engineering program has been re-accredited for six full years. We were not surprised by this outcome because our ABET visitor had been very positive at the exit interview during his visit to campus. In fact, he expressed a lot of interest about our Sustainability option in our undergraduate degree because they were hoping to develop something like it at his home institution! We really are a leading institution in this area of Civil Engineering. Earning full accreditation is a fantastic outcome and a great relief. Thanks, again, to Mike Mamlouk for leading our preparations for our accreditation effort.

We continue to advance innovative approaches to undergraduate (and graduate) education. This past year many of our faculty have been engaged in a National Science Foundation project aimed at promoting pedagogies of engagement in our classrooms. More of our faculty are expanding their portfolios of teaching techniques to incorporate some of the many things that are now known about how people learn engineering concepts. The faculty who have joined this *Community of Practice* in teaching have participated in workshops and are implementing new approaches into their own classrooms. Thanks to Shane Underwood and Narayanan Neithalath for taking leadership roles in this effort.

From where I sit the future looks very bright. We get better every year, we do more every year, and we keep finding ways to bring significant impact to the world around us. I am looking forward to another great year!

Construction Engineering



Samuel T. Ariaratnam, PhD, PE, PEng
Construction Engineering Program Chair

I have wonderful news to share with all of you! Our Construction Engineering program was successful in obtaining a full six-year accreditation from the Accreditation Board for Engineering and Technology (ABET). This was our initial accreditation and thus Arizona State University is now officially the 17th ABET Accredited Construction Engineering program in the United States joining the ranks of peer institutions such as Iowa State University, Purdue University, Virginia Tech University, and North Carolina State University. A lot of hard work and dedication on

the part of the faculty, staff and students made this a successful endeavor!

Our enrollment continues to grow at both the undergraduate and graduate levels. We began the 2016 academic year with a record 110 enrolled undergraduate students, which was a significant increase from the Fall 2015 first day enrollment of 84 students. Furthermore, our graduates continue to obtain excellent industry positions throughout the country and are in high demand. I believe that our rigorous curriculum and strong internship program are major reasons for this job success. At the graduate level, we are seeing a major increase in Master's enrollment with over 40 graduate students currently in the program. We also continue to grow with internal transfer students. Our marketing plan continues to bring fruition as we have recruited talented students from all over the United States, Asia, Europe, South America, Africa, and the Middle East. I see no indication of this growth slowing down anytime in the near future!

Our program continues to focus on delivering an educational experience that combines the best aspects of Civil Engineering and Construction Management to produce a graduate with the ability to both design and oversee construction of infrastructure projects. The program emphasizes planning, design, and management for the construction of infrastructure including bridges, airports, pipelines, and other systems that are vital to our nation's economy. Producing high-quality Construction Engineers is imperative as our nation continues to address an infrastructure network in varying stages of deterioration.

Several goals moving forward are to continue to maintain our strong educational curriculum, increase our undergraduate enrollment to meet industry demands, and to further cultivate fundraising efforts to support innovative program initiatives. I am looking forward to continued success as we strive to make Arizona State University the school of choice for future Construction Engineers!

Del E. Webb School Of Construction (DEWSC)



Allan D. Chasey, PhD, PE, LEED AP
Associate Professor and DEWSC Program Chair

The Del E. Webb School of Construction Program continues to build on our legacy as the exciting place to learn and grow! Our new home College Avenue Commons has provided that living and learning place for both our Undergraduate and Graduate programs. Our OSHA Training Institute is in its 4th year and continues to grow under very capable leadership. The Construction in Indian County (CIIC) is making a significant impact in Indian country through the Annual Conference, the CIIC

Student Organization, and our resident Eminent Scholar.

First, our growth: We started the Fall of 2016 with just over 300 undergraduate students and slightly over 100 graduate students. Our recruiter, Whitney Hatfield, has done an outstanding job by getting the DEWSC name out in many different venues. Even with this new energy for recruiting, we continue to need your assistance as we make DEWSC the best construction program in the US.

Our OSHA Training Institute, the Western OSHA Education Center, under the leadership of Lisa Hogle, is offering a full schedule of occupational safety and health training. The DEWSC Safety Days continues to grow in numbers and influence due to the efforts of Lisa and the Western OSHA Ed Center. We have been able to integrate Safety beyond just the one Safety Class we offer. Also movement is underway to add an MS degree in Safety and a pathway for Community College students to transfer to ASU to continue their studies in Occupational Safety. If you need update training or would like more information, contact Lisa at <http://asuotiec.org>.

The Construction in Indian Country program continues to expand. Jerome Clark, our CIIC Program Manager, developed a strong program to support our native students and recruit them into the DEWSC. The CIIC Annual Conference continues to grow and provides endowed scholarship for our native students. This year we were fortunate to have Wanda Dalla Costa join us as our resident Eminent Scholar. Her impact in the community has provided another resource to improving Construction in Indian Country. Lisa (OSHA Ed Center) and CIIC teamed up and won a Susan Harwood Grant to provide Safety Leadership Training to the Native folks in our State. Very exciting!

Finally, each year our students continue to show very well at the annual Associated Schools of Construction Student Competition in Reno, NV. Your direct support was evident in 2016! We were able to send 77 students to Reno, the largest contingent ever from DEWSC. We also were able to send two teams to the Region 2 Competition in Chicago and the electrical team brought home a trophy. This year we also started a Student Chapter of the National Home Builders Association and are sending a team to the National Student Competition in Florida in January, 2017.

Even with these program improvements, we still face our challenges; especially in continuing to increase our student population. We have been fortunate to hire an outstanding recruiter with the generous support of an alumnus, and she is working diligently to develop a sustainable recruiting plan. While we continue to graduate bright, young students into the profession, we must recruit a good class each year to ensure the number of graduates meets the industry needs.

I want to thank you all for your fantastic support for the past four plus years and want to encourage you to continue your support as it is vital if we want to improve the School. You can support by being a guest lecturer in the classroom, a faculty associate to take an entire semester class, provide opportunities for our students to visit an active construction site, donate funds for additional scholarships, hire an intern and be a part of our recruiting process. The challenges are great, but that is what has made the Del E. Webb School of Construction even better. I look forward to the School continuing to move forward in 2017 with your assistance.

Environmental Engineering



Treavor H. Boyer, PhD
Associate Professor
Environmental Engineering Program Chair

I am pleased to introduce you to the new Environmental Engineering (EVE) undergraduate program at Arizona State University, which will offer a Bachelor of Science in Engineering (BSE) in Environmental Engineering and will seek ABET accreditation. The EVE program is currently going through the approval process at ASU, which includes curriculum committee reviews by the Fulton Schools of Engineering (FSE) and University Senate, and

final approvals by the Provost and Arizona Board of Regents. The EVE program is on track to be approved during spring 2017 and will officially start accepting students in Fall semester 2017.

The BSE in Environmental Engineering will cover the engineered processes and systems that preserve, protect, and restore the natural environment for benefits to human health and ecosystem services. The degree will appeal to students who seek to identify, evaluate, and design sustainable solutions to current and pressing environmental problems that span local, regional, national, and global scales. In recognition of the interdisciplinary nature of these challenges, the degree will include new environmental engineering courses and incorporate courses from other programs in FSE. Course offerings will cover fundamental engineering concepts applied to environmental processes and environmental engineering design, as well as applied learning experiences including a summer internship or research experience and capstone design course.

The EVE program is designed to leverage existing strengths in SSEBE and at ASU. The program will include new courses that cover fundamental concepts in environmental engineering including transport and phase partitioning, environmental chemistry, and applied microbiology as well as a re-designed standalone laboratory course. The EVE program will include existing courses from civil engineering and sustainable engineering because of the shared interest in the built and natural environments. The EVE program will also be multi-school including courses from School for Engineering of Matter, Transport & Energy (Chemical Engineering) and the Polytechnic School (Environmental and Resource Management). The curriculum is envisioned to prepare graduates to solve environmental engineering challenges of today and challenges in the future. I look forward to updating you on the progress and accomplishments of the new EVE program in the coming years.

Graduate Program



Peter Fox, PhD, PE
Professor and Graduate Program Chair

The School of Sustainable Engineering and the Built Environment graduate degree programs encompass Civil, Environmental and Sustainable Engineering (CESE), Construction Management (CON) and Construction Engineering (Con Eng) - CESE MSE, CESE MS, CESE PhD, CON MS, CON PhD and Con Eng MSE.

We continue to receive large numbers of applications, for the Fall 2017 semester, enabling us to select highly qualified applicants to our programs. The School of Sustainable Engineering and the Built Environment continues to have the largest number of Dean's Fellowships in the Ira A. Fulton Schools of Engineering and I am confident this will continue in the future.

The high quality of our research continues with our participation in two National Science Foundation Engineering Research Centers. Engineering Research Centers are the most prestigious grant awards given by the National Science Foundation. Our leadership and participation in these centers has gained us prestigious recognition from other top universities and industry.

We continue to have more than 100 PhD students and our PhD student enrollment is growing as a consequence of our success at obtaining research centers and funding. We have continued to increase the number of enrolled under-represented groups and our goal to make our program more diverse and inclusive is being embraced by our faculty and research sponsors.

During the 2016 calendar year our research expenditures continued to grow as we had our most successful year at obtaining new funding in our history. This increase in funding will further enable us to financially support a larger number of our MS students and maintain funding for our PhD students either as research assistants or as teaching assistants.

We now have two fully on-line Master's degree programs that should increase our enrollment of MS students. The on-line Master's degree program in Construction Management was initiated in 2014 and the on-line Master's degree program in the specialty area of Sustainable Engineering was initiated in 2015. We are cooperating with other top English speaking universities in the world to expand our on-line Master's degree offerings. Combined with the success of our accelerated MS degree program (formerly known as 4+1), we expect to retain more of our best students and increase the number of high quality international students.

New Faculty Join SSEBE



Treavor Boyer, PhD

**Associate Professor
PhD, University of North
Carolina at Chapel Hill**

Joined SSEBE in August 2016

Areas of Research:

Drinking water and wastewater treatment; urine source separation; nutrient management and resource recovery.



Efthalia Chatziefstratiou, PhD

**Lecturer
PhD, The Ohio State University**

Joined SSEBE in January 2016

Areas of Research: Atmospheric modeling, computational fluid dynamics, and climate change.



Christian Hoover, PhD

**Assistant Professor
PhD, Northwestern University**

Joined SSEBE in August 2016

Areas of Research: Fracture mechanics; materials testing; porous materials.



Giuseppe Mascaro, PhD

**Assistant Professor
PhD, Università di Cagliari, Italy**

Joined SSEBE in August 2016

Areas of Research: Stochastic hydrology, statistical downscaling, watershed modeling, impact of climate change on water resources, remote sensing, food-water-energy nexus, and hydroinformatics.



Ram Pendyala, PhD

**Professor and Associate Director
PhD, University of California, Davis**

Rejoined SSEBE in August 2016

Areas of Research: Multimodal transportation planning, transportation systems modeling; activity-travel behavior analysis; transportation technology and policy.

Visiting Eminent Scholar



Wanda Dalla Costa, AIA, LEED A.P.

Visiting Eminent Scholar, Del E. Webb School of Construction

Wanda holds a Master of Design Research from the Southern California Institute of Architecture and a Master of Architecture from the Faculty of Environmental Design at the University of Calgary. Dalla Costa is an architect and a member of the Saddle Lake First Nation.

Areas of Research: sustainable housing; culturally responsive architecture methods; built environments as a teaching tool for traditional knowledge; traditional construction methodologies; and Indigenous metrics in the built environment.

The Del E. Webb School of Construction recently celebrated the completion of a new course she teaches aimed at exploring solutions to housing needs in Native American communities in Arizona. Community-Based Design: Innovations in Tribal Housing (Con 598: Indigenous Project Delivery), focuses on devising affordable, sustainable, energy efficient and culturally responsive housing prototypes.



Paul Westerhoff

ASU Regents' Professor

Paul Westerhoff has been named **Regents' Professor** at ASU, the highest faculty honor, for the 2016-17 academic year. Regents' Professors are honored for achievements that have brought them national and international distinction.

He has served as chair of the Department of Civil and Environmental Engineering at ASU and founding director of ASU's School of Sustainable Engineering and the Built Environment. He is currently serving as the **Interim Vice Dean for Research and Innovation** for the Ira A. Fulton Schools of Engineering.

Westerhoff has received wide recognition for his work on water treatment and developing novel technologies to address emerging water issues. The technologies and applications that he has invented to treat drinking water can transform water safety, particularly for the underdeveloped world.

In addition to publishing more than 180 peer reviewed papers, Westerhoff has received support from the U.S. Environmental Protection Agency for three of its coveted STAR projects. He also has support from the National Science Foundation, National Institutes of Health and the SemiConductor Research Corp. for his research into nanomaterials in the water.

Bruce Rittmann

- **Elected 2016 National Academy of Inventors (NAI) Fellow**
- **2016 Perry L. McCarty/AEESP Founders' Award, Association of Environmental Engineering and Science Professors**
- **Gordon Maskew Fair Award for 2016 from the American Academy of Environmental Engineers & Scientists**

Bruce Rittmann's advances in using bacteria to clean contaminated water earned him a **National Academy of Inventors Fellowship**, the highest professional distinction awarded to academic inventors. To qualify for selection, NAI nominees must hold U.S. patents that make a tangible impact on "quality of life, economic development and welfare of society."

Rittmann also serves as the director of the Swette Biodesign Center for Environmental Biotechnology, which he founded to "understand and manage microbial communities that provide services to society."

One of the center's projects involves the use of microorganisms in a carbon dioxide-capture system designed to reduce the troublesome buildup greenhouse gases in the Earth's atmosphere. The system works by taking carbon dioxide out of the air and delivering it to microbes to do photosynthesis and transform it into renewable biofuels and chemical products.

Rittmann shared information about progress on the use of microorganism-enabled processes to treat wastewater, clean up pollutants and recover useful resources at the 2016 Water Environment Federation Technology Exposition and Conference. In addition to delivering an update on his research, Rittmann was there at the behest of the Association of Environmental Engineering and Science Professors to accept its prestigious **Perry L. McCarty/AEESP Founders' Award**.



Bruce Rittmann is a member of the National Academy of Engineering, a Fellow of the American Association for the Advancement of Sciences, the Water Environment Federation and the International Water Association and a Distinguished Member of ASCE.

Rittmann has also been selected to receive the **Gordon Maskew Fair Award for 2016** from the American Academy of Environmental Engineers & Scientists. The award is presented to a Board Certified Environmental Engineer of the Academy who is judged to have contributed substantially to the status of the environmental engineering profession.

In addition to research, Rittmann has proved himself as a leader in education, providing insight into curricula changes and improvements. In terms of service, his efforts to improve not only his academic unit, but the university overall are evident. He is a tireless advocate for ASU, helping to bring top talent to the university.



Peter Fox

2016 Fair Distinguished Engineering Educator Medal, Water Environment Foundation

Professor **Peter Fox's** leading role in establishing an environmental engineering program at ASU and his mentorship of more than 120 graduate students is a large part of what has earned him 2016's top educator award from the Water Environment Federation, a major international organization of water-quality professionals.

The award, which "recognizes accomplishments in the education and development of future engineers," is named in honor of Gordon Maskew Fair, a Harvard University professor of sanitary engineering known for not only teaching students the technical aspects of the field but inspiring them to use their skills to protect and enhance environmental quality.

"Peter's past body of work and his current service, research and outreach have been instrumental in driving our environmental engineering graduate program to national prominence. I cannot think of anyone else who is so deserving of this award," says Professor **G. Edward Gibson Jr.**, director of SSEBE.

Construction programs lauded for enhancing education efforts



G. Edward Gibson, Jr., director of the School of Sustainable Engineering and the Built Environment, accepted an industry award to Arizona State University for the quality of its construction education programs.

Arizona State University's innovations in construction engineering and management education are being recognized with two of the major annual awards for professional development bestowed by the Construction Industry Institute.

The **CII Curriculum Partner Award** acknowledges the academic progressiveness of the construction management program in the **Del E. Webb School of Construction and the construction engineering program in SSEBE**, both part of ASU's Fulton Schools.

The award recognizes education programs that are incorporating published CII research topics into their curriculum.

A **CII Distinguished Professor Award** for exemplary demonstration of commitment to teaching spotlights the work of Assistant Professor **Kristen Parrish**. The award recognizes the most outstanding university faculty members who are

incorporating published CII research findings into the courses they teach.

Parrish's accomplishments as an educator include twice winning the top 5% teaching award given by the Fulton Schools and attracting more than \$400,000 to support her research to improve engineering education.

The mission of CII is to inspire owners, contractors/suppliers and academia to collaborate through research to produce best practices and implementation resources, creating innovative solutions that improve safety and capital efficiency.



Assistant Professor **Kristen Parrish** has won a Distinguished Professor Award from the Construction Industry Institute for the effectiveness of her teaching.

Among these notable efforts:



Assistant Professor **David Grau** launched and leads a CII Best Practices course at ASU.



Assistant Professor **Mounir El Asmar** has developed new Sustainable Construction and Alternative Project Delivery courses that incorporate CII research findings.



Associate Professor **Avi Wiezel** has developed a leadership course in which he employs tools and methods based on CII research findings into classroom learning activities.



Parrish and Associate Professor **Kenneth Sullivan** are launching a program to instruct faculty on new best practices for engaging students in construction management courses, focusing on the use of CII materials to facilitate hands-on, real-world, problem-based learning.



Professor **Samuel Ariaratnam** incorporates many resources, including CII research, to demonstrate the workforce challenges affecting the construction industry in his Construction Project Management course. He has also launched a construction engineering program that enables students to pursue a professional engineer license in construction.

Expertise in soil mechanics has had major impact on infrastructure engineering



Sandra Houston, professor in the School of Sustainable Engineering and the Built Environment

Professor **Sandra Houston's** professional peers are honoring her career achievements with one of the most prestigious awards for important contributions to her branch of engineering.

The American Society of Civil Engineers is giving Houston its **2017 Karl Terzaghi Award**, which recognizes research publications that have made a significant impact in the fields of soil mechanics, subsurface and earthwork engineering

and subsurface and earthwork construction. This will be Houston's second major award from the American Society of Civil Engineers.

Houston's research over the years has attracted support or led to project collaborations involving the National Science Foundation, the U.S. Environmental Protection Agency, the American Water Works Association and Research Foundation, the Arizona Department of Water Resources and the Arizona Department of Transportation.

Her nominators for the Terzaghi Award also emphasize Houston's record of service to her profession, in particular her work on committees of the ASCE's Geo-Institute, for which she served a term as president.

Neithalath cementing his status as pioneering civil engineering researcher



Professor Narayanan Neithalath (right) directs undergraduate engineering student Hannah Hansen (left) and Assistant Research Professor Sumanta Das in testing new techniques to heal cracks in concrete.

Narayanan Neithalath's strides in research to improve the design and development of sustainable infrastructure and construction materials have been recognized by the American Society of Civil Engineers (ASCE), which has awarded him the **2016 Walter L. Huber Civil Engineering Research Prize** *"For research and dissemination of fundamental microstructure-property studies on sustainable cementitious materials thereby facilitating rational performance-based design, culminating in practical applications."*

Neithalath is making particular progress with new materials and methods for producing more durable cement and concrete. His efforts span across a wide range of the physical, chemical and mechanical aspects of these materials, as well as the environmental impacts of their production and use over their lifespans. His efforts include making cementless binding systems that could replace conventional Portland cement in many applications and thus significantly reduce the environmentally harmful greenhouse gas emissions produced by standard cement.

Sustainability conference drew engineers and construction professionals from around the world

Academics and industry leaders from 31 countries participated in the **International Conference on Sustainable Design, Engineering and Construction (ICSDEC)** May 18-20 that was hosted and led by a group of Fulton Schools faculty in the College Avenue Commons (CAVC) building.

It was the fourth and largest ICSDEC event, which was founded by **Oswald Chong**, an associate professor in the **Del E. Webb School of Construction** in the School of Sustainable Engineering and the Built Environment.

More than 250 professionals attended, coming from China, India, Japan, the United Kingdom, Italy, Norway, Ecuador, Korea and Colombia, among other countries, including those from 32 states throughout the United States.

The focus of the conference is on giving participants the latest data and science to integrate it into their work in sustainability, resilience and construction, said Chong, who continues to help organize the event as its founding chair.

Associate professor Oswald Chong (front row, third from right) is the founder of the International Conference on Sustainable Design Engineering and Construction. He is pictured with the team of engineering and construction students who helped manage activities at the recent conference at ASU.



Global impact of Gibson's construction planning expertise helps earn prestigious honor



For his far-reaching contributions to the construction industry, a prominent national organization of professional engineers is giving one of its most prestigious awards to **Professor G. Edward Gibson, Jr.**

Gibson is director of the School of Sustainable Engineering and the Built Environment and holds the university's Sunstate Chair in Construction Management and Engineering.

Gibson has been selected by the American Society of Civil Engineers to receive the **2016 Peurifoy Construction Research Award** "For his contributions to the study, implementation and application of methods and practices to improve front-end planning of capital projects across all industry sectors."

The award honors those who have made significant advancements in construction engineering and management through research and development of new technology, principles or practices.



Professor **Barzin Mobasher's** work to take the field of composite concrete materials from its origins to where it is now — with its own textbooks, conferences, doctoral student theses and international reports - has not gone unnoticed. The American Concrete Institute gave him its **Delmar L. Bloem Distinguished Service Award** at the ACI Spring 2016 Concrete Convention and Exposition in Milwaukee, Wisconsin. The award recognizes his work as committee chair in publishing three international reports that detail new design procedures he has developed through his materials research. "We need to design concrete more

efficiently," Mobasher says. "I think people are listening and that's important because each of us has a role, and we're putting a solution on the table. If people acknowledge and use it, that's the best reward."



Edd Gibson, Director, SSEBE (left) presents the **2016 SSEBE Outstanding Service Award** to **Mounir El Asmar**, assistant professor in the School of Sustainable Engineering and the Built Environment. The nominator wrote, "Dr. El Asmar has demonstrated excellence and innovation in service to SSEBE. His diverse accomplishments are in line with ASU's New American University design aspirations. He has served his profession, engaged in student recruitment and retention, assumed committee leadership, and contributed to the School's national and international visibility."



The **2016 SSEBE Outstanding Teaching Award** goes to **Aaron Cohen**, lecturer in the School of Sustainable Engineering and the Built Environment. The nominator wrote, "Aaron's knowledge, dedication and student involvement demonstrate significant support for our school and the larger university community. He has consistently demonstrated an ability to bring an exceptional level of instruction to the classroom as is evidenced by the continued comments received during the Senior Exit interviews."



Larry Mays' accomplishments in water resources engineering over the past four decades continue to bring him prestigious honors. Mays was recently awarded the American Society of Civil Engineers (ASCE) 2016 **Ven Te Chow Award** "For his research on watersheds, water resources, water infrastructure and hydro systems addressing their design, management and optimal operations, and his popular and authoritative textbooks and

handbooks that have had an international impact." Mays was also inducted into the **Academy of Civil Engineers** at the **Missouri University of Science and Technology** where he earned undergraduate and master's degrees in civil engineering. Inductees are selected for outstanding achievements as engineers as well as for their professional and community leadership and improving the quality of engineering graduates.

The Ira A. Fulton Schools of Engineering **Top 5% Teaching Award** for 2016 was presented to **Mikhail Chester, Kristen Parrish** and **Shane Underwood**.

Steven Ayer and **Shane Underwood** were chosen as **ASCE Outstanding Reviewers** in 2016 – Steven for his work on the *Journal of Computing in Civil Engineering* and Shane for his work on the *Journal of Materials in Civil Engineering*.



Construction management competition can be career-building experience

Four frenzied days — and nights — of facing brain-straining problems.

Standing before panels of experts charged with rendering tough judgment on your work. Matching skills against determined peers in a contest in which only a small fraction of the players can grab a trophy.

And yet the students subjected to the rigors of what is known as the **Reno competition at the Associated Schools of Construction (ASC) annual regional conference** in Nevada are always thrilled to be there.

"It is an amazing event that all construction and design students should experience," said **Tom Fyffe**, who graduated from Arizona State University in spring 2016 with a construction management

degree. He participated in four regional ASC student competitions.

"It has been the highlight of my time at ASU," said **Daisy Herrera**, a senior in construction management and a veteran of six ASC student competitions.

Solving real-word construction problems

Fyffe and Herrera were among 77 students in ASU's Fulton Schools to participate in the recent ASC Reno competition.

Construction management and construction engineering majors in the Del E. Webb School of Construction and SSEBE were joined at the event by more than 1,300 fellow students from close to 50 college and university construction schools.

It's a hectic environment in which the competitive atmosphere can be physically and emotionally intense, but learning to endure the ordeal is big part of what makes it worthwhile for students, said construction management lecturer **Aaron Cohen**, the ASU team's faculty advisor.

Teams are given problems from actual construction projects. Students must devise solutions that include plans and strategies for project scheduling, labor coordination, work site safety, cost estimation and sustainable design, among other things.

They then have to present their solutions to judges, many of whom work with companies that were involved in those construction projects, and who know how the array of problems were remedied.

Teams in the Reno competition face tight deadlines and tough challenges to find solutions to construction project problems. Pictured at work during the demanding event are ASU students (from foreground to background) Richard Carman, Abby Boaz, Keegan Abele and Christopher Ortega. They were members of one of the Virtual Design and Construction teams. Photographer: Whitney Hatfield

NSF graduate research fellowship motivates doctoral student to strive for exceptional achievements

Recipients of National Science Foundation Graduate Research Fellowships are seen by the federal agency as potential leaders in research, teaching and innovation in engineering and science.

Career success for these students is viewed as critical to the United States maintaining its leading role in technological advancement and its strength in national security. They also have opportunities for internships, professional development and participation in international research projects, and the freedom to do their own research at any accredited U.S. institution of graduate education of their choice.

Anjali Mulchandani thought it was "a humorous but apt take on my work," Professor Paul Westerhoff described her dissertation on getting water from the air and gold from waste material as "finding valuable things in unexpected places."



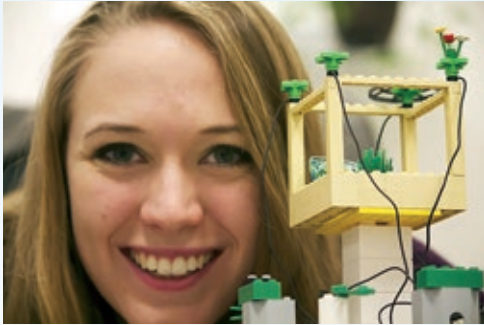
A main thrust of Mulchandani's research is atmospheric water capture, involving "a renewable, reusable system that could collect moisture from the air, and then convert it to a liquid phase for use as drinking water," she explains. "This kind of system could be deployed to provide water in military, disaster relief, or rural off-grid locations."

The K-12 education outreach she's done so far has led her to "fall in love with teaching, especially with teaching young students, because they are so open to learning and get so excited about it," she says.

With her presentation titled "You flushed the toilet, now what?" she teaches students about wastewater treatment plants, metals that are in foods and personal care products that end up in sewage, how sewage and waste are currently disposed of, and new sewage treatment and resource recovery technologies.

Getting support from an NSF Graduate Research Fellowship award to help her pursue career goals in both research and teaching is a big motivator.

BISTEG wins entrepreneurial support



A team led by **Kaitlin Vortherms**, a **civil engineering major**, was one of 20 teams chosen for **Arizona State University's Edson Student Entrepreneur Initiative** for the 2016-2017 academic year. Of those 20 teams, 12 are led by Fulton Schools students.

"The fact that more than half of 2016's Edson awards are going to engineering students is indicative of the entrepreneurial

mindset that has been activated within the Fulton Schools," says Brent Sebold, who oversees a venture development program for engineering students at ASU.

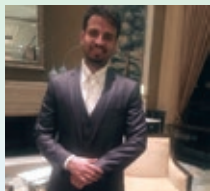
The Edson Initiative offers 20 student teams a year up to \$20,000 each in seed funding, office space at SkySong, the Arizona State University Scottsdale Innovation Center, mentorship and training to advance their ventures. The teams will spend the 2017 year in the intensive startup accelerator focused on helping the students execute their business models, deliver their products or services and create local jobs.

The BISTEG team aims to make buildings better. BISTEG (Building Integrated Solar Thermal Electricity Generation) solar thermoelectric modules shade buildings to maximize energy efficiency while producing solar thermal energy to power them.

"We were inspired by the Arizona heat," says Vortherms. "Buildings are typically designed to keep heat out. However, we see an opportunity for infrastructure and buildings to utilize the heat instead of wasting it."

Thermoelectric generators are small, solid state devices that use a temperature differential to produce power and are the core of the product because of their adaptability and reliability.

The team also consisted of **Payson Seager** from the **Del E. Webb School of Construction**, Dylan Kerr from the Herberger School of Design & Arts, Ryan Kofron from the W.P. Carey School of Business and Andrew Park from the School of Electrical Computer and Energy Engineering.



The North American Society for Trenchless Technology has selected **Amr Fenais** as one of the recipients of the **2017 Argent Memorial Scholarship** in the amount of \$5,000.



ASU teams make strong showing at major civil engineering competition

Teams from ASU's chapter of the American Society of Civil Engineers (ASCE-ASU) equaled the organization's best overall performance ever in the **ASCE's Pacific Southwest Conference** competition (PSWC) for college students.

Seventy ASCE-ASU members participated in the event that took place March 30 through April 2, 2016 at California State University, Long Beach.

ASU's squad finished in 5th place overall among teams from 18 universities in California, Arizona, Nevada and Hawaii – jumping from 15th place overall in last year's competition to match the ASCE-ASU chapter's highest-ever finish in 2012.

The individual teams finished as follows: concrete canoe team placed 3rd, the steel bridge team took 5th place, surveying team placed 4th and the transportation team placed 5th.

"This success was a product of the hard work and determination of many students," said civil engineering student Wesley Scatena, who was elected chapter president just before the start of spring semester.

The Arizona State University **ASCE Student Chapter** has been selected by the Committee on Student Members to receive a **Certificate of Commendation** for its outstanding activities as recorded in the 2015 Chapter Annual Report. This is a distinction earned by only the top 5% of all Student Organizations. **Chris Lawrence** is the chapter faculty advisor and **Wesley Scatena** is the student chapter president.

Clinton Laulo gets feet wet in hydrology with AHS Bouwer intern scholarship



Clinton Laulo, a civil engineering major, has been awarded the prestigious **Herman Bouwer Intern Scholarship** from the Arizona Hydrological Society. It gives students enrolled in a hydrology-related discipline at any Arizona college or university the opportunity to gain practical experience.

The scholarship acknowledges the extensive contributions of Bouwer to both AHS and the science of hydrology. Bouwer was the chief engineer with the Water Conservation Laboratory of the U.S. Department of Agriculture for many years and his pioneering work in groundwater recharge with particular emphasis on the reclamation and reuse of sewage effluent through Soil Aquifer Treatment was influential not just in Arizona, but nationally and internationally.

The AHS arranged for Laulo to observe three areas of the water industry in Arizona, consulting, municipal and regulatory. He worked his first two weeks with Carollo Engineers, a water engineering consulting firm that has worked on projects in the Phoenix area for more than 80 years. He then spent two weeks with the City of Phoenix visiting wastewater treatment plants, potable water treatment facilities, and working with ground water systems and pumps. His final two weeks of the program was with the Arizona Department of Water Resources.

During the 2016 spring semester Laulo was enrolled in CEE 361, an introduction to environmental engineering class taught by Bruce Rittmann, Regents' Professor of Environmental Engineering and Director of the Swette Center for Environmental Biotechnology. Rittmann encouraged him to apply for the scholarship and also taught him about public water needs, risks and processing methods.

Women in Construction conference gave students valuable career insights

Six construction management students in the **Del E. Webb School of Construction** participated in the **Women in Construction West Coast Conference in San Diego**.

They joined more than 300 construction industry professionals for two days of networking, educational presentations and panel discussions designed to provide insights into careers in construction fields.

The students heard from trailblazers for women in the construction industry and listened to talks about challenges for females in the business, as well as the outlook for women's roles in the profession in the future.

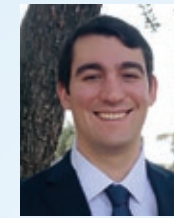
They also had opportunities to seek out mentors in particular aspects of the industry and get advice on career advancement.

"This was a one-of-a-kind conference designed to promote and advance women in construction, which is exactly what our Advancing Women in Construction (AWIC) student program is all about," said **Whitney Hatfield**, a student recruiter for the Del E. Webb School of Construction and advisor for the AWIC program.

Overall, there are currently 35 women in the construction management program in the Del E. Webb School and 16 in the construction engineering program in the School of Sustainable Engineering and the Built Environment.



Six members of the Advancing Women in Construction program attended the Women in Construction conference. From left to right: Janette Sanchez, Natasha Hebel, Carolina Urquijo Graff, Vanessa Sanchez, Brianna Esqueda and Eden Roth.



Douglas Rice, a PhD student in the School of Sustainable Engineering and the Built Environment and recipient of the ASU Fulton Schools of Engineering Dean's Fellowship has won

a poster contest sponsored by WaterReuse Arizona entitled **"Bright Concepts in Arizona Water"** that was open to students and young water professionals. Douglas has received a complimentary registration to the WaterReuse National Symposium and up to \$500 in travel assistance to attend the symposium. Douglas is also the recipient of the **WaterReuse Arizona 2016 Scholarship** in the amount of \$2,500. The purpose of this award is to encourage full-time students with a focus on wastewater reclamation, water reuse, and/or desalination.



Monireh Mahmoudi won this year's **ITE (Institute of Transportation Engineers) Student Paper District Award from District 6** which

covers Arizona, California and other western states. She presented her paper titled *"Toward a City with Fully Coordinated Vehicle Sharing System"* at the ITS District annual meeting in Albuquerque on July 10-13.



Daniela Panfil, a student in ASU's Barrett, the Honors College studying civil engineering and sustainability, received the **Outstanding Engineering Student of the Year Award** from the Greater Phoenix

Area Engineers Week organization. Panfil has maintained a perfect 4.0 grade point average and earned a number of scholarship awards based on her academic performance, public service activities and research interests.

Engineers take to Peace Corps sites for spring break



Brianna Celaya, a junior studying civil engineering

A chance to set foot in a place they've never been before is beckoning three students to Caribbean countries for Arizona State University's spring break.

These Fulton Schools students are traveling as part of ASU's new Global Intensive Experience (GIE) programming.

Brianna Celaya, a civil engineering junior, and **Leslie Amaya**, a construction management sophomore, will be sampling life as a Peace Corps volunteer as they tour projects led by current Peace Corps volunteers in the Dominican Republic. **Eric Arellano**, a computer science freshman, is heading to Cuba for a close-up look at a country on the verge of increasing globalization.

GIE programs pair a week-long study abroad with the option of taking a coordinated spring semester course. Arellano describes the format as taking a class that includes "the best field trip in the world."

These programs are designed to expand study abroad access to students who might benefit from shorter travel duration or an alternate way of engaging in a global experience.

Celaya has long had a desire to experience another culture, but found it difficult to find the perfect time to go. "A spring break trip proved to be ideal," she said.

Seeing the Peace Corps in action

Celaya and Amaya's GIE is hosted by recruiters from the Peace Corps, and gives students the opportunity to visit communities with active Peace Corps projects in the Dominican Republic, many of which have a sustainability focus.

"We will observe the progress of projects that the Peace Corps has established in various communities and provide support," said Celaya.

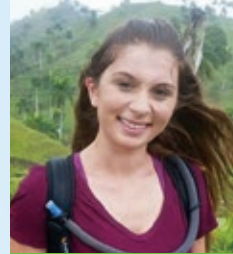
They will visit a project that focused on developing a vertical garden made out of wooden pallets and recycled materials in a rural community. A Peace Corps volunteer helped establish the project, which is now maintained with help from a local 12-year-old child.

The group will also travel to see a mountain water system established four years ago near the small village of Yasika.

Additional projects include helping at a tree nursery site in a deforested area and helping to lay the concrete foundation of a school structure that is constructed using plastic bottles, wire mesh fencing and a few pieces of wood.

The students are already familiar with these projects and the work that needs to be done thanks to online material and assignments in preparation for the trip.

"[As part of our orientation] we had a Skype video call with the directors of the Peace Corps who are currently serving in the Dominican Republic and who will help direct our program," said Amaya.



Leslie Amaya, a sophomore studying construction management



Army vet returns to school, graduated with master's of science in construction management

ASU student **Darrell Stanley** knew in his early 20s that he wouldn't always be able to rely on his body for a steady paycheck.

After an honorable discharge from the Army, Stanley became a certified refrigerator repairman in 1996. Several co-workers told him welcome aboard, but to also start looking for another job.

"They told me about their back problems and physical ailments as they got older, and that I should use my GI Bill to get a college degree," Stanley said. "It took 18 years, but I eventually got the message."

The 42-year-old member of the Navajo Nation received his bachelor's degree in construction management from Arizona State University's Ira A. Fulton Schools of Engineering in 2011. Tribal leaders back home in Kayenta, Arizona, took note of his 3.3 GPA, and made him an offer.

"They said they'd pay for my education if I went back to school to get my master's, so I took advantage of it," said Stanley, who works as a construction manager for the Salt River Pima Maricopa Indian Community.

Stanley has lived up to his end of the agreement and graduated with a master's of science in construction management in 2016.

Outstanding Graduates in the Class of 2016

At the end of the fall and spring semesters, each of the six Ira A. Fulton Schools of Engineering select one undergraduate student in each of its academic degree programs as its Outstanding Program Graduate.

These students are among the leading performers in academic studies, with high grade point averages for their classroom work and related research training throughout their undergraduate years.

In addition, they have contributed to the Fulton Schools of Engineering's mission through their efforts in activities such as research, mentoring, service to others and leadership on student engineering projects and team competitions.

SSEBE Outstanding Graduates

Thomas Fyffe, DEWSC (Spring 2016)

Daniela Panfil, CESE (Spring 2016)

Jeffrey Capaci, Construction Engineering (Spring 2016)

Michael Halas, DEWSC (Fall 2016)

Parham Dehghani, CESE (Fall 2016)

Robert Richards, Construction Engineering (Fall 2016)

SSEBE Leadership and Service Awards

Brooke Ridley, CESE (Spring 2016)

Kyle Marshall, CESE (Spring 2016)

Amelia Ochsenbein, CESE (Spring 2016)

Victoria Flys, CESE (Spring 2016)

Alexei Burtscher, DEWSC (Fall 2016)

Jose Llanos, CESE (Fall 2016)

SSEBE 4.0 Awards

Thomas Fyffe (Spring 2016)

Brooke Ridley (Spring 2016)

Kyle Marshall (Spring 2016)

Cooper Lewis (Spring 2016)

Amelia Ochsenbein (Spring 2016)

Christopher Bennett (Spring 2016)

Victoria Flys (Spring 2016)

Daniela Panfil (Spring 2016)

Safety Award won by **Sean O'Donnell** (2016)



Jeffrey Capaci



Parham Dehghani



Victoria Flys



Thomas Fyffe



Robert Richards



Daniela Panfil

Civil, Environmental and Sustainable Engineering

Amin Abbaszadegan

Instantaneous Project Controls:
Current Status, State of the Art,
Benefits, and Strategies
Chair: Dr. David Grau

Majed Alzara

Measuring the Construction
Performance in Saudi Arabia and
Proposing New Procurement
Model Based on BV PIPS (A
University Case Study)
Chair: Dr. Dean Kashiwagi

Reza Arababadi

Operational and Technological
Peak Load Shifting Strategies in
Residential Buildings
Chair: Dr. Kristen Parrish

William Barr

Computational Sustainability
Assessment of Algal Biofuels
and Bioproducts for Commercial
Applications
Chair: Dr. Paul Westerhoff and
Dr. Amy Landis

Navid Behzad

Leadership and Management
Balance for Rehabilitating
Distressed Construction Projects
Chair: Dr. Avi Wiesel

John Cribbs

Workflow Management Using
Building Information Modeling
(BIM) for Prefabrication
in a Construction Retrofit
Environment
Chair: Dr. Allan D. Chasey

Akash Dakhane

Multiscale Engineering
Response of Alkali Activated
Aluminosilicate Binders
Chair: Dr. Narayanan Neithalath

Vikram Dey

Innovative Structural Materials
and Sections with Strain
Hardening Cementitious
Composites
Chair: Dr. Barzin Mobasher

Andrew Fraser

Transportation Infrastructure and
Heat Vulnerability
Chair: Dr. Mikhail Chester

Dhaval Gajjar

Use of Customer Satisfaction to
Minimize Risks
Chair: Dr. Dean Kashiwagi and
Dr. Kenneth Sullivan

James Gifford

Phosphorus Recovery from
Microbial Biofuel Residual Using
Microwave Peroxide Digestion
and Anion Exchange
Chair: Dr. Paul Westerhoff

Padmini Gudipudi

Investigation and Improvement
in Reliability of Asphalt Concrete
Fatigue Modeling using Fine
Aggregate Matrix Phase
Chair: Dr. B. Shane Underwood

Angel Gutierrez

Experimental Evaluation of the
Performance of Geomembrane
Liners Subject to Dnndrag and
Seismic Loading
Chair: Dr. Edward Kavazanjian, Jr.

Canio Hoffarth

A Generalized Orthotropic
Elasto-Plastic Material Model for
Impact Analysis
Chair: Dr. Subramaniam Rajan

Dong Won Ki

Anaerobic Conversion of Primary
Sludge to Resources in Microbial
Electrochemical Cells
Chair: Dr. Morteza Abbaszadegan

Jong Hoon Kim

Sustainability Assessment
Framework for Infrastructure:
Application to Buildings
Chair: Dr. Samuel Ariaratnam

Nariman Mahabadi Mahabadi

Multiphase Fluid Flow through
Porous Media: Conductivity and
Geomechanics
Chair: Dr. Jaewon Jang

Mohamed Mohamed

Towards Improving Electron
Recovery and Coulombic
Efficiency of Microbial
Electrochemical Cells Fed with
Fermentable Electron Donors
Chair: Dr. Bruce Rittmann and Dr.
Cesar Torres

Sean O'Donnell

Mitigation of Earthquake-Induced
Liquefaction via Microbial
Denitrification: A Two Stage
Process
Chair: Dr. Edward Kavazanjian, Jr.

David Ramsey

A National Study on Leveraging
Public Infrastructure Funds:
Project Performance and
Financing Source Analysis for
Public-Private Partnerships
(PPP) in the U.S. Transportation
Sector
Chair: Dr. Mounir El Asmar

Janet Reyna

Developing New Methods for
Analyzing Urban Energy Use
in Buildings: Historic Turnover,
Spatial Patterns, and Future
Forecasting
Chair: Dr. Mikhail Chester

Richard Rushforth

Quantifying the Hydro-Economic
Dependencies of US Cities:
Development of the National
Water Economy Database
Chair: Dr. Benjamin L. Ruddell

Jake Smithwick

Optimizing Contractor
Organizational Agility in Dynamic
Markets
Chair: Dr. Kenneth Sullivan

Jiyun Song

Urban Microclimatic Response to
Landscape Changes via Lang-
Atmosphere Interactions
Chair: Dr. Zhihua Wang

Jera Sullivan

Developing a Decision-Making
Framework for Market Entry in
the Sheet Metal Construction
Industry
Chair: Dr. Mounir El Asmar

Dwarakanath Triplican

Ravikumar
An Anticipatory-Lifecycle
Approach Towards Increasing
the Environmental Gains from
Photovoltaic Systems through
Improved Manufacturing and
Recycling
Chair: Dr. Thomas Seager and Dr.
Matthew Fraser

Benjamin Wender

Developing Anticipatory Life
Cycle Assessment Tools to
Support Responsible Innovation
Chair: Dr. Thomas Seager

Tiantian Xiang

Improvement in Convective
Precipitation and Land Surface
Prediction over Complex Terrain
Chair: Dr. Enrique Vivoni

Jiachuan Yang

Urban Green Infrastructure:
Modelling and Implications to
Environmental Sustainability
Chair: Dr. Zhihua Wang

Yiming Yao

Characteristics of Distributed
Cracking for Analysis and Design
of Strain Hardening Cement
Based Composites
Chair: Dr. Barzin Mobasher

Xianglei Zheng

Applications of Nanotechnology
in Geotechnical Engineering
Chair: Dr. Jaewon Jang

2016 Scholarships and Fellowships

A.G.C. Student Chapter Scholarship	Ryan Leon, Robert Petersen, Samuel Schlinger	Briston Veteran Advancement Scholarship	Jonathan Lyle
Advancing Women in Construction (AWIC)	Vanessa Sanchez	Carl L. and Jean Wolcott Meng Memorial Scholarship	Jorge Saldana Avila
Advancing Women in Construction (AWIC) Scholarship (Achen-Gardner)	Brianna Esqueda	CEAS-DEW Construction Scholarship	Richard Carman, Nolan Schamberger, Carlos Torres, Mario Ramirez, Oswaldo Robledo, Christopher Sauer, Jeffrey Solberg, Sean Osborne, Christopher Ortega
Advancing Women in Construction (AWIC) Scholarship (Bechtel)	Eden Roth	CEE Graduate Study GPF Scholarship (Civil)	Benjamin Wender, Megan Altizer, Golnoosh Miri, Padmini Gudipudi, William Barr, Seungtaek Lee
Ames Family Scholarship	Genesha Gourdine	CEE Graduate Study Scholarship (Construction)	Akash Dakhane, Samuel DiPietro, David Gastelum
Amy and Kent Geiser Honorary Scholarship	Marija Knezevic	CFMA Joseph J. Quigley Memorial Scholarship	William Heaton, Chris Coscia
Andrew Hanneman Scholarship	Belem Urquijo Graff, Leslie Amaya	Charles and Nancy O'Bannon Scholarship	Carmen Alderton
Arizona Society of Civil Engineers (AzSCE) Scholarship	Emily Ford	Charles and Nancy O'Bannon Scholarship for Construction	William Heaton
Associated Minority Contractors (AMCA) NAMU Scholarship	Belem Urquijo Graff	Civil and Environmental Engineering General Scholarship	Jorge Saldana Avila, Chris Lavoie
Bechtel Construction Scholarship	Haiedar Al-Robaie, Alexis Butscher	D.L. Withers Construction Scholarship	Chris Coscia
Ben C. Griggs Memorial Scholarship	Natasha Hebel	Daniel and Katherine Mardian Scholarship	Leslie Amaya
Betty Hum Graduate Assistantship	Tasmia Khan		

2016 Scholarships and Fellowships

Dave Clifton Memorial and ASPE Chapter 6 Scholarship	Vanessa Sanchez	Elyse and Paul Johnson M&G Scholarship (NAMU)	Erick Berry
Del E. Webb Foundation Finance and Accounting Scholarship	Sean Godfrey	FNF Construction, Inc. Scholarship	Jason Tidwell
Del E. Webb Foundation Graduate Scholarship	Jake Gunnoe, Kristen Hurtado, Anthony Pesek, Richard Standage, Jolene Walters, Mohammad Hossein Khoshchreh Jamali, Darrell Stanley	Frank M. Chandler Memorial Scholarship	Kwan Lee
Del E. Webb Foundation Undergraduate Student Scholarship	Simran Johal	James Grose New American University Scholarship (NAMU)	Ryan Cooper
Del E. Webb Foundation Women in Construction Scholarship	Belem Urquijo Graff, Leslie Amaya	Jan Bennett Endowed Scholarship	Abraham Bonilla
Del E. Webb Memorial Scholarship	Abby Boaz, Miller Rowley, Alexander McCoy, Benjamin Williams	Jan Tuma Memorial Scholarship	Alexander Colburn
DeTommaso Endowment (NAMU)	Marlene Tapia	Jason McElroy Memorial Scholarship	Richard Carman
Dr. Sandra L. Weber Memorial Scholarship	Belem Urquijo Graff	Jerry King Scholarship	Caymian Gordon
Edd and Gail Gibson M&G Leaders Scholarship	Hayley Monroe	Jim Bebout Scholarship	Kwan Lee
Edward Kavazanjian Fellowship	Angel Gutierrez	L.C. Jacobson Grad Fellowship	Jason D. Hailer, Alfredo Rivera, Yasir Meshari Alhammadi, John David Cribbs, Mohammad Hossein Khoshchreh Jamali
		Martin H. Rosness Memorial Scholarship	Jarod Kline
		Marvin Sheldon Memorial Scholarship	William Grgantov

2016 Scholarships and Fellowships

Matthew Witczak Scholarship	Rachel von Gnechten, Erick Berry
Mike Kolling Memorial Scholarship	Jordan Seawright, Kahla Vitz, Jalen Knox
Mike Kolling Memorial Scholarship-Construction	Abraham Bonilla, Elvis Estrada
Opus West Construction Corporation Undergraduate Scholarship	Belem Urquijo Graff
Paragon Structural Design, Inc. Scholarship	Austin Aguinaga
Phoenix/Scottsdale Groundwater Contamination Scholarship	Joshua Steele, Michelle Young
Pulte Home Corporation Scholarship	Ethan Kauffman
R. Glen Schoeffler Scholarship	Sean Godfrey
Robert H. Johnson Undergraduate Scholarship	Abby Boaz, Miller Rowley, Benjamin Williams, Haiedar Al-Robaie
Robert J. Wheeler Memorial Scholarship	Cole Lucey, Tyler Lopes, Andrew McMiller

Ron Pratte Scholarship	Elvis Estrada
Samuel F. Kitchell Undergraduate Leadership Award	Chris Coscia, Natasha Hebel
Stanley Consultants Scholarship	Daniel Galvez
Suntec Concrete Scholarship	Elvis Estrada, Janette Sanchez
Terry Bourland Memorial NAMU Scholarship	Jack Symmes, Robert Richards, Belem Urquijo Graff, Vanessa Sanchez
The Beavers Heavy Construction Scholarship	Samuel Schlinger
William A. Pulice Scholarship	Sean Godfrey
ASU ISA Study Abroad Planning Scholarship	Yulissa Quintero

Congratulations to the above students on their achievement and a special thank you to the donors for their contributions. Total scholarships and fellowships were awarded in the amount of:

\$315,208

Fulton Schools “Rock Star”



Edward Kavazanjian, Jr., Director, Center for Bio-mediated and Bio-inspired Geotechnics (CBBG) in the School of Sustainable Engineering and the Built Environment

Edward Kavazanjian's

name has been synonymous with geotechnical engineering since joining Arizona State University's faculty in 2004.

He has attained international status as a leading geotechnical engineer and has advanced the field through a cutting-edge research and educational agenda within the Fulton Schools.

Now Kavazanjian is furthering his commitment to geotechnical engineering at ASU by designating SSEBE

as the primary beneficiary of his estate.

This gift aims to extend the long-term viability and prominence of the geotechnical and geoenvironmental engineering program within the Fulton Schools.

Establishing an endowed chair

Two million dollars of the estate gift will support the establishment of an **Edward Kavazanjian, Jr. Chair in Geotechnical Engineering**.

In 2013, Kavazanjian became an Ira A. Fulton Chair. He described the resources that the chair provided as “a weight being lifted off [his] shoulders.”

“Becoming a chair enabled me to transform my research and teaching agenda — and I want to do the same for those who come after me,” said Kavazanjian.

Endowed chairs provide faculty members with discretionary funding that can lead to the development of new research areas or improvements in lab facilities and equipment. Over the past three years Kavazanjian has used the funds he received as an Ira A. Fulton Chair to help send dozens of students to premier geotechnical engineering conferences, to support undergraduate and graduate students conducting research and to purchase, update and repair lab equipment and supplies.

Professor's endowment will move geotechnical engineering program forward

Kavazanjian hopes that his gift will someday be used to recruit or retain a prominent engineer working in the field of geotechnical or geoenvironmental engineering to serve on the Fulton Schools faculty.

Geotechnical program growth

This estate gift will also enhance two funds Kavazanjian created seven years ago: one provides fellowship support for geotechnical students and the other offers discretionary spending for the geotechnical program.

As part of the estate gift both funds will be increased by \$250,000, with each providing an estimate of \$10,000 in fellowship and program support each year (\$20,000 total).

The geotechnical program is growing in conjunction with the new **Center for Bio-mediated and Bio-inspired Geotechnics (CBBG)**, a National Science Foundation (NSF) Engineering Research Center.

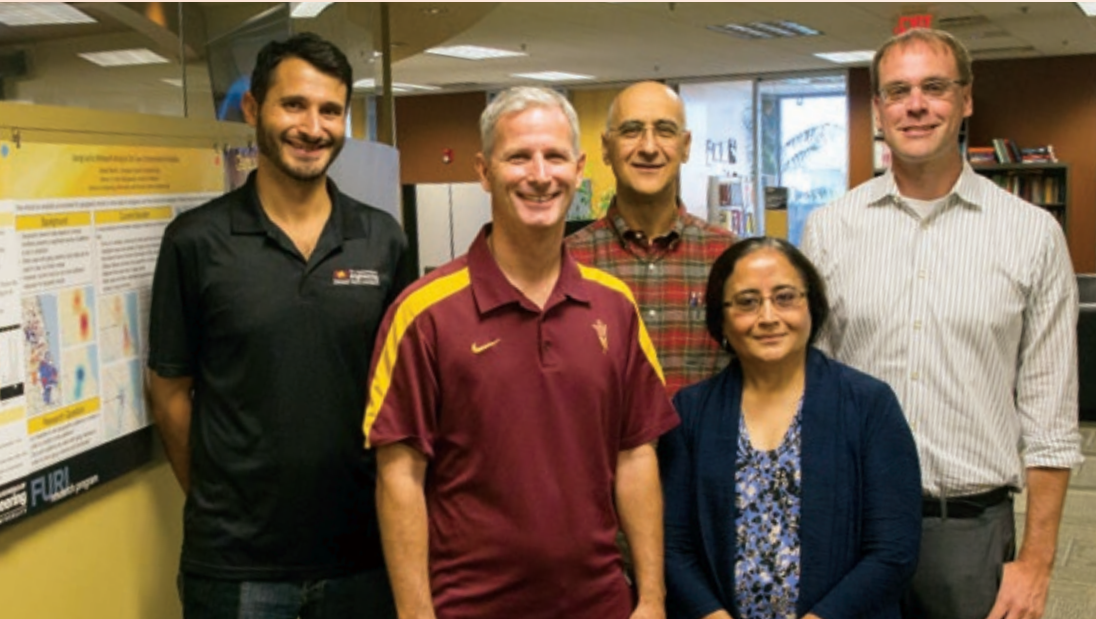
As the director of CBBG, Kavazanjian will be influential in expanding the geotechnical engineering faculty by adding two additional faculty members in the next few years.

Kavazanjian's students have made and will continue to make a difference with the knowledge they gained from a foremost expert in such areas as the analysis, design and construction of solid-waste landfills and other waste containment sites, environmental restoration of hazardous sites, and techniques for reducing the impacts of earthquakes and soil erosion on highways, landfills and other infrastructure systems.

“Ed is inspiring in his generosity of time and contributions to students,” said Sandra Houston, a professor in geotechnical engineering who was the department chair of the Civil and Environmental Engineering Department (now part of SSEBE) when Kavazanjian was hired by ASU.

His academic and industrial leadership, and philanthropic contributions were recognized at a reception on February 3, 2016. On February 4, 2016, he was honored by the University in the Regents' Professor Ceremony.

Society's food, energy and water challenges require interdisciplinary approach



An interdisciplinary team from Arizona State University's Ira A. Fulton Schools of Engineering are collaborating to create a set of tools to help decision makers sustainably address the future of food, energy and water system policy in the Phoenix metropolitan area and beyond.

From left to right: Giuseppe Mascaro, Dave White, Hessam Sarjoughian, Rimjhim Aggarwal and Ross Maciejewski. Photographer: Pete Zrioka/ASU

Here in the desert, water is a big concern. For the average person living in the Phoenix metropolitan area, the prospect of future water shortages makes us think about fixing that dripping faucet, buying high-efficiency washing machines and xeriscaping our green lawns — things we can do as individuals to conserve water.

But to really understand our future as desert dwellers and create the appropriate policies for future generations, it's necessary to look how water affects and is affected by other crucial resources we depend on: food and energy.

Five Arizona State University faculty members from a range of disciplines recently received a **five-year, \$3 million National Science Foundation award**. As part of the **NSF's Innovations at the Nexus of Food, Energy and Water Systems (INFEWS) program**, the team conducts research to build decision support tools that look at the interdependence of these systems and help develop sustainable policies for the future.

A complex nexus

Historically, policies for agriculture, energy and water have been made in isolation of one another. In reality, these systems are all interconnected. This interplay is called the food-energy-water nexus.

Food, energy and water systems are interconnected and affect and are affected by climate, population, policies and the economy. Policy enacted in one area of this nexus can have unforeseen consequences in another.

For example, Phoenix is the fourth fastest growing metropolitan area in the country, and every resident needs water for drinking and other daily uses. Additionally, water is used to irrigate crops, generate energy and cool power plants. When water levels decrease, issues arise not only for consumers, but also in agricultural and energy sectors.

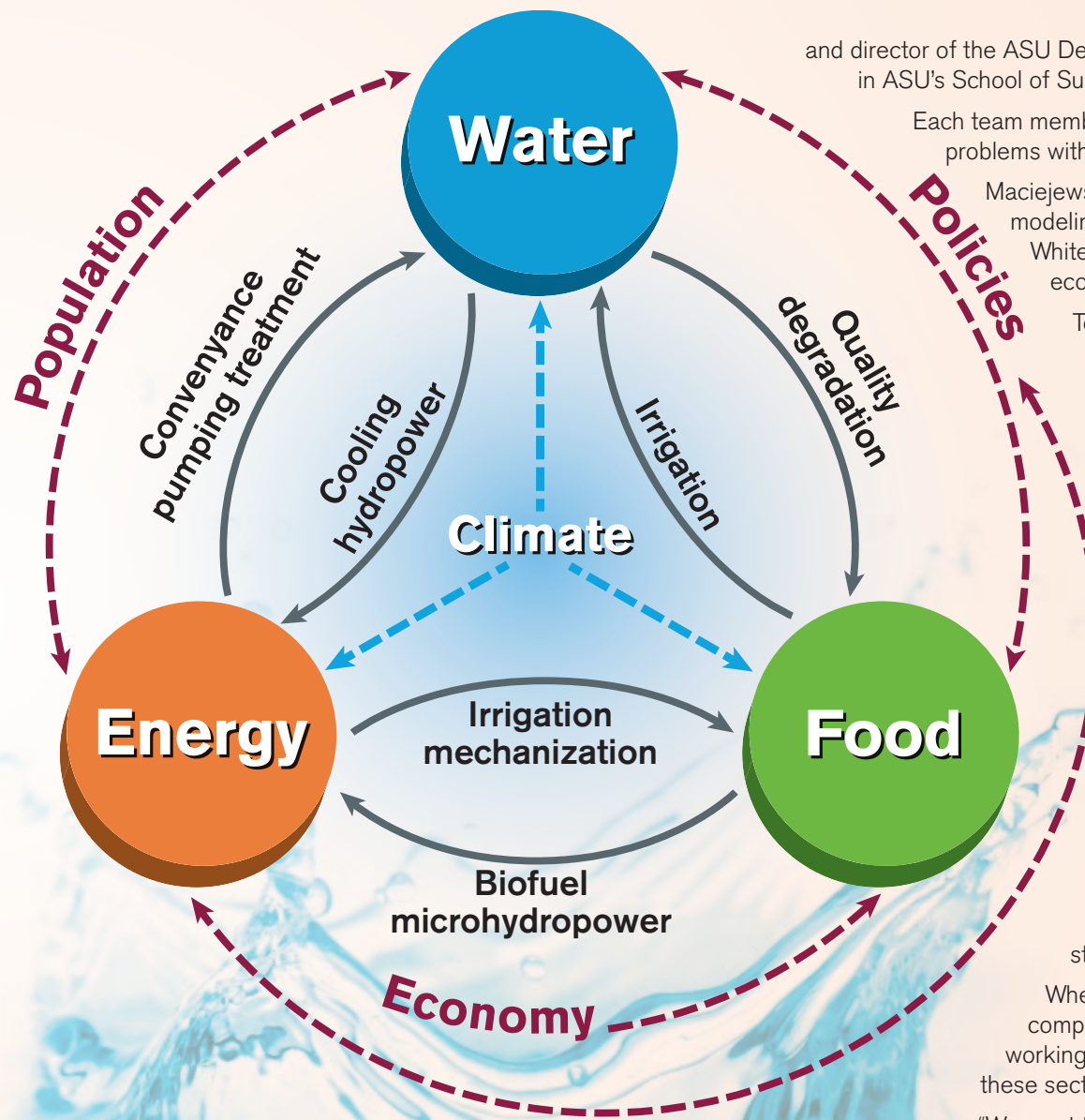
Around the world, as demands on each sector of the nexus continue to grow, the siloed approach to policies involving limited natural resources impedes a sustainable future. Successful policy in all sectors takes into account the links, synergies and conflicts between them through anticipatory governance, or using data and models to predict how variations will affect our world and how we can proactively plan for the consequences through policy.

Evaluating how these systems interact can be difficult, as each individual sector is highly complex. Together, their behavior becomes even more complex to predict.

The NSF INFEWS program has assembled interdisciplinary teams to answer the call to this grand challenge. This \$50 million program looks to study the interconnections and interdependencies of the food-energy-water nexus, bringing scientific and engineering experts from a wide range of fields together to develop innovative scientific and engineering pathways to produce new knowledge, techniques and a workforce capable of managing them.

Interdisciplinary teams solve wide-ranging problems

The team, led by Ross Maciejewski, assistant professor, School of Computing Informatics and Decision Systems Engineering, includes co-principal investigators **Giuseppe Mascaro, SSEBE assistant professor**, Hessam Sarjoughian, associate professor, School of Computing Informatics and Decision Systems Engineering, Dave White, professor in ASU's School of Community Resources and Development



and director of the ASU Decision Center for a Desert City, and Rimjhim Aggarwal, associate professor in ASU's School of Sustainability.

Each team member brings his or her own area of expertise to define, analyze and visualize problems within the food-energy-water nexus.

Maciejewski is an expert on data visualization, Sarjoughian in heterogeneous modeling methods, Mascaro in hydrology and water resource engineering, White in environmental policy and stakeholder engagement, and Aggarwal in economics and sustainable food systems.

Together they have a more complete understanding of the nexus and how individual sectors interact.

"The ultimate societal objective of our food-energy-water nexus activities is to develop basic knowledge that will transform the planning, management and operation of interrelated food, energy and water systems to achieve long-term sustainability and security," White says.

The state of Arizona is uniquely positioned to help solve food-energy-water nexus sustainability challenges. The desert state's experiences may soon become the reality in more places globally as the natural and built worlds grow and change.

"Phoenix already has problems others are expected to face, so if we can find the solutions here we can apply them elsewhere," Maciejewski says. "We've done a good job of solving a lot of these problems, like population growth and land use change, so we're a good example of how to take on sustainability solutions, and a lot of that has been helped by ASU."

Nurturing a new crop of interdisciplinary experts

As the nexus is a relatively recent research domain, the ASU team also faces the challenge of introducing a new generation of engineering students to the new territory.

When searching for graduate students and postdoctoral researcher to complete their research team, Mascaro noted that students were already working on water or energy or food, but not many worked on a combination of these sectors. They hope to find an innovative group of students to change that.

"We want to make this a five-year interdisciplinary research project for our students to build their doctoral topics on," Maciejewski says. "We want to graduate world experts on the food, energy, water nexus."

Peter Lammers (below), research professor with the Arizona Center for Algal Technology and Innovation in the School of Sustainable Engineering and the Built Environment



ASU receives U.S. Department of Energy award for algae biofuel research

An Arizona State University research team will seek to significantly increase yields of algal biomass feedstock to ramp up production of biofuels as part of a multi-university project supported by a recently awarded \$2 million grant from the Bioenergy Technologies Office in the U.S. Department of Energy.

Peter Lammers, a research professor with **Arizona Center for Algal Technology and Innovation**, in SSEBE, leads the team that will share funding from the grant with collaborators at New Mexico State University, Colorado State University and the National Renewable Energy Laboratory. AzCATI, which serves the algae industry and research community alike as a national testbed for research and commercialization of algae-based products ranging from biofuels to pharmaceuticals, is embedded within the School of Sustainable Engineering and the Built Environment.

Researchers will evaluate mixotrophic metabolism in algae that consume both carbon dioxide and waste sugars derived from plant cellulose. They'll use a heat-tolerant algae strain isolated from Yellowstone National Park that is perfectly adapted to growth in closed bioreactors that reduce evaporative water loss — which is critical for deployment of the technology in the arid southwestern United States.

Researchers see potential for multiplying algal production rates by five times over current rates. That achievement would significantly reduce the cost of enclosed algal cultivation systems and boost production particularly in the southwestern United States.

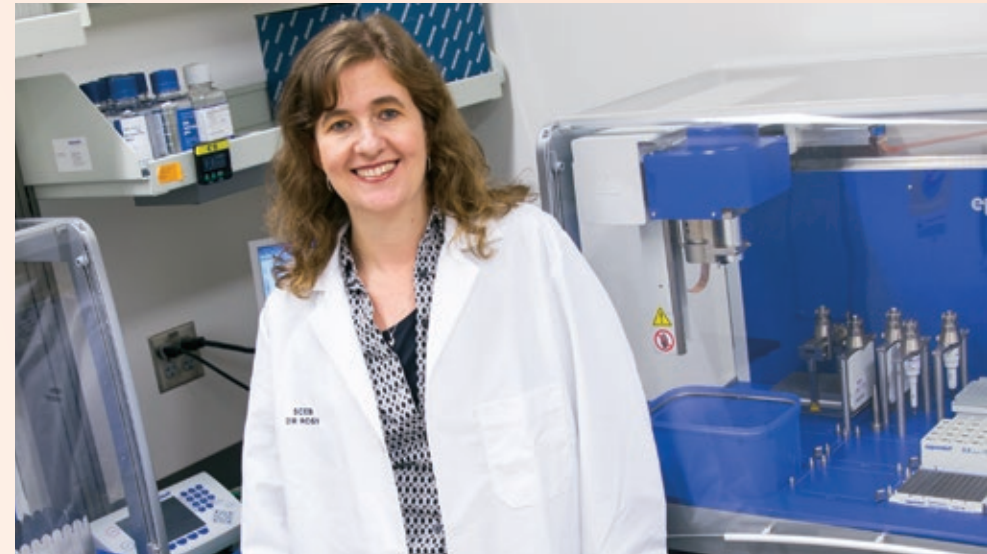
Rosa Krajmalnik-Brown, an associate professor of civil and environmental engineering in the School of Sustainable Engineering and the Built Environment, will utilize her expertise and the facilities at ASU's **Swette Center for Environmental Biotechnology** to identify all microbes that are able to grow in the production system and describe the full suite of metabolic reactions occurring in the mixotrophic, waste-to-energy process.

Algal feedstock production platforms specifically designed for scale-up on land with limited water resources remain a big gap in the Bioenergy Technologies Office algae research and development portfolio.

The majority of previous algae cultivation studies utilized open-pond cultivation systems that use too much water for deployment in arid regions, but also struggle with culture stability and productivity in outdoor scale-up trials.

As a result, abundant flat land in the Southwest plays little or no role in current DOE resource assessments. Still, the region offers significant potential for algal biofuels that would not compete with food production if water-scarcity challenges can be overcome.

"Water is required in large quantities to grow algae and yet water is in very short supply here," Lammers says.



Rosa Krajmalnik-Brown, associate professor in the School of Sustainable Engineering and the Built Environment

"Our production systems avoid evaporation through the use of enclosed systems. These heat up in the sunlight via the greenhouse effect, so we use algae that evolved in hot springs that thrive under the conditions found in our enclosed photobioreactors," he says. "Our work will evaluate ways to reduce the energy requirement for algae biomass cultivation beyond eliminating the cooling requirement, as we seek to reduce the energy requirements for mixing as well."

Energy and fertilizer extraction from the algal biomass is accomplished through a process called hydrothermal liquefaction, which works like a pressure cooker to produce a bio-crude oil that can be upgraded to liquid transportation fuels or a natural gas substitute through a process called catalytic hydrothermal gasification.

The funding will support the development of a more robust bio-economy, to create green jobs, spur innovation and provide environmental services while achieving national energy goals.

ASU researchers aim to pull fuels out of thin air

Nonrenewable fossil fuels give liquid fuels a bad name. But all liquid fuels aren't fossil fuels, and fuels don't have to be dirty.

Fuels are considered dirty when they put new carbon dioxide into the atmosphere, which causes pollution and the buildup of environmentally detrimental greenhouse gases. But what if rather than using fuels that add carbon dioxide, we could create fuels that recycle carbon dioxide from the atmosphere?

Researchers at Arizona State University are exploring the idea of creating fuels that do just that: carbon-neutral liquid fuels. Think of them as fuels created from air.

The endeavor builds on the advances being made at **ASU's Center for Negative Carbon Emissions**, which is developing a technology that collects carbon dioxide from the atmosphere using an air-capture technique that literally scrubs it from the air, and then captures it so it can be reused at an affordable cost. Think of it as a carbon dioxide recycling program.

This effort moves toward closing the carbon cycle, which means making sure no new carbon dioxide ends up in

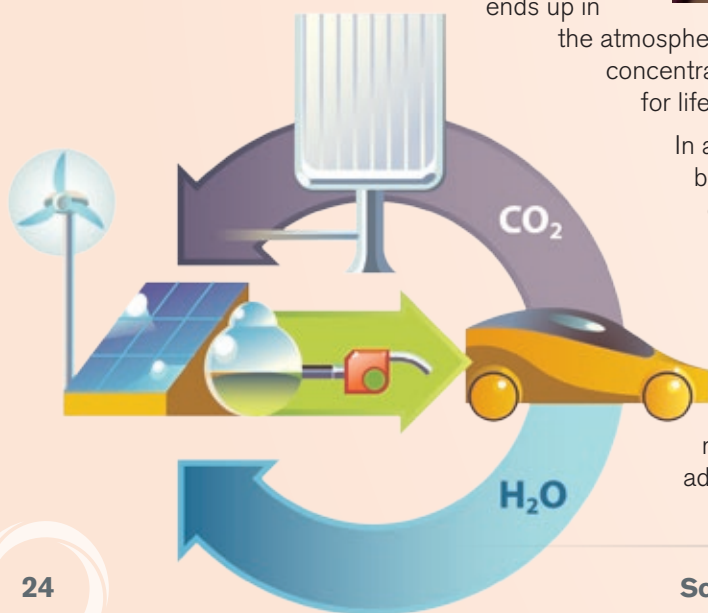
the atmosphere — essential for ensuring that concentrations don't surpass unsafe limits for life on earth.

In addition to the environmental benefits of removing carbon dioxide, excessive amounts of it can be turned into carbon-neutral liquid fuels, making it a renewable energy source.

"If we can make air-capture affordable then we have a carbon-neutral feedstock to make liquid fuels and take advantage of abundant renewable



The Center for Negative Carbon Emissions' novel air-capture technology features a plastic resin that captures carbon dioxide when dry, and releases it when moist. The process has promising new applications in creating carbon-neutral liquid fuels, a greener alternative to fossil fuels.
Photo by: Jessica Hochreiter



energy," said **Christophe Jospe**, who was CNCE's chief strategist from September 2014 until June 2016 and is now founding The Carbon A List to highlight the most promising approaches to capturing and recycling carbon dioxide.

Arvind Ramachandran, a first-year environmental engineering doctoral student from Chennai, India, is advancing research in converting captured carbon dioxide into fuels and chemicals under the supervision of **Klaus Lackner**, the director of CNCE and a professor in the School of Sustainable Engineering and the Built Environment.

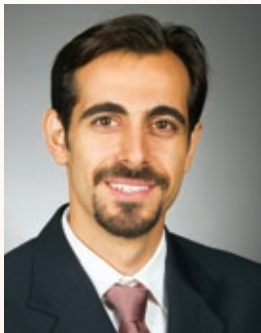
Ramachandran, a budding specialist in this new and exciting field, says it best: "The answer to our search for a sustainable future is likely to involve a combination of technologies — and fuels from air will play an important role."

Decision-Making Framework for New Market Opportunities: A Chance to Grow Your Business

Market opportunities can present themselves to construction companies in a variety of ways. For example, a customer could ask the company to expand geographically, or a new market sector in need of service can have a strong pull. Growth through market entry provides the opportunity to develop and motivate personnel, expand the brand, better serve customers, and mitigate market risks.

Unfortunately, statistics show **only one out of five market entry decisions are successful**. One of the reasons is that most company leaders make these types of market entry decisions only a few times in their careers; not enough to build experience to identify all the major risks. Although a standardized decision-making process greatly improves the likelihood of a successful market entry, a survey of sheet metal and HVAC contractors indicates only **6% of contractors have a formal process in place**.

Drs. Mounir El Asmar and Kenneth Sullivan, and **PhD student Jera Sullivan**, designed a framework to address this issue, working closely with the New Horizons Foundation and over 200 sheet metal and HVAC contractors. The new framework organizes the market entry decision process, embeds learning from the experiences of peers who have made similar decisions, and increases the decision's probability of success. Several tools and guides were developed and are available here: <http://ciri-riskmitigation.org/>



Mounir El Asmar

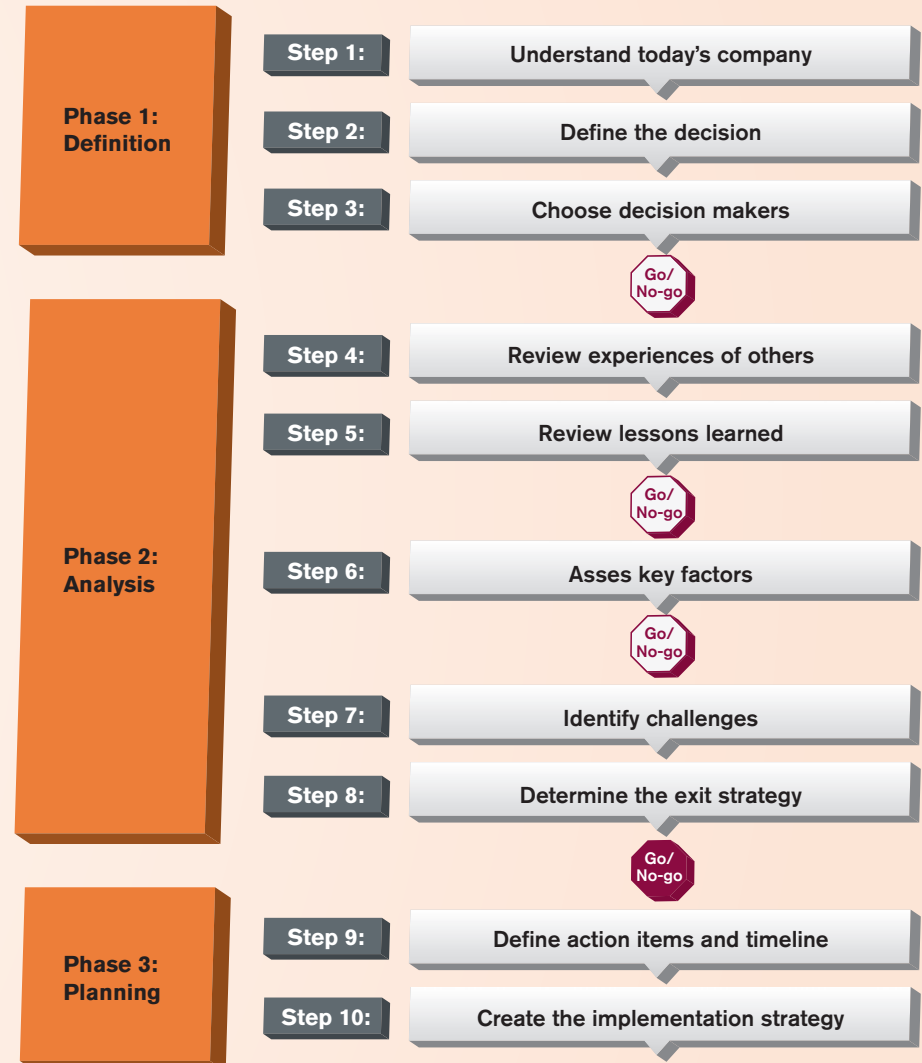


Kenneth Sullivan



Jera Sullivan, PhD Student

Market Entry Decision-Making Framework





ASU takes leading role in future of U.S. transportation system

ASU has been named the lead institution for a new U.S. Department of Transportation Tier 1 University Transportation Center that will focus on improving regional travel demand forecasting.

It's one of 20 Tier 1 centers recently awarded to universities around the country – selected from more than 200 proposals – and the first and only one to be led by an Arizona university since the inception of the University Transportation Centers program two decades ago. The new awards provide each of the Tier 1 centers \$7 million over five years.

The center's work will be part of a larger DOT program to develop new systems and technologies that provide better surface transportation mobility and accessibility across the country.

The new center, called the Center for Teaching Old Models New Tricks – or TOMNET for short – puts ASU in charge of a consortium that includes researchers at the Georgia Institute of Technology, the University of Washington and the University of South Florida.

TOMNET's mission is to significantly improve data models and analytical tools that are used to plan transportation infrastructure, operate multimodal systems and optimize travelers' movements in complex networks, said **Ram Pendyala**, the center's director. Pendyala is a professor in the Civil, Environmental and Sustainable Engineering program of the School of Sustainable Engineering and the Built Environment.

More than simply advancing the analytical aspects of forecasting models, Pendyala said, TOMNET will incorporate “human factors” into its research by exploring ways in which sociological and psychological aspects of people's attitudes and values can be used in predicting transportation choices and mobility patterns.



Ram Pendyala, professor and associate director in the School of Sustainable Engineering and the Built Environment

The long road ahead: Improving transportation infrastructure



Minnesota's 1-35 bridge collapse

ASU researchers are paving the way to roads that last longer, cost less and keep safety and sustainability at the forefront.

About 40 percent of federal highways and major roads in the U.S. are not considered to be in good condition. Nearly 70,000 of the nation's bridges are considered structurally deficient, while more than 98,000 are functionally obsolete according to the Federal Highway Administration.

Our roads are in desperate need of a revamp. Researchers at ASU are paving the way to better transportation infrastructure that lasts longer, costs less and protects the environment as well as human safety.

ASU engineering professor **Kamil Kaloush** tests and recommends improvements to pavement performance. His team found that materials for roads can be made better by including a special ingredient derived from cars themselves — recycled tires.

Tire scraps are ground into a material called crumb rubber. The rubber reacts as an enhanced elastic component when mixed with asphalt cement. The mixture forms rubberized or asphalt rubber pavement. This is one of the projects Kaloush oversees as the director of the **National Center of Excellence on SMART (Sustainable Materials and Renewable Technologies) Innovations at ASU.**

Rubberized pavement has many benefits. Just like the egg in a recipe for chocolate chip cookies, rubber makes roads much more resistant to cracking. That translates to less maintenance over time, a smoother and safer ride for drivers.

"Reduced deformation and cracking translates into road-user benefits such as better ride quality, less fuel consumption, lower maintenance frequencies and safer roadways," Kaloush said.

The asphalt-rubber mixture is cost-effective compared with conventional pavement and is better for the environment. Rubberized pavement is also stronger and better performing than traditional types, so it can be applied as a thinner layer, using less material. Because it uses recycled materials, rubberized pavement requires fewer natural resources to produce. Its smoother surface also reduces particle emissions from tire wear and tear, resulting in better air quality.

Because rubberized pavement is thinner than traditional types, it stores and gives off less heat. Researchers have shown this can help mitigate the urban heat-island effect, which happens when buildings and paved surfaces absorb and retain heat. That results in cooler temperatures for everyone, on and off the road.

ASU engineering professor **Narayanan Neithalath** is also developing new materials for infrastructure. Some of his research focuses on longer-lasting concrete and cement for roads, bridges, tunnels and dams. Portland cement is the most commonly used material for these projects, but it lasts only 20 to 25 years and has an environmental footprint like a fleet of Hummers. Neithalath wants to replace Portland cement with a material that lasts twice as long and requires fewer resources to manufacture — call it the Prius of the concrete world.



Kamil Kaloush, professor, SSEBE



Narayanan Neithalath, professor, SSEBE



Building brainy bridges

Narayanan Neithalath's team is hoping to advance a new area of infrastructure technology that borrows a technique from the medical field. Just like an electrocardiogram monitors the rhythm of a patient's heart, Neithalath wants to develop sensors that monitor the health of our highways.


But Neithalath's team is working on a new, more accurate type of fiber-optic sensor. These are coated in chemicals that react with the pavement to measure markers of deterioration. Sensors detect the presence of chlorides and sulfates and then transmit their findings back to engineers.

"For example, if you're putting a lot of salt on your bridge and it starts to go through and corrode the steel, my fiber-optic sensors will tell me how much salt is inside the concrete," Neithalath said.

Before sensors, the only way to find out a road's health was to sever it open and peer between the cracks, or wait for a catastrophic failure. This new approach is like preventative medicine. As soon as the sensors detect vulnerability, they diagnose the problem and alert engineers that repairs are needed. Engineers can then order more tests or decide on a course of treatment.

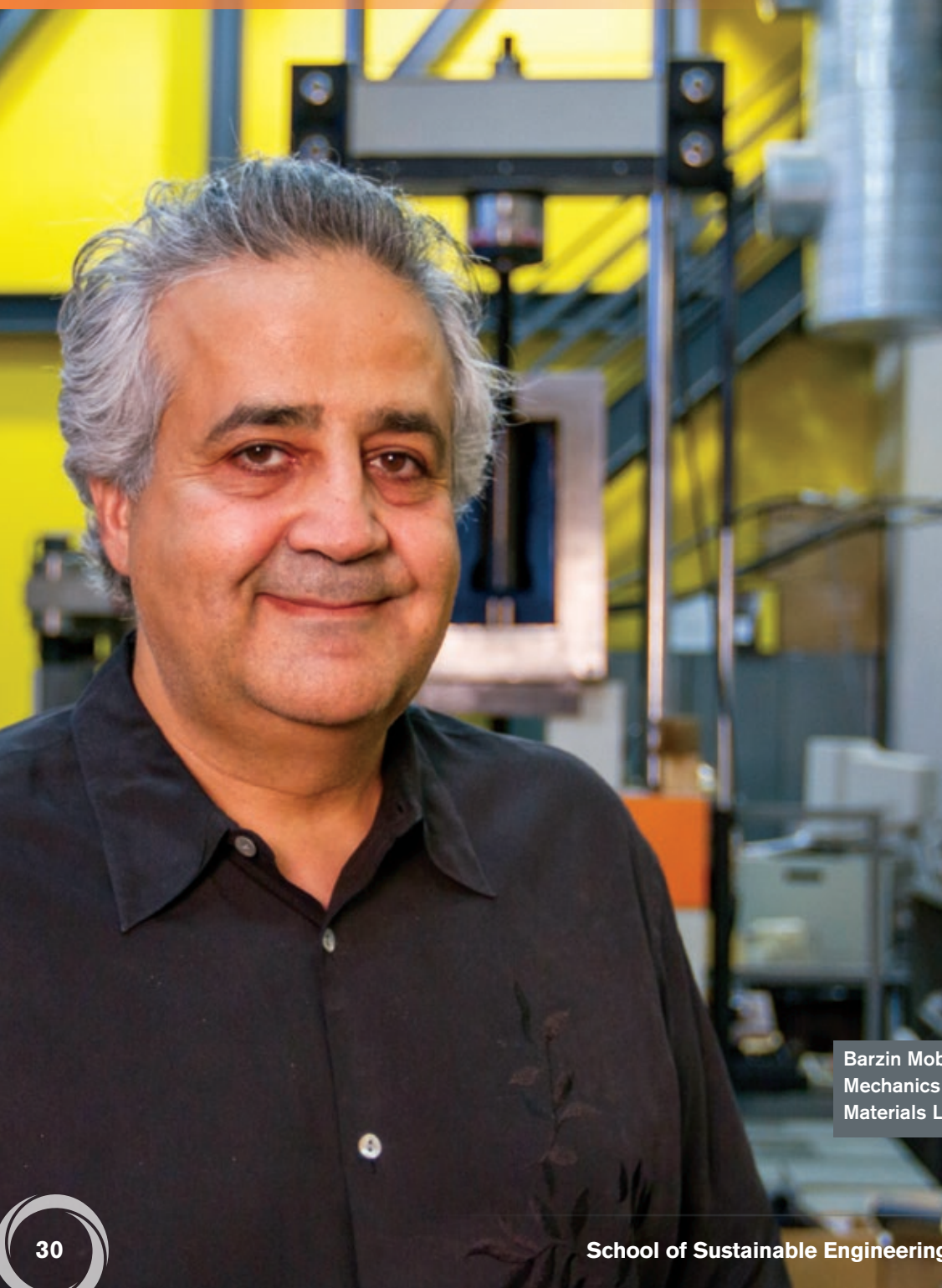
Catching corrosion early on is especially important as more people move into cities. With a growing population, it becomes difficult to shut down roads and bridges for major repairs. With this in mind, ASU researchers want to build infrastructure that puts safety and sustainability on cruise control.

"We can use less resources, we can make bridges last longer and we can make them less risky," Neithalath said. "Sustainability is a collaboration of all these different things." Neithalath is a professor in the School of Sustainable Engineering and the Built Environment.



Some roads across the U.S. already use sensors. For example, the bridge that replaced Minnesota's I-35W is self-monitoring, with 323 fiber-optic sensors embedded in the concrete. The 504-foot structure is also the only bridge in the U.S. to be illuminated by LED lights.





Building a foundation for a better world

ASU professor wants to make composite concrete the next big thing in construction. Fiber- and textile-reinforced concrete is better economically and environmentally.

Substandard housing affects almost 2 billion people worldwide. Wood, often the American building material of choice for housing, isn't always a global resource in developing nations and can be fraught with environmental and durability issues.

That's why professor **Barzin Mobasher** is developing fiber- and textile-reinforced concrete that is strong in compression like traditional concrete but has the added capability to be strong in tension as well as flexible – a material more suitable for a wider range of infrastructure projects.

"I want to develop the next generation of the two-by-four that's not wood, but acts like wood – it can be connected with screws and be used to build trusses – and would not contribute to cutting down forests," said Mobasher, a professor of civil and environmental engineering who has spent more than 30 years researching composite concrete materials.

"The idea is that concrete by itself is very weak in tension and strong in compression," Mobasher said. "You have to reinforce it to increase its tensile strength, such as with rebar and steel. But my work deals with using a smaller type of reinforcement in the context of fibers, the same technology of composite materials like carbon fiber composites replacing the aluminum in the structural components of airplanes."

This concrete has the added ductility, or the ability to absorb energy, to withstand earthquakes and other stresses that would topple other structures thanks to tiny fibers or sheets of textile. Mobasher says houses can be made out of 90 percent composite concrete that is structurally sound and energy-efficient.

Barzin Mobasher in the Structural Mechanics and Infrastructure Materials Laboratory at ASU.

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John Nicklow named UNO president

University of New Orleans provost John Nicklow has been named its next president. Before UNO, Nicklow was the provost and vice chancellor for academic affairs at Southern Illinois University, and its associate dean in the College of Engineering. He holds bachelor's and master's degrees in civil engineering from Bucknell University in Lewisburg, PA and a doctorate in **civil engineering** from **Arizona State University**. In announcing his hiring to UNO, Peter Fos, retiring president, said Nicklow brought "an exceptional combination of skill and experience as a faculty member, researcher, fundraiser, enrollment management professional and administrator."



Melanie Sikes, a 2004 ASU civil engineering graduate received the **Outstanding Young Engineer of the Year** award from the Greater Phoenix Area Engineers Week organization. Sikes, a registered professional civil engineer with Carollo Engineers, was recognized for accomplishments over more than 11 years in project engineering and leadership with a focus on planning, design and construction of water and wastewater infrastructure. She is the current president of the ASCE Phoenix branch and an advisor to ASU's ASCE chapter as well as serving on national and regional committees for the organization's activities. Sikes is also a member of the Arizona Water Association's Young Professionals Committee and is involved in the Arizona Region Future City Competition.

The Piedmont chapter of the South Carolina Society of Professional Engineers (SCSPE) has named Tindall's **Shawn Goddeyne, P.E. Young Engineer of the Year (YEOY)**. This award honors engineers who make outstanding contributions to the engineering profession and the community during the early years of their career. Goddeyne joined Tindall in 2015 and is a licensed professional engineer in several states with specialties in structural engineering, prestressed and reinforced concrete design and steel design. He earned a **Bachelor of Science in Civil Engineering from Arizona State University**.

Arizona Western College celebrated the completion of its engineering building renovation and expansion project highlighting increasing opportunities for Yuma students in the STEM fields. Mayor **Doug Nicholls**, who left Yuma after high school to obtain a **bachelor's degree at Arizona State University in civil engineering**, said there were no local opportunities for engineering students as there are now. Now, students are able to complete a Bachelor of Science degree in systems engineering at AWC and University of Arizona Yuma-two years at each.



**Morteza Abbaszadegan, PhD**

Professor
PhD, University of Arizona
Morteza.Abbaszadegan@asu.edu

Research Expertise: Contemporary water quality issues related to health-related water microbiology including microbial detection methodologies, pathogens inactivation and removal mechanisms during water treatment processes, water quality in water distribution systems and microbial monitoring of source waters. Abbaszadegan is a professor of environmental microbiology/engineering and founding director of the National Science Foundation (NSF) Water & Environmental Technology (WET) Center at Arizona State University.

Honors and Distinctions: Authored more than 100 research manuscripts, book chapters and reports in the area of environmental microbiology and engineering; Editor of the Journal of Water and Health; successfully established NSF Centers in Water Quality and Environmental Technology at ASU; served on several national and international committees and currently is the Chair, Section 9510, Detection of Enteric Viruses for Standard Methods. Abbaszadegan received the Outstanding Research Team Award, University of Arizona.

**Braden Allenby, PhD, JD**

President's Professor
PhD, Rutgers University
Braden.Allenby@asu.edu

Research Expertise: Sustainable engineering, Design for Environment, industrial ecology, engineering and applied ethics, transhumanism and emerging technologies, and earth systems engineering and management

Honors and Distinctions: Allenby is the Lincoln Professor of Engineering and Ethics, and of Law, past President of the International Society for Industrial Ecology, ex-Chair of the AAAS

Committee on Science, Engineering, and Public Policy, Chair of the IEEE Presidential Sustainability Initiative, an AAAS Fellow, an AT&T Industrial Ecology Fellow, a Batten Fellow at Darden Business School at the University of Virginia, and a Fellow of the Royal Society for the Arts, Manufactures & Commerce. Allenby is also the founding chair of the Consortium for Emerging Technologies, Military Operations, and National Security; founding director of the Center for Earth Systems Engineering and Management.

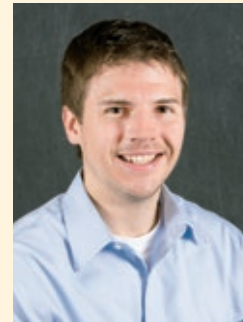
**Samuel T. Ariaratnam, PhD, PE, PEng**

Professor and Construction Engineering Program Chair
PhD, University of Illinois at Urbana-Champaign
ariaratnam@asu.edu

Research Expertise: Sustainable urban underground infrastructure systems with an emphasis on horizontal directional drilling and trenchless pipe replacement

Honors and Distinctions: Ariaratnam has published over 250 technical papers, holds four patents, co-authored five textbooks, and is active in numerous professional organizations. He received the Young Civil Engineer Achievement Award from the University

of Illinois at Urbana-Champaign in 2003, Arthur M. Wellington Prize (2015) and John O. Bickel Award (2001) from the American Society of Civil Engineers (ASCE) and was named to the Phoenix Business Journal's prestigious "Top Forty under 40" list in 2006. Trenchless Technology Magazine named Ariaratnam the "2012 Trenchless Technology Person-of-the-Year". He was Chairman of the International Society for Trenchless Technology from 2010-2013 and currently serves as Vice Chair of the ASCE Pipelines Division. Ariaratnam is a registered professional engineer in the State of Arizona and the Province of Ontario (Canada).

**Steven K. Ayer, PhD**

Assistant Professor
PhD, The Pennsylvania State University
sayer@asu.edu

Research Expertise: Emerging and mobile computing technologies in design and construction, mixed and augmented reality visualization, building information modeling (BIM), and engineering education

His research focuses on leveraging existing and emerging computing technologies to assist the building industry and also help in educating students who intend to pursue careers in these fields. His research explores new technological capabilities as well as how these new

technologies influence human behavior in design and construction contexts. Up to date information about his research can be found at www.etbimlab.com.

Honors and Distinctions: Ayer is a member of the American Society of Civil Engineering (ASCE); ASCE's Construction Research Congress; FIATECH's "Horizon 360" and "Emerging Systems and Technology Productivity Advancement Target" teams; and Building SMART's Academic Interoperability Coalition. He was also selected as one of 2016's "CII New Scholars" by the Construction Industry Institute.

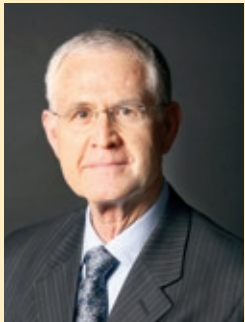
**Treavor Boyer, PhD**

Associate Professor
Environmental Engineering Program Chair
PhD, University of North Carolina at Chapel Hill
thboyer@asu.edu

Research Expertise: Boyer's research is broadly focused on water sustainability, and spans drinking water and wastewater treatment, and natural aquatic systems. Specifically, his research takes a systems thinking approach to water quality and treatment that considers global drivers such as urbanization, climate change, biogeochemical cycles, sustainable engineering, and disruptive innovation.

Examples of recent research projects include innovative ion exchange treatment and regeneration for small drinking water systems, urine source separation as an alternative approach for nutrient recovery and pharmaceutical removal from wastewater, and impacts of sea-level rise and saltwater intrusion on drinking water treatment and disinfection. Before joining ASU, Boyer was an Associate Professor in the Department of Environmental Engineering Sciences at the University of Florida.

Honors and Distinctions: Boyer is the recipient of an NSF CAREER award and has been recognized for his commitment to teaching and mentoring by several departmental awards at the University of Florida.

**Allan Chasey, PhD, PE**

Associate Professor and Program Chair DEWSC
PhD, Virginia Tech
achasey@asu.edu

Research Expertise: Construction process for high-technology, controlled environment facilities, sustainable construction Chasey is an associate professor and the Program Chair for the Del E. Webb School of Construction. He received his PhD from Virginia Tech, MS in Engineering Management from the Air Force Institute of Technology, and BS in Civil Engineering from ASU. He is also the Sundt Professor of Alternate Delivery and Sustainable Development.

Honors and Distinctions: Chasey is a registered Professional Civil Engineer in Arizona, an OSHA Construction Outreach Trainer, and a LEED AP. He serves on the Board of Advisors for Fiatech and the Board of Directors for the Healthcare Institute. He is a member of the American Society of Civil Engineers (ASCE), the Association for the Advancement of Cost Engineering (AACE), and the International Society of Pharmaceutical Engineers (ISPE) and the American Society of Healthcare Engineering.

**Mikhail Chester, PhD**

Assistant Professor
PhD, University of California, Berkeley
mchester@asu.edu

Research Expertise: Energy and environmental assessment of large infrastructure systems, transportation systems and cities, evaluating life-cycle and supply chain effects and their associated human and environmental impacts.

Chester has an affiliate appointment with the School of Sustainability. His research expands the assessment boundaries of complex systems to understand comprehensive effects of policies and decisions, including infrastructure interdependencies. He is interested in determining the external control and damage costs of these impacts and how internalization of these costs may inform behavioral economics for sustainable policies and decisions. Chester's transportation life-cycle assessment research project website with up-to-date results and in-depth methodological documentation is available at www.sustainabletransportation.com.

Honors and Distinctions: Chester's Environmental Assessment of Passenger Transportation Should Include Infrastructure and Supply Chains publication was recently selected as one of the journals top 3 manuscripts for 2009.

**Oswald W. Chong, PhD, PEng, LEED AP**

Associate Professor
PhD, University of Texas at Austin
ochong@asu.edu

Research Expertise: Energy modeling and degradation, information technology and systems, energy, project management systems, heavy infrastructure systems

Chong joined the School of Sustainable Engineering and the Built Environment in 2014. He founded the International Conference on Sustainable Design, Engineering and Construction (its fourth conference in 2016 and attended by over 250 participants), the Institute of Sustainable Engineering Knowledge, and the Elsevier Journal of Knowledge and Information Modeling for Sustainable Science, Design and Engineering. Chong's research focuses on the clustering, modeling and disseminating of sustainable engineering knowledge, and understanding and modeling the degradation and recovery processes of materials, products, buildings, infrastructure, and systems. He also works extensively on project management systems for infrastructure (particularly tunneling and underground construction).

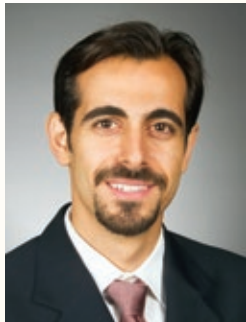
Honors and Distinctions: Chong advises the government agencies in several countries on issues pertaining to carbon emissions, energy efficiency, sustainability, information technology and productivity.

**Otakuye Conroy-Ben, PhD**

Assistant Professor
PhD, University of Arizona
Otakuye.conroy@asu.edu

Research Expertise: Antibiotic and metal resistance in bacteria, environmental endocrine disruption, wastewater epidemiology, solid waste management, bacterial gene expression, bioremediation of petroleum contaminated water and soil, wastewater reuse, boron stable isotopes, proteoliposomes for water treatment

Honors and Distinctions: Member of the American Indian Science and Engineering Society (AISES), Board of Directors Society for the Advancement of Chicanos and Native Americans in Science (SACNAS), Society of Environmental Toxicology and Chemistry (SETAC), American Society of Civil Engineers (ASCE), Water Environment Foundation

**Mounir El Asmar, PhD**

Assistant Professor
Senior Sustainability Scientist, Global Institute of Sustainability
Co-director, EPA National Center of Excellence on SMART Innovations
PhD, University of Wisconsin-Madison
asmar@asu.edu

Research Expertise: Innovative project delivery systems, sustainable performance improvement, decision making for the built environment.

El Asmar's research activities focus on improving the performance of the built environment and the stakeholders delivering it. He uses mathematical and statistical modeling to develop processes that advance decision-making in the built environment. His work is funded by the U.S. Department of Transportation, the National Cooperative Highway Research Program, the Construction Industry Institute, the New Horizons Foundation, the National Science Foundation, and private industry.

Honors and Distinctions: American Society of Civil Engineers (ASCE) Thomas Fitch Rowland Prize, Construction Industry Institute (CII) Distinguished Professor Award; ASCE Excellence in Civil Engineering Education Teaching Fellowship; SSEBE Outstanding Service Award, ASCE Best Paper Award for the Journal of Construction Engineering and Management.

**James Ernzen, PhD, PE**

Associate Professor
PhD, University of Texas at Austin
james.ernzen@asu.edu

Research Expertise: Concrete materials, production and construction operations; integrated project delivery methods

Ernzen serves as the Academic Co-chairperson of the Project Delivery Methods Task Force in the Alliance for Construction Excellence where he teaches and performs research in integrated project delivery methods. He coordinates the concrete construction emphasis area in DEWSC.

Honors and Distinctions: Participated on an FHWA-AASHTO sponsored International Scanning Tour (2001) to investigate innovative contracting methods in Europe; designated as one of 75 charter Fellows of the Design Build Institute of America (2002); Distinguished Service Award by American Institute of Steel Constructors, and the Lifetime Achievement Award from the Arizona Chapter of the American Concrete Institute. Director of the Del E. Webb School (2005-2009).

**Peter Fox, PhD, PE**

Professor and Graduate Chair
PhD, University of Illinois
Peter.fox@asu.edu

Research Expertise: Water reuse, biological treatment processes and brine disposal/desalination

Professional interests are primarily in water reuse, biological treatment processes and brine disposal/desalination. Fox has focused his most recent work on physical water treatment systems and sustainable technologies.

Honors and Distinctions: Fox served on the National Academy of Science ad-hoc committee that published the National Research Council report entitled "Prospects for Managed Underground Storage of Recoverable Water" in 2008; authored the groundwater recharge chapter in the Metcalf and Eddy textbook on water reuse; executive committee member for the development of the national roadmap for desalination and water purification; Quentin Mees Research Award from the AzWater Association (1991, 1994, 1997 and 2003); Nathan Burbank Environmental Educator Award (2013).



Matthew Fraser, PhD

Professor
Executive Director, Quantum Energy and Sustainable Solar Technologies Engineering Research Center
PhD, Caltech
Matthew.fraser@asu.edu

Research Expertise: Urban air quality, sources and control of air pollution, sustainability analysis of energy systems

Fraser is the Executive Director of the Quantum Energy and Sustainable Solar Technologies Engineering Research Center (QESST ERC), as well as a Professor in SSEBE and the School of Sustainability at ASU. The QESST

ERC is an interdisciplinary team consisting of multiple universities, world renowned companies, and leading photovoltaic (PV) entrepreneurs focused on building a strategic partnership to generate innovative solutions to sustainable electricity generation. As a faculty member, Fraser directs his own research projects on urban air quality. His research focuses on using organic speciation and receptor modeling to apportion ambient pollutants to their original source.

Honors and Distinctions: Presenter "University/City Partnerships in Promoting Urban Sustainability" at the White House Office of Science and Technology Policy Workshop on Energy Efficiency, (2011). Panelist at the American Association for the Advancement of Science and Brookings Institute Forum on "Eco-Engineering: Building Sustainable Cities," (2011).



G. Edward (Edd) Gibson, Jr., PhD, PE, NAC

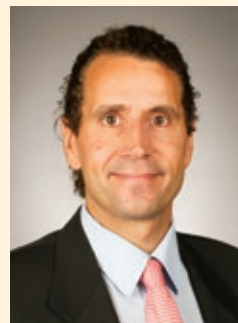
Professor and Director of SSEBE
Sunstate Chair of Construction Management and Engineering
PhD, Auburn University
GEdwardGibsonJr@asu.edu

Research Expertise: Front end planning, alternative project delivery methods, risk management, dispute resolution

Edd Gibson joined ASU and the Del E. Webb School of Construction in August 2009 as its programs chair. In 2011 he was named director of the School of Sustainable Engineering and the Built Environment. Gibson has led over \$9.5 million in funded research during his career from sponsors

such as NSF, Construction Industry Institute, NRC, and Alfred P. Sloan Foundation. He has taught on the university level for over 25 years and has delivered more than 200 short courses to industry, receiving awards for university and continuing education instruction. Gibson has several years of industry employment experience and is a licensed professional engineer in Texas.

Honors and Distinctions: Elected as Fellow in ASCE, 2006; elected National Academy of Construction (NAC), 2005; U.S. Dept. of State, Fulbright Senior Specialist Grant to Norway, 2004; Construction Industry Institute's Researcher of the Year Award, 2004; Construction Industry Institute's Outstanding Instructor Award, 2014; National Society of Professional Engineers; Sustaining Universities Program; Outstanding Engineering Educator Award 2002; American Society of Civil Engineers' 2016 Peurifoy Research Award.



David Grau, PhD

Assistant Professor
PhD, The University of Texas at Austin
David.Grau@asu.edu

Research Expertise: Sustainable design and construction operations, uncertainty analysis and risk management, worker health and safety, lean theory and implementation, and engineering education

Grau graduated with both an MS and a PhD in Civil, Architectural, and Environmental Engineering from The University of Texas at Austin, and with an Industrial Engineering degree from the Universitat Politècnica de Catalunya. Previous to his affiliation with ASU, he taught at The

University of Alabama as an Assistant Professor for four years. Currently Grau is a member of ASCE and ASSE professional societies.

Honors and Distinctions: During his academic career, Grau has been the recipient of numerous teaching and research awards, including the Distinguished Professor Award by the Construction Industry Institute and the Celebration of Engineering & Technology Innovation (CETI) award by FIATECH. Complementing his academic career, he has worked in the private industry for more than ten years inclusive of positions such as program manager for heavy industrial projects and director of a large engineering department. He has led large interdisciplinary and multicultural teams to deliver numerous capital projects in South America, Africa, and Europe. Grau holds a professional license as Industrial Engineer in Spain.



Rolf Halden, PhD, PE

Professor PhD, University of Minnesota
Director, Center for Environmental Security
halden@asu.edu

Research Expertise: Pollution, health, urban metabolism, water, wastewater, environmental monitoring & remediation, green chemistry/engineering

Halden has led over \$12M in sponsored research (NIH, EPA, DOD, NSF and DOE) at Livermore National Lab, Johns Hopkins and ASU. He has authored over 180 peer-reviewed articles, book chapters, and patents as well as 300+ conference papers. His works include a

book on contaminants of emerging concern, the first map of the human cord blood proteome, and the Human Health Observatory. Devices developed by his team for water monitoring and aquifer remediation are in commercial use at hazardous waste sites.

Honors and Distinctions: American Chemistry Society Expert (2014 –); FAO/EPA-NAS Expert Forum on Microplastics (2016/2014); Congressional Briefing (2011); ASU Biodesign Startup Company (2010–); NRC Committee of the National Academies (2006–07); FDA Special Government Employee and Nonprescription Drugs Advisory Committee (2005 –); Maryland State Water Quality Advisory Committee (2003–05).



Keith Hjelmstad, PhD

Professor and CESE Program Chair
PhD, University of California, Berkeley
keith.hjelmstad@asu.edu

Research Expertise: Computational mechanics, earthquake engineering, stability of structures, optimization, structural identification, nondestructive evaluation of large structures, and numerical simulation of complex structures.

Hjelmstad is Professor of Structural Engineering in the School of Sustainable Engineering and the Built Environment (SSEBE). He previously served as University Vice President and Dean of the

College of Technology and Innovation at ASU.

Honors and Distinctions: Prior to coming to ASU Hjelmstad was on the faculty at the University of Illinois at Urbana-Champaign for 25 years where he was a professor, associate dean of academic affairs, and a member of the Science Steering Committee of the Center for Simulation of Advanced Rockets. Hjelmstad is the author of the book Fundamentals of Structural Mechanics (Springer, 2/e); a member of several professional associations for engineers and serves as associate editor of the Journal of Constructional Steel Research and the ASCE Journal of Structural Engineering.



Christian Hoover, PhD

Assistant Professor
PhD, Northwestern University
Christian.Hoover@asu.edu

Research Expertise: Translating material fracture behavior at nano-, micro- and macroscale into improved structural performance relevant for many civil engineering applications.

Hoover joined the School of Sustainable Engineering and the Built Environment in 2016 after serving as a post-doctoral student at MIT. Hoover's recent work focuses mostly on experiments with nano-materials, but he has also made theoretical and numerical

contributions to the understanding of fracture mechanics.

Honors and Distinctions: 2012 Terminal Year Fellowship through McCormick School of Engineering. Member of the American Concrete Institute.



Sandra Houston, PhD, PE

Professor
PhD, University of California, Berkeley
Sandra.houston@asu.edu

Research Expertise: Geotechnical engineering

Houston's contributions to the field of geotechnical engineering focus on unsaturated soils, including in particular advancement of methodologies for dealing with arid region problem soils, particularly collapsible and expansive soils. She joined ASU in 1984 and is the regular instructor of undergraduate and graduate level foundation engineering classes and teaches a graduate level

course on Unsaturated Soil Mechanics.

Honors and Distinctions: Leadership positions in the American Society of Civil Engineers (ASCE), the Geo-Institute of ASCE, and the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE). Recipient of the ASCE 2017 Karl Terzaghi Award, 2015 Daniel Jankowski Legacy Award, 2004 William H. Wisely American Civil Engineer Award, past president of the Geo-Institute (GI), past chair of the GI Committee on Unsaturated Soils and the ASCE Committee on Diversity and Inclusion.



Jaewon Jang, PhD

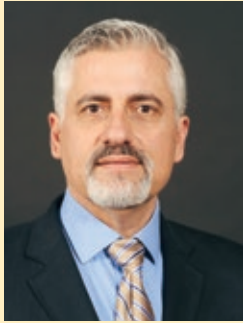
Assistant Professor
PhD, Georgia Institute of Technology
Jjang19@asu.edu

Research Expertise: Multiphase fluid flow through porous media for the application to gas hydrate production, shale gas recovery, CO₂ sequestration, and geothermal recovery

Jang joined the School of Sustainable Engineering and the Built Environment at Arizona State University in 2014. Prior to coming to ASU, he spent three years at Wayne State University as an assistant professor. In addition, Jang has three years of experience at highway and tunnel

construction sites in Korea. Jang's research focuses on the physical and chemical processes in soils during energy production and waste disposal such as methane production from gas hydrate-bearing sediments, geothermal energy recovery, and CO₂ sequestration.

Honors and Distinctions: Jang is a member of American Geophysical Union (AGU), International Society for Porous Media (INTERPORE), American Society of Civil Engineers (ASCE). He has 9 peer-reviewed journal papers and conference proceedings.



Kamil Kaloush, PhD, PE

Associate Professor
Director, National Center of Excellence on SMART Innovations
PhD, Arizona State University
Kamil.kaloush@asu.edu

Research Expertise: Pavements, materials characterization, crumb rubber and fibers applications, urban heat Island

Kaloush is an associate professor in the School of Sustainable Engineering and the Built Environment, affiliate faculty in the School of Sustainability, and Director of the National Center of Excellence on SMART Innovations (www.asuSMART.com). He is a registered Professional Engineer, and has over 30

years of experience in pavement research and management services. His areas of expertise include pavement materials design, thermal properties, advanced laboratory testing, field performance evaluation, and pavement management systems.

Honors and Distinctions: AzBusiness Leaders – Research; Greater Phoenix Area E-Week Outstanding Engineering Educator; Rubber Pavements Association Outstanding Research Award; IRF Global Awards for RJ122 Highway Rehabilitation, Rio de Janeiro, Brazil. Asphalt Rubber Ambassador Award; Board of Directors: Transportation Research Board Design and Construction Group Executive Board; International Road Federation (IRF); Rubberized Asphalt Foundation; Arizona Council for Transportation Innovation; Civil Engineering Examination Committee, National Council of Examiners for Engineering and Surveying; and Vice Chair of the Technical Advisory Board of the Rubber Pavements Association.



Dean T. Kashiwagi, PhD, PE

Professor
PhD, Arizona State University
Dean.Kashiwagi@asu.edu

Research Expertise: Supply chain best value procurement risk minimization

Kashiwagi is the worldwide expert in optimizing the delivery of construction and other services using performance information. His Performance Information Procurement System (PIPS) and Performance Information Risk Management System (PIRMS) are licensed by the U.S. Army Medical Command and the General Services Administration.

Kashiwagi has generated over \$12M in grants over 18 years, and has successfully run over 975 project tests, delivering over \$4.7B of construction and other services. He is director of the Performance Based Studies Research Group (PBSRG) at ASU.

Honors and Distinctions: Over 206 refereed conference and journal papers; registered engineer in eight states; 2011 Silver Award for Procurement Excellence by NASPO; 2009 International Facility Management Association Educator of the Year; 2005 CoreNet Global Innovation of the Year Award; 2001 Pono Technology Award, Fulbright Professor.



Edward Kavazanjian, Jr., PhD, PE, NAE

Professor
Director, Center for Bio-mediated and Bio-inspired Geotechnics
PhD, University of California, Berkeley
edkavy@asu.edu

Research Expertise: Biogeotechnical engineering, geotechnical earthquake engineering, waste containment, mechanical properties of municipal solid waste

Honors and Distinctions: Geotechnical engineer with 20 years' experience in practice and 19 years teaching and research experience. Appointed Regents Professor in 2015, elected to the National Academy of Engineering in 2013, recipient of the Karl Terzaghi Award (2011), Thomas A. Middlebrooks Award (2010), and Ralph B. Peck Award (2009) from ASCE, the Arizona Pavements/Materials Conference Community Service Award (2012), and the Greater Phoenix Area eWeek Engineering Educator of the year (2009). Director of the NSF-sponsored *Center for Bio-mediated and Bio-inspired Geotechnics (CBBG)*, lead-author of the Federal Highway Administration guidance document on *LRFD Seismic Analysis and Design for Transportation Geotechnical Features and Structural Foundations*, Past President of the Geo-Institute of ASCE. Currently serves as President of the US University Council for Geotechnical Education and Research (USUCGER).



Rosa Krajmalnik-Brown, PhD

Associate Professor
PhD, Georgia Institute of Technology
Dr.Rosy@asu.edu

Research Expertise: Applications of molecular microbial ecology to enhance microbial bioremediation, bioenergy, and human health. Other areas of interest include bioremediation of soil, sediments, and groundwater, the use of microbial systems for bioenergy, and host-microbe interactions to improve health.

Krajmalnik-Brown is an associate Professor in the School of Sustainable Engineering and the Built Environment and the Swette Center for Environmental Biotechnology. She joined the SSEBE faculty in 2007 and has been successful in bringing funding for her research from many federal agencies including NIH, DoE, DoD and NSF. Krajmalnik-Brown is the author of several patents and more than 70 peer-reviewed publications. She specializes in molecular microbial ecology for bioremediation, the use of microbial systems for bioenergy production, and the human intestinal microbial ecology and its relationship to obesity, bariatric surgery, and autism.

Honors and Distinctions: 2016 Fulton Exemplar Faculty; 2012 Forty under Forty leaders, City of Phoenix; NSF CAREER award 2011-2015; AEES Outstanding 2003 Ph.D. Candidate in Environmental Engineering; Fulbright Scholar 1997-2000.



Klaus S. Lackner, PhD

Professor
Director, Center for Negative Carbon Emissions
PhD, Heidelberg University, Germany
Klaus.Lackner@asu.edu

Research Expertise: Closing the carbon cycle by capturing carbon dioxide from the air, carbon sequestration, carbon footprinting, innovative energy and infrastructure systems and their scaling properties, the role of automation, robotics and mass manufacturing in downscaling infrastructure systems, and energy and environmental policy

Lackner joined the School of Sustainable Engineering and the Built Environment at Arizona State University in 2014. Prior to coming to ASU he was the Ewing Worzel Professor of Geophysics and department chair, Earth and Environmental Engineering, at Columbia University.

Honors and Distinctions: Director of Lenfest Center for Sustainable Energy at the Earth Institute, Columbia University; American Association for the Advancement of Science Fellow (2013); Recognized for contributing to the 2007 Nobel Peace Prize for the IPCC; Co-founder of Global Research Technologies (2004).



Yingyan Lou, PhD

Assistant Professor
PhD, University of Florida
Yingyan.lou@asu.edu

Research Expertise: Transportation network modeling and analysis, optimization of multi-modal transportation networks, transportation operations, implications of emerging technologies and travel behaviors in transportation planning and operations, statistical modeling of transportation safety.

Lou holds a B.S. and a B.A. Econ degree from Beijing University, and received her M.S. and Ph.D. degrees in Civil Engineering from the University of Florida. Before ASU, she worked at the Department of Civil, Construction and Environmental Engineering at The University of Alabama.

Honors and Distinctions: Pikarsky Award for Outstanding Ph.D. Dissertations in Science and Technology Council of University Transportation Centers (2010); served on the Editorial Board for four journal and conference publications; member of three Transportation Research Board committees (Transportation Network Modeling, User Information Systems, and Highway Safety Performance); vice chair of the Intelligent Transportation Systems Interest Group in the Transportation and Logistics Society of the Institute for Operations Research and Management Sciences; Outstanding Area Editor Award 2012 COTA International Conference of Transportation Professionals (2012).



Michael S. Mamlouk, PhD, PE, F.ASCE

Professor
PhD, Purdue University
Mamlouk@asu.edu

Research Expertise: Highway materials, pavement design and management, pavement evaluation, pavement maintenance and rehabilitation

Honors and Distinctions: Over 30 years of research and teaching experience in the field of pavement/materials engineering. He recently completed an \$850,000 project funded by the National Cooperative Highway Research

Program (NCHRP) dealing with the endurance limit of hot-mix asphalt. Mamlouk has published numerous technical papers and is actively involved in professional societies such as ASCE, AAPT, TRB and ASTM. He is the main author of the "Materials for Civil and Construction Engineers" textbook, which has been used by over 150 engineering schools worldwide. He is a professional engineer in the state of Arizona and has worked as a consultant and expert witness to many highway agencies and local industry. He is a fellow of ASCE and an active member of other professional societies such as TRB, AAPT and ASTM. He received the Pavements/Materials Conference Community Service Award in 2010.



Giuseppe Mascaro, PhD

Assistant Professor
PhD, University of Cagliari, Italy
Giuseppe.mascaro@asu.edu

Research Expertise: Stochastic hydrology, statistical downscaling, watershed modeling, impact of climate change on water resources, remote sensing, food-water-energy nexus, and hydroinformatics. Mascaro's research focuses on extracting meaningful information from observations and models of the earth's climate and using it to support engineering applications. Mascaro actively seeks ways to

synergistically utilize statistically- and physically-based data analysis techniques and models. The outcomes of his research aim at (i) monitoring and quantifying the risk of climate extremes; (ii) planning, designing, and operating infrastructure and energy systems; and (iii) supporting agriculture and food production.

Honors and Distinctions: Mascaro joined SSEBE in 2016 after four years as a Post-Doctoral Scholar at ASU. Prior to that, Mascaro was a Post-Doctoral Research Assistant at the University of Cagliari, Italy. He is currently affiliated with the Global Security Initiative, and the Urban Climate Research Center at ASU and an active member of the American Geophysical Union (AGU) and European Geophysical Union (EGU).



Larry Mays, PhD, PE, PH, D.WRE, F.ASCE, F.IWA

Professor
PhD, University of Illinois
Mays@asu.edu

Research Expertise: Hydrosystems. Study of ancient water systems and the use of optimization methods for the analysis, design and operation of water infrastructure systems to promote water resources sustainability

Mays' research has been published in over 220 peer-reviewed and proceeding papers, over 70 chapters in books he edited, and another invited 13 book chapters. He is the author, co-author or editor-in-chief of 23 books including Ancient Water Technologies, Water Resources

Engineering; Groundwater Hydrology; Applied Hydrology; Hydrosystems Engineering and Management; Water Resources Handbook; Water Distribution Systems Handbook; Hydraulic Design Handbook.

Honors and Distinctions: 1992 ASPE Engineer of the Year in Education Award, 1993 AWPCA Quentin Mees Research Award, 1999 distinguished alumnus award from Civil Engineering, University of Illinois at Champaign-Urbana, a fellow of ASCE, IWRA, and IWA, 2014 ASCE Julian Hinds Award, 2014 Prince Sultan Bin Abdulaziz International Water Prize – Surface Water, Lifetime Member of ASCE, 2015 Warren Hall Medal - UCOWR, 2016 Academy of Civil Engineering at the Missouri University of Science and Technology, and the 2016 ASCE Ven Te Chow Award.



Barzin Mobasher, PhD, PE

Professor
PhD, Northwestern University
Barzin@asu.edu

Research Expertise: Mechanics of composite materials, development of new construction materials, durability of building materials, and performance based specifications

Mobasher, who joined the Ira A. Fulton Schools of Engineering faculty in 1991, has been involved in research and teaching in the area of cement and concrete engineering for more than 25 years. He has published more than 150 peer-reviewed research papers

on the mechanics and durability of concrete technology, and has delivered more than 120 technical presentations worldwide.

Honors and Distinctions: Fellow of the American Concrete Institute (ACI) (2009); member of the American Society of Civil Engineers (ASCE) and American Ceramic Society and member of the International Editorial Board of Computers and Concrete; author of "Mechanics of Fiber and Textile Reinforced Cement Composites"; paper titled: Mechanical behavior of strain-hardening cement-based composites (SHCC) under low and high tensile strain rates was selected among the top three papers in 2011 by the Japan Concrete Institute.



Narayanan Neithalath, PhD

Professor
PhD, Purdue University
Narayanan.Neithalath@asu.edu

Research Expertise: Materials science of cementitious systems including chemistry-based design of novel and carbon-neutral materials for desired performance, material characterization, property prediction and sensing, experimental mechanics, and computational modeling of material response at multiple scales

His specific expertise is in the materials science of cements and concrete, including development of new materials, and composition-microstructure

property relationships that aid in material design. He has published around 150 papers in peer reviewed journals and conference proceedings, and has received several awards for his work on novel concrete materials.

Honors and Distinctions: NSF CAREER Award (2008); Bengt Friberg Award (2005) for the Best Paper by a Young Author– 8th International Conference on Concrete Pavements, Colorado Springs, CO; Portland Cement Association (PCA) Fellowship (2003) for research on Enhanced Porosity Concrete systems; Section Editor (Cementitious Materials) – ASCE Journal of Materials in Civil Engineering; Member of the editorial board of Cement and Concrete Composite.



Kristen Parrish, PhD

Assistant Professor
PhD, University of California Berkeley
Kristen.Parrish@asu.edu

Research Expertise: Energy efficiency in commercial buildings, lean construction, integrated project delivery, decision-making systems

Parrish joined the School of Sustainable Engineering and the Built Environment in 2012. She has a Senior Sustainability Scientist appointment in the Global Institute of Sustainability. Previously, she was a Scientific Engineering Associate at the Lawrence Berkeley National Laboratory and a lecturer at the University of California

Berkeley. Parrish's work focuses on integrating energy efficiency measures into building design, construction, and operations processes. Specifically, she is interested in novel design and delivery processes that financially and technically facilitate energy-efficient buildings. Parrish serves as the Chair of the International Conference for Sustainable Design, Engineering, and Construction; she also serves the ASU community through participation in Society of Women Engineers and Advancing Women in Construction events.

Honors and Distinctions: Outstanding Performance Award at Lawrence Berkeley National Laboratory (2010), Best Mentor Award (2012) for her work with Technovation; SSEBE Service Award (2013); Ira A. Fulton Schools of Engineering Top 5% Teaching Award (2015).



Ram M. Pendyala, PhD

Professor and Associate Director
Director, USDOT University Transportation Center (TOMNET)
PhD, University of California at Davis
Ram.pendyala@asu.edu

Research Expertise: Transportation systems engineering, activity-based travel behavior modeling, travel demand forecasting, travel surveys and big data applications, transformative technologies in transportation, policy analysis

Pendyala conducts research and teaches courses in transportation systems engineering and planning. He develops computational

model systems capable of forecasting demand for transportation under a wide variety of socio-economic, built environment, and policy scenarios. He has more than 200 publications and is the Director of a USDOT University Transportation Center called TOMNET. He has completed more than \$7 million in sponsored research for federal, state, and local agencies.

Honors and Distinctions: Chair, Transportation Research Board (TRB) Planning and Environment Group (2015-2018); Chair, TRB Travel Analysis Methods Section (2009-2015); TRB Pyke Johnson Best Paper Award (2011 and 2013); Associate Editor, Transportation Research Part D (2015-present); Chair, International Association for Travel Behavior Research (2010-2012).



François Perreault, PhD

Assistant Professor
PhD, University of Quebec in Montreal
Francois.perreault@asu.edu

Research Expertise: Perreault's research uses an interdisciplinary approach, combining microbiology, chemistry, and nanotechnology, to address critical issues related to water quality and water treatment. His research focuses on the development of biofouling control strategies in engineered systems, the use of novel nanomaterials for water treatment technologies, and in understanding the fundamental interactions of nanomaterials with biological systems.

Honors and Distinctions: Perreault received the 2015 Exceptional Reviewer Award for the journal Environmental Toxicology and Chemistry, the 2014 Best paper award in Environmental Science & Technology Letters, the Francine Beaudoin-Denizeau Excellence Award in Biochemical Toxicology, and the Saint-Lawrence Center Excellence Award in Environmental Sciences. He was a Natural Sciences and Engineering Research Council of Canada doctoral and postdoctoral fellow. He is a member of the Editorial board of Environmental Toxicology and Chemistry.



Subramaniam (Subby) Rajan, PhD

Professor
PhD, University of Iowa
S.Rajan@asu.edu

Research Expertise: Finite element based design optimization, parallel computations, constitutive material modeling

Rajan's teaching and research interests include solid mechanics with emphasis on constitutive modeling, finite element analysis, design optimization and high-performance software development. Currently he is working on research projects sponsored by the Federal Aviation Administration (FAA), the Army Research Office

(ARO) and local industries. These projects involve characterization of materials for blast and ballistic mitigation, development of constitutive models and computer simulations, and design optimization to reduce the weight, thickness and cost of body, vehicle and aircraft armor.

Honors and Distinctions: Outstanding Engineering Educator of the Year (2009) awarded during Greater Phoenix Area Engineer's Week; Top Five Percent Faculty Award from Ira A. Fulton Schools of Engineering (2008); member of the Educator Advisory Board for the Kno Corporation; Board member for the Resource Center for Global Ec happiness and Faculty Expert for the Indo-US Collaboration for Engineering Education



T. Agami Reddy, PhD, PE

Professor
PhD, Thermodynamics and Energy Laboratory, University of Perpignan, France
T.Agami.Reddy@asu.edu

Research Expertise: Sustainable energy, building energy data analytics and knowledge extraction for efficient operation of building energy systems, green building technologies and solar systems

Honors and Distinctions: 2014 Yellott Award by the Solar Energy Division of the American Society of Mechanical

Engineers (ASME), SRP Professor of Energy and Environment with joint faculty appointments with The Design School and the School of Sustainable Engineering and the Built Environment, courtesy teaching appointments in the School for Engineering of Matter, Transport and Energy and the School of Sustainability, licensed mechanical engineer, a Fellow of the American Society of Mechanical Engineers (ASME) and the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE), former Chair of the ASME Solar Energy Division, and Past Chair of the ASHRAE Research Committee.



Bruce Rittmann, PhD, NAE

Regents' Professor
Director, Swette Center for Environmental Biotechnology
PhD, Stanford University
Rittmann@asu.edu

Research Expertise: Environmental biotechnology, or managing microorganisms to provide services to society. The services include bioremediating pollution of water and soil, and generating renewable bioenergy. This highly inter-disciplinary research links engineering fundamentals with microbial ecology, biochemistry, genetics, geochemistry, and materials.

Honors and Distinctions: Membership in the National Academy of Engineering (NAE), Distinguished Member of ASCE, a Fellow of the AAAS and the IWA, the Huber and Freese Awards from the ASCE, and appointment as a Regents' Professor at ASU, more than 510 publications and on the ISI's List of Most Highly Cited Researchers.



Kenneth T. Sullivan, MBA, PhD

Associate Professor
PhD, University of Wisconsin-Madison
Kenneth.Sullivan@asu.edu

Research Expertise: performance measurement, organizational change, value-based contracting, risk management, project delivery, project controls

Sullivan has conducted his research across the project life-cycle including design, construction, facility management, IT, finance, and numerous business services. The research is applied at both organization and project levels, including organizational

transformation, contract optimization, risk management, project management, and accountability systems. He has worked with federal, state, local, and private organizations with his concepts being applied real-time on over \$4 Billion worth of projects.

Honors and Distinctions: Sullivan has a PhD, MS, and BS in Civil and Environmental Engineering and a MBA in Real Estate and Urban Economics all from the University of Wisconsin-Madison; 2014-2016 Fulton Exemplar; 2013 IFMA Educator of the Year; 2012 ASCE Leadership and Management in Engineering Journal Best Article Award.



Thomas P. Seager, PhD

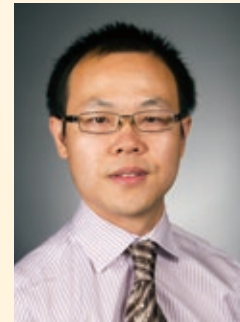
Associate Professor
PhD, Clarkson University
thomas.seager@asu.edu

Research Expertise: resilient infrastructure systems, life cycle assessment of emerging technologies, team science

Seager leads research teams working at the boundaries of engineering and social science to understand resilient infrastructure systems, the life-cycle environmental consequences of emerging energy technologies, novel approaches to teamwork and communication in socio-technical

integrative settings, and engineering ethics education.

Honors and Distinctions: Seager is the founder and President of the Sustainability Conoscente Network, a community of scholars and practitioners sharing knowledge related to a systems approach to sustainable technologies. He chairs the annual International Symposium on Sustainable Systems and Technologies and has co-founded two startup companies resulting from research conducted at ASU.



Pingbo Tang, PhD

Assistant Professor
PhD, Carnegie Mellon University
tangpingbo@asu.edu

Research Expertise: Automated As-Built Building Modeling and Spatial Analysis for Construction Safety and Productivity, Human Factors in Construction, Construction and Facility Management, 3D Imaging for Quality Control, Scientific Workflow and Urban Systems Engineering.

Tang serves as a member of TRB Committee on Bridge Management, ASCE, and ASTM Committee E57 (3D

imaging systems). Tang is an associate editor of ASCE Journal of Computing in Civil Engineering, the Vice Chair of the 2017 International Workshop on Computing in Civil Engineering (IWCCE 2017), and the Vice Chair of the Data Sensing and Analysis (DSA) committee of ASCE.

Honors and Distinctions: Tang won one of the Best Paper Awards of Construction Research Congress, ASCE, 2009, the Best Poster Award of Construction Industry Institute's 2011 Annual Conference, and the 2013 CEE Recent Alumnus Achievement Award of Carnegie Mellon University, the National Science Foundation CAREER Award in 2015.



B. Shane Underwood, PhD

Assistant Professor
PhD, North Carolina State University
Shane.Underwood@asu.edu

Research Expertise: Pavement materials characterization and design, performance modeling, scale dependent characterization and modeling of infrastructure materials, advanced laboratory testing of construction materials, sustainable pavement strategies

Underwood is the Co-Director of Sustainable Materials in Civil Infrastructure at the National Center of Excellence on SMART Innovations. He holds M.S. and Ph.D. degrees from North Carolina State

University in Transportation Materials and Civil Engineering. His primary area of expertise is in experimental mechanical characterization and modeling of infrastructure materials.

Honors and Distinctions: Underwood is a member of ASCE and TRB where he participates in the Engineering Mechanics Institute and Characteristics of Asphalt Paving Mixtures to Meet Structural Requirements committee respectively. He has received several fellowships and scholarships in support of his research including the prestigious Dwight D. Eisenhower Graduate Research Fellowship. He was the SSEBE Outstanding Instructor in 2015.



Enrique R. Vivoni, PhD, PE

Professor
PhD, Massachusetts Institute of Technology
vivoni@asu.edu

Research Expertise: hydrologic theory, numerical modeling and field techniques; applications of remote sensing and geographical information systems; water resources sustainability

Vivoni is well known for his research in hydrology and its linkages with ecological, atmospheric and geomorphologic processes. As a surface hydrologist, he performs research in hydrometeorology, ecohydrology, geomorphology and surface

groundwater interactions. His teaching is centered on engineering hydrology, watershed modeling and ecohydrology.

Honors and Distinctions: Vivoni is the recipient of several awards including the Presidential Early Career Award for Scientists and Engineers (2008), the U.S. Fulbright Garcia Robles Scholarship (2009) and the Kavli Science Fellowship (2010). He is an active member of the American Geophysical Union, American Society of Civil Engineers and American Meteorological Society. Vivoni is a Senior Sustainability Scientist in the Global Institute of Sustainability at ASU and holds a joint appointment in the School of Earth and Space Exploration.



Zhihua Wang, PhD

Assistant Professor
PhD, Princeton University
zhwang@asu.edu

Research Expertise: Sustainable urban environment under the changing climate

Wang conducts research in urban meteorology and hydrology, including soil-land-atmosphere-climate interactions, turbulent transport of energy and water, mitigation strategies of urban heat island effect, and the long-term sustainability of cities.

Honors and Distinctions: Wang is an active member of the American Meteorological Society (AMS), American Geophysical Union (AGU), American Physical Society (APS) and International Association for Urban Climate (IAUC). He obtained first class honor Bachelor's degree in civil and environmental engineering. Wang is currently the co-director of climate systems research for the National Center of Excellence on SMART Innovations, and a senior sustainability scientist in the Global Institute of Sustainability at ASU.



Paul Westerhoff, PhD, PE, BCEE

Regents Professor and Vice Dean for Research and Innovation
PhD, University of Colorado
p.westerhoff@asu.edu

Research Expertise: nanotechnology, water treatment, emerging pollutants

Westerhoff has a strong publication and research record, has garnered wide recognition for his work related to treatment and occurrence of emerging contaminants in water, and has been active in multidisciplinary research. He has led research funded by WRF, WERF, USEPA, NSF, and local organizations

investigating the fate of nanomaterials in water, use of nanomaterial-based technologies for water and reuse treatment, reactions and fate of oxoanions (bromate, nitrate, arsenate) during water treatment, characterization, treatment and oxidation of natural organic matter in watersheds, formation of disinfection by-products, removal of taste and odor micropollutants. He has over 200 peer reviewed journal article publications. He is the Deputy Director of the NSF/ERC on Nanoenabled Water Treatment.

Honors and Distinctions: 2016 ASU Regents Professor; Vice Chair of the WaterReuse Foundation Research Advisory Board; external advisory board member of the EPA-NSF Center for Environmental Impacts of Nanotechnology; 2013 AEESP/Arcadis Frontier in Research Award, 2005 ASCE Walter L. Huber Research Award and 2006 WEF Paul L. Busch Award.



Avi Wiezel, PhD, PE

Associate Professor
Assistant Dean for Facilities, IAFSE
PhD, Technion-Israel Institute of Technology
avi.wiezel@asu.edu

Research Expertise: Leadership in Construction Management, buildability modeling, construction education

A faculty member since 1995, Wiezel holds a M.Sc. degree in structural engineering and a M.Sc. and Ph.D. in building science. Prior to becoming a professor, Wiezel held several managerial positions with construction and engineering firms in Europe

and the Middle East. Wiezel is a true interdisciplinary researcher, with interests ranging from computer modeling of human skills in construction, to engineering education, and leadership. He served as the President of the Faculty Senate in the School of Engineering and as the Chair of the Education Committee of the Technical Council on Computers and Information Technology (TCCIT) in the American Society of Civil Engineers (ASCE).

Honors and Distinctions: Top 5% of best teachers in the Ira A. Fulton Schools of Engineering; Outstanding Faculty Member Award; served as Coordinator of Construction Graduate Studies and the Interim Chairman of the Del E. Webb School of Construction Management Programs.



Claudia E. Zapata, PhD

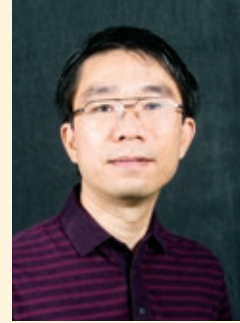
Associate Professor
PhD, Arizona State University
Claudia.zapata@asu.edu

Research Expertise: Unsaturated soil behavior with focus on laboratory and field characterization of problematic soils; applications related to the hydro-thermal and mechanical behavior of soil material due to static and repeated loading; environmental effects on soil behavior; and bio-mediated soil stabilization.

A member of the ASU faculty since 2006, Zapata's current research activities include the study of fundamentals behind fluid flow due to

thermal gradients and how it affects airfield pavement performance; and the characterization of fiber-reinforced clay materials. She is currently the Deputy Director of the NSF Center of Bio-mediated and Bio-inspired Geotechnics in charge of overseeing the Education, Diversity and Inclusion plan and activities of the NSF Center.

Honors and Distinctions: Zapata is the author of more than 50 technical publications focusing on expansive soils, unsaturated soil properties predicting models, and environmental effects on pavement design. She currently serves as the Chair of the Transportation Research Board committee on the Engineering Behavior of Unsaturated Geomaterials and is an active member of several committees for TRB and the ASCE.



Xuesong Zhou, PhD

Associate Professor
PhD, University of Maryland
xzhou74@asu.edu

Research Expertise: Dynamic traffic assignment, traffic demand analysis, traffic flow estimation and prediction, train timetabling and real-time dispatching, visualization analytics

Zhou joined SSEBE in 2013. Previously, he was an associate professor at University of Utah. He has been assisting the Federal Highway Administration (FHWA) to develop and provide technical support for large-scale simulation based dynamic traffic assignment systems, for

the past 10 years. He is the Co-Chair of the IEEE ITS Society Technical Committee on Traffic and Travel Management, Public Relations Officer for Institute for Operations Research and the Management Sciences, Railway Applications Section (RAS). He also serves as the Chair for the Network Equilibrium Modeling Subcommittee in TRB Committee on Transportation Network Modeling (ADB30). He is also the co-inventor of Key2SafeDriving technologies, which has been reported by more than 300 media outlets including New York Times, Wall Street Journal and National Public Radio.

Honors and Distinctions: Zhou and his students received the Best Paper Award in the 15th IEEE International Intelligent Transportation Systems Conference.

Faculty Emeritus

William W. Badger, PhD

Howard H. Bashford, PhD

Allan Chasey, PhD

Apostolos Fafitis, PhD

Paul Johnson, PhD

Matthew Witczak, PhD

**Absar Alum, PhD**

Assistant Research Professor
PhD, University of Arizona
Alum@asu.edu

Research Expertise: Health related environmental microbiology, microbial pathogen survival and detection, and endocrine disrupting chemicals in water

**Paul Dahlen, PhD**

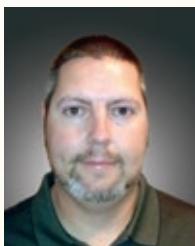
Assistant Research Professor
PhD, Arizona State University
Paul.Dahlen@asu.edu

Research Expertise: Assessment and remediation of hydrocarbon impacts to soil/groundwater

**Thomas A. Dempster, PhD**

Associate Research Professor
PhD, Arizona State University
Arizona Center for Algae Technology and Innovation
dempster@asu.edu

Research Expertise: Phycology; algal taxonomy and physiology; large scale cultivation of microalgae for biofuels and high value products; bioremediation of air (CO₂ capture) and wastewater (nutrient uptake) using microalgae

**Henri Gerken, PhD**

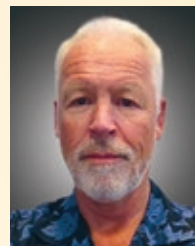
Research Scientist Sr.
PhD, Arizona State University
hgerken@asu.edu

Research Expertise: Understanding the cell walls of microalgae for the purposes of enzymatic digestion for enhanced extraction of biofuels and fine products produced in the algae; genetic engineering of algae for enhanced production of bioproducts

**Jacob Kashiwagi, PhD**

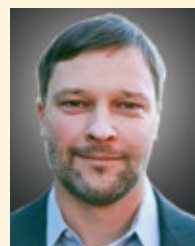
Assistant Research Professor
PhD, Delft University
Jacob.Kashiwagi@asu.edu

Research Expertise: Development of a leadership model that increases supply chain and project management efficiency through technology that aligns expertise, increases transparency, and minimizes required transactions and communication

**Peter Lammers, PhD**

Research Professor
PhD, Portland State University
Peter.lammers@asu.edu

Research Expertise: Chief Scientist for the DOE-funded Algal Testbed Public Private Partnership (ATP³) led by ASULightworks and Principal Investigator of the Realization of Algae Potential (REAP) Project funded by DOE (2014-2016).

**Jeffrey Stempihar, PhD, PE**

Assistant Research Professor
Civil, Environmental and Sustainable Engineering
PhD, Arizona State University
jstempih@asu.edu

Research Expertise: Airport design, pavement materials design, thermal properties, and transportation research implementation

**Robert Stirling, MBA**

Research Technologist
Swette Center for Environmental Biology
MBA, Duke University
Robert.stirling@asu.edu

Research Expertise: Startup technology marketing expertise; entrepreneurship, including new product modeling techniques, licensing practices and product development practices

**Pierre Wensel, PhD**

Research Engineer
Arizona Center for Algae Technology and Innovation
PhD, Washington State University
Pierre.Wensel@asu.edu

Research Expertise: Design, construction, control, and optimization of upstream cultivation and downstream harvesting microalgal processes

Lecturers

**Efthalia Chatziefstratiou, PhD**

Lecturer
PhD, The Ohio State University

Teaching/Research Expertise: Teaching areas include engineering mechanics, statics and dynamics. Research interests include atmospheric modeling, computational fluid dynamics, and climate change.

**Christopher Lawrence, PhD**

Lecturer in CESE and CNE Programs
PhD, Arizona State University
Chris.lawrence@asu.edu

Teaching Expertise: Teaching areas include engineering mechanics and numerical methods, civil engineering materials, and geotechnical engineering.

Research Expertise: Research and engineering areas focus on soil suction measurements, unsaturated soil mechanics, and the development of advanced soil testing systems.

**Aaron Cohen, MS, CPC**

Lecturer
Associated General Contractors (AGC) Lecturer
MS, DePaul University
Aaron.cohen@asu.edu

Teaching/Research Expertise: Teaching focuses on courses in the heavy/civil concentration for the DEWSC Construction Management degree program.

**Kristen Ward, PhD**

Lecturer
PhD, University of Arizona
Kmward6@asu.edu

Teaching/Research Expertise: Structural Engineering, Engineering Mechanics, Earthquake Engineering, Numerical Methods

**Kraig Knutson, PhD**

Senior Lecturer
PhD, Arizona State University
Kraig.knutson@asu.edu

Teaching/Research Expertise: Teaching and research include historical construction methods, infrastructure security and application of industrial engineering techniques to construction processes.

**Edwin C. Weaver, BS, MCE, PE**

Senior Lecturer in DEWSC Program
MCE, North Carolina State University
Edwin.weaver@asu.edu

Teaching Expertise: Teaches and develops graduate and undergraduate courses in the concrete construction safety and Project Management and Construction Management degree programs.

Research Expertise: Contracts and specifications for concrete construction, concrete paving for airfields and safety during concrete and masonry construction operations.

**Wylie K. Bearup, PhD, PE**

Professor of Practice
Executive Director, Alliance for Construction Excellence
Beavers-Ames Professor of Practice for the Heavy Civil Program
Del E. Webb School of Construction
PhD, University of Illinois
Wylie.bearup@asu.edu

Research Expertise: Construction project delivery methods, Virtual Design and Construction, design-construction interface, construction contracting methods, partnering and dispute resolution processes.

**Jeffrey Goss, MA**

Professor of Practice
Executive Director, Office of Global Outreach and Extended Education
Assistant Dean, Ira A. Fulton Schools of Engineering
Jeffrey.Goss@asu.edu

Research Expertise: Education and Leadership Management

**Thomas Roberts, PhD**

Professor of Practice
PhD, Arizona State University
tbroberts@asu.edu

Research Expertise: Research includes both commercial and government space-based communications systems as well as terrestrial wireless systems; recent research includes novel contributions in the understanding of complexity and operationalizing the concept of resilience. He teaches sustainable systems engineering.



Farewell

Allan D. Chasey, Associate Professor and DEWSC Program Chair retired on December 31, 2016 after 21 years of service to ASU. We extend our best wishes to AI and thank him for his many years of service to ASU and DEWSC.

SCHOOL OF **Sustainable Engineering**
and **the Built Environment**

Building A
SUSTAINABLE
Future

