SCHOOL OF SUSTAINABLE ENGINEERING AND THE BUILT ENVIRONMENT

Looking towards the future

ANNUAL REPORT 2015
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The Numbers

at a glance

Undergraduate Degrees Conferred:

- Construction: 50
- Construction Engineering: 9
- Civil: 103

Graduate Degrees Conferred:

- Construction: 28
  - MS: 19
  - PhD: 2
- Construction Engineering: 11
- Civil: 38
  - MSE: 18
  - MS: 20

Enrollment

- Undergraduate: 1166
- MS: 278
- PhD: 142

Faculty

- Full Time Lecturers: 6
- Research Faculty: 11
- Professor of Practice: 3
- Tenured and Tenure-track Faculty: 43

Total Scholarships Awarded 2015: $314,660

SSEBE Research Expenditures

- 2015: $13,425,740
- 2014: $10,790,300
- 2013: $8,178,264
- 2012: $8,367,001

National Academy of Engineering Members:
- Edward Kavazanjian, Jr.
- Bruce Rittmann
- Della M. Roy

National Academy of Construction Members:
- G. Edward Gibson, Jr.
- William Badger (emeritus)

ASU Charter – 2015 and beyond

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 “Looking Toward the Future.” As you read the articles in this report, you will see that our faculty, staff and students are truly inventing the future as they pursue many of the grand challenges facing humankind. From carbon capture and climate change, to new ways of modeling future events using computers, to a new discipline called bio-geotechnical engineering, to developing sustainable infrastructure and energy solutions, to providing clean water to those who do not have access, our efforts are world changing. The endeavors outlined in this report merely scratch the surface of the many activities that are on-going in our School.

In looking forward to the future, it is useful to look back over the past six years, which have provided a foundation and basis for everything that is in this report. In 2010, we had just begun the process of merging the civil engineering and construction management programs into a single school. Since that time, we have grown from 34 full time professors, lecturers and professors of practice to 52. We have grown from 938 undergraduates and 234 graduate students (1172 total) in 2010 to 1166 undergraduate students, 278 MS and 142 PhD students (1586 total) in 2015. During the past six years, our research expenditures have increased from $7.2 to $13.4 million, with over $19.2 million in new awards during 2015. Our faculty and staff have moved from old and dated facilities into three state-of-the-art buildings, ISTB2, ISTB4 and CAVC, enhancing our capabilities to teach and do research. In sum, these unprecedented changes have truly been dramatic and will set the stage for rapid improvement in the next five years. Our faculty and staff have performed wonderfully as we have transformed our efforts during this time frame.

Our students continue to demonstrate their technical and leadership capabilities, again winning a number of prestigious awards and competing very successfully at regional and national competitions. During 2015, we matriculated 278 graduates with these students going to work for many of the best engineering and construction firms in the country. Our students also engage in helping our local community, region and the world in a number of outreach activities.

Our programs actively engage industry partners locally and nationally through the Del E. Webb School of Construction (DEWSC) Industry Advisory Council under Dr. Chasey’s leadership, and Industry Advisory Boards for Civil, Environmental and Sustainable Engineering (CESE) and Construction Engineering under Dr. Hjelmstad’s and Dr. Ariaratnam’s leadership. As a testament to this interest and involvement, we held a career fair in October 2015, with 61 companies setting up booths in the new CAVC building recruiting our students.

After a successful on-site visit in March 2014, the American Council of Construction Education accredited our Construction Management program through 2021. Both our civil engineering and construction engineering programs had good accreditation visits from ABET in October and we are awaiting official word from those visits in summer 2016.

Recruiting of outstanding faculty members is a critical success factor for our School, and during 2015 we welcomed Pete Lammers, Otak Conroy-Ben, Thomas Roberts, and Francois Perreault 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 recently published Charter and guiding Mission & Goals are provided on the facing page. Our School continues to be aligned with and making strides in addressing this broad vision. Our national reputation for teaching, discovery, research and creativity is leading to many visits from peers representing other universities, research agencies and industry.

This year, 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!

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 reorganized and expanded their charter to better meet the needs of our program and community. Under the leadership of Ron Hilgart (of HILGARTWILSON), FOCE launched four thrust areas: (1) Education, (2) Internship and Employment, (3) Membership and Resources, and (4) Partnering. Each of these areas is supported by a standing committee and provides a fresh approach to engaging the professional community. The new vision of FOCE will provide multiple ways for our students, faculty, and professional partners to engage to promote a vibrant civil engineering community in the region.

This past fall we hosted ABET for our accreditation visit. Suffice it to say that a lot of work goes into preparing for an accreditation visit. Mike Mamlouk did yeoman’s work bringing all of the information together with the help of the faculty. The visit went very smoothly; the outcome will be announced later this year. One of the things you learn when you prepare for an accreditation visit is how strong the program is, how hard every faculty member works on our shared educational mission, and how broad is the purview of what we do (we offer about eighty courses every semester!).

We continue to advance innovative approaches to undergraduate education. We completed the third year of implementation of The Mechanics Project—our effort to reform the learning environment in the sophomore-level mechanics courses. We now have our sights set on the junior-year experience, too. Our ultimate goal is to make every interaction with our students positive and to deliver an educational experience equal to the best available anywhere.

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!

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 Programs are building an exciting place to learn and grow!

As we moved into our new home (College Avenue Commons), we saw a year of explosive growth, both in our Undergraduate and Graduate programs. We successfully achieved ACCE (American Council of Construction Education) accreditation. Our OSHA Training Institute is in its 3rd year and continues to grow under new leadership. The Construction in Indian Country (CIIC) is making a significant impact in Indian country through its Annual Conference, the CIIC Student Organization, and our resident Eminent Scholar.

First, our explosive growth: We started the Fall of 2015 with just under 300 undergraduate students and slightly over 100 graduate students. Compared with the Fall of 2014, that was a 30+% growth in the undergraduate ranks and about a 40+% growth in the Master’s degree. Our new recruiter, Whitney Hatfield, has done an outstanding job in recruiting 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 continue to make DEWSC the best construction program in the US.

Second, a successful accreditation visit: The Visiting Team in March was very impressed with our new building, our faculty, our industry involvement, and of course, the students. They were very complimentary about the leadership support all the way from our school director to the dean. The other part of this story is that the Accreditation Standards are changing to an outcomes based methodology which will require continued industry interaction with our faculty and students to ensure that we have the proper outcomes and our graduates are ready for an exciting construction career that will occur in 2021.

Our OSHA Training Institute, the Western OSHA Education Center, is under new leadership. Lisa Hogle assumed the Director’s position and is offering a full schedule of occupational safety and health training classes. The Safety and Health Professional Certificates program, designed for individuals with safety responsibilities who wish to improve their practical knowledge while earning a valuable credential, continue to be very popular. If you need update training or would like to explore a certificate program, contact Lisa at http://asuotiec.org.

The Construction in Indian Country program continues to expand. Jerome Clark, the CIIC Program Manager, has 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 to be a resident Eminent Scholar and to help provide another resource to improve Construction in Indian Country.

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 2015! We were able to expose more of our students to this outstanding construction competition by sending over 60 students to Reno, one of the largest contingents ever from DEWSC. 2016 will prove to be even bigger.

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 for all your support in the past and encourage you to continue that support as it is vital as we continue 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 or 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 moving the School forward in 2016 with your assistance.
I am pleased to give you an update of the Construction Engineering program at Arizona State University. The recent increase in construction-related activity in the U.S. has resulted in an exponential growth in enrollment at both the undergraduate and graduate level. Currently, we have close to 90 undergraduate students and over 30 graduate students pursuing Master’s Degrees. We continue to market our program and recruit talented students from all over the United States. Furthermore, we are excelling on the global stage by attracting the brightest and best students internationally from countries such as India, China, Saudi Arabia, and Mexico just to name a few. 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. To date, all of our graduates have successfully found full-time employment prior to graduating or went on to pursue advanced degrees. I believe that our rigorous curriculum and strong internship program are major reasons for this job success. Producing high-quality Construction Engineers is imperative as our nation continues to address an infrastructure network in varying stages of deterioration.

The big news this year was that the Construction Engineering program underwent our initial ABET Accreditation visit. This involved an evaluation of all aspects of our program by an independent Program Evaluator. Overall, I felt that the site visit went very well. We should receive the final results shortly. If all goes well, Arizona State University will have 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. I want to thank all of our stakeholders, both internal and external, for their support of the program and helping me to guide this ship. I am fully committed to continuing to grow our World-Class program!

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. In other words, I want to make Arizona State University the school of choice for future Construction Engineers!

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 2016 semester, enabling us to select highly qualified applicants to our programs. The 2016 pool of applicants is the strongest and most diverse pool of applicants I have seen in my 25 years at Arizona State University. A large percentage of domestic applicants are coming from top universities, have graduated cum laude and have 90+% scores on their GREs. 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 was recognized with our successful competition for 2 National Science Foundation Engineering Research Centers. Engineering Research Centers are among the most prestigious grant awards given by the National Science Foundation. Our leadership and participation in these centers has gained us national recognition and other top universities have been contacting us regarding our formula for success.

During the 2015 calendar year our research expenditures continued to grow and 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 and almost all of our PhD students either as research assistants or as teaching assistants.

We continue to have more than 100 PhD students and we expect PhD student enrollment to grow 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. 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. 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

Otakuye Conroy-Ben, PhD
Assistant Professor
PhD, University of Arizona

*Joined SSEBE in August 2015*

**Areas of Research:** Conroy-Ben completed a postdoc appointment in biochemistry in the area of metal and antibiotic resistance in bacteria. She joined us after serving as a faculty member at the University of Utah. Her research interests lie in the area of emerging contaminants, including environmental endocrine disruption, multidrug resistance via chemical efflux in bacteria, and sewer epidemiology. This research has been featured in Environmental Science and Technology, Science of the Total Environment, Chemosphere, and FEMS Microbiology Letters.

Peter Lammers, PhD
Research Professor
PhD, Portland State University

*Joined SSEBE AzCATI in January 2015*

**Areas of Research:** Lammers is the Chief Scientist for the DOE-funded Algal Testbed Public Private Partnership (ATP³) led by ASU-Lightworks and Principal Investigator of the Realization of Algae Potential (REAP) Project funded by DOE (2014-2016). REAP partner institutions include New Mexico State and Washington State Universities, Argonne, Los Alamos and Pacific Northwest National Laboratories, and three companies Algenol Biofuels, Pan Pacific Technologies and UOP-Honeywell.

Francois Perreault, PhD
Assistant Professor
PhD, University of Quebec, Montreal

*Joined SSEBE in August 2015*

**Areas of Research:** In his work, Perreault uses an interdisciplinary approach, combining microbiology, chemistry, and nanotechnology, to address critical issues related to water quality and water treatment. His current 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. His research has been published in ACS Nano, Environmental Science and Technology, Chemical Society Reviews, Nanotoxicology, and Environmental Pollution.
Edward Kavazanjian, Jr., Ira A. Fulton Professor of geotechnical engineering in the School of Sustainable Engineering and the Built Environment has joined the ranks of the highest faculty honor at Arizona State University, as Regents’ Professor for the 2014-15 academic year.

The title is conferred on full professors who have made exceptional achievements that have brought them national and international distinction. Kavazanjian is particularly well known for his work on analysis, design and construction of landfills and waste-containment systems, especially under earthquake loading. His contributions in earthquake engineering have crucial importance to catastrophic events that occur with frequency.

Kavazanjian was elected into the National Academy of Engineering in 2013. He has also received a number of prestigious awards in recognition of his scholarship, including awards from the most recognized and respected civil engineering organization in the world.

Most recently, Kavazanjian has become a pioneer in the newly emerging field of biogeotechnical engineering.

Thomas Roberts, PhD
Professor of Practice
PhD, Arizona State University

Joined SSEBE in August 2015

Areas of Research: Dr. Roberts is a systems engineer who returned to academia after a 25-year career participating in some of the largest systems humans have ever created and deployed. Among other things, these include both commercial and government space-based communications systems as well as terrestrial wireless systems. He also spent several years developing systems in the healthcare claims management arena. His work included explorations of artificial intelligence and biomimicry in deploying fault-tolerant distributed systems. As an expert in large, distributed systems, his most recent research includes novel contributions in the understanding of complexity and operationalizing the concept of resilience. He now teaches sustainable systems engineering.

Jeffrey Stempihar, PhD
Assistant Research Professor
PhD, Arizona State University

Joined SSEBE in August 2015

Areas of Research: Dr. Jeff Stempihar is an assistant research professor in SSEBE and a research scientist in the National Center of Excellence on SMART Innovations at ASU. He is a registered professional engineer with over 12 years of engineering and research experience. His experience includes airport and pavement engineering and research focus includes pavement materials design, thermal properties, and transportation research implementation.
Faculty Honors and Awards

Houston receives Jankowski Legacy Award

In more than 30 years at Arizona State University professor Sandra Houston has seen significant change. From being one of its first female engineering faculty members, to serving as one of the first female civil engineering department chairs in the country, to helping build a nationally recognized research effort.

Houston has played a key part in the legacy of the Ira A. Fulton Schools of Engineering. Houston, a professor in the School of Sustainable Engineering and the Built Environment, has been recognized for her efforts and long-term commitment to ASU and the Fulton Schools as the recipient of the Daniel Jankowski Legacy Award.

Named after longtime engineering faculty member Dan Jankowski, the bi-annual award is one of the Fulton Schools’ highest faculty honors. A faculty committee selects recipients, who are recognized for sustained, exemplary commitment to student success across research, teaching and service.

Houston joined ASU in 1984 and quickly became interested in the field of unsaturated soil mechanics, a subfield of geotechnical engineering. Geotechnical engineering focuses on soil as an engineering material, while unsaturated soil refers to the soil found above the water table. Now, 30 years later, ASU is considered a leader in the field. Multiple faculty members are working in the area and the university operates an unsaturated soils research lab.

ENR Southwest Legacy Award

An illustrious 38-year engineering and management career has kept Wylie Bearup as a central figure in public and private construction in the Southwest. The retired Army lieutenant colonel and city of Phoenix engineer has worked on projects around the globe. He spearheaded the transformation of downtown Phoenix and how the state of Arizona looks at construction delivery methods. Most recently, he has taken on a new challenge to pass on his wealth of knowledge to a new generation of construction professionals.

These efforts led to Bearup’s selection as the recipient of the inaugural ENR Southwest Legacy Award.

Bearup, who retired from the city last year, is now the executive director of ASU’s Alliance for Construction Excellence and a professor in ASU’s Del E. Webb School of Construction.
Fellow status recognizes Ariaratnam’s construction engineering achievements

Samuel Ariaratnam has been elected to the distinguished rank of Fellow of the American Society of Civil Engineers (ASCE). The organization bestows the honor to recognize members who “have made celebrated contributions and developed creative solutions that change lives around the world.”

Ariaratnam is a professor of construction engineering and management in the Ira A. Fulton Schools of Engineering. He serves on the faculty of the School of Sustainable Engineering and the Built Environments, including its Del E. Webb School of Construction, and is chair of the construction engineering program.

ASCE, the oldest engineering society in the United States, has more than 150,000 members of the civil engineering profession in more than 170 countries. The honorary role of Fellow is held by fewer than four percent of its members.

Ariaratnam’s expertise is in infrastructure management and rehabilitation, and trenchless underground construction methods. He has authored more than 200 technical papers in the field, holds four patents, and co-authored the book “Horizontal Directional Drilling Good Practices Guidelines and the Pipe Bursting Good Practices.”

He has particular expertise in horizontal directional drilling, a method used to install water, sewer, telecommunication, electrical and gas lines with minimal impact on surface ground.

Other ASCE Fellows on the faculty in SSEBE include Edd Gibson, Ed Kavazanjian, Larry Mays, Mike Mamlouk, Bruce Rittmann and Apostolos Fafitis.

Ariaratnam is also the recipient of the 2015 Arthur M. Wellington Prize from ASCE for his paper, “Quantification of a Sustainability Index for Underground Utility Infrastructure Projects.”

Each year, ASCE gives out the prestigious award to the author(s) of a paper on land, water or air transportation, or other related subjects. The Wellington Prize is among ASCE’s oldest and most prestigious awards.

Mays honored for career accomplishments in water resources research and scholarship

Larry Mays recently received the Warren A. Hall Medal from the Universities Council on Water Resources (UCOWR) for his accomplishments in water resources research and scholarship.

The Warren A. Hall Medal, named in honor of one of the council’s founders and a well-known leader in water resources research and education, honors those with distinctive records of advancing knowledge in the area-particularly teachers who have demonstrated a strong commitment to the education of students.

Mays is on the faculty of the School of Sustainable Engineering and the Built Environment. He has been at ASU for 26 years after beginning his academic career 13 years earlier at the University of Texas at Austin. His awards include the Engineer of the Year in Education Award from the Arizona Society of Professional Engineers and the Quentin Mees Research Award from the Arizona Water and Pollution Control Association. Among his national and international honors are the American Society of Civil Engineers Julian Hinds Award and the Prince Sultan Bin Abdulaziz International Prize for Water-Surface Water Prize presented to him in Saudi Arabia in 2014.

Mays has also been elected a Fellow of the International Water Association (IWA). His specialties include water resources engineering, hydrology, water resources sustainability, and the study of ancient water systems.

According to the IWA “Being an IWA Fellow is recognition of sustained outstanding contribution to the profession….The accomplishments that are being honored shall have contributed importantly to the advancement or application of water science and technology, bringing the realization of significant value to society.”
Mounir El Asmar has been recognized by the American Society of Civil Engineers (ASCE) for his outstanding contributions to construction management and construction engineering. He was presented the ASCE Thomas Fitch Rowland Prize on June 9 at the International Construction Specialty Conference in Canada for his research to quantify the performance of emerging construction project delivery systems. El Asmar is an assistant professor in the School of Sustainable Engineering and the Built Environment. The ASCE award was based on the results of a project he led and reported on in a paper written with two colleagues that was published in the ASCE Journal of Construction Engineering and Management.

El Asmar teamed with professor Awad Hanna, chair of the construction engineering and management program at the University of Wisconsin-Madison, and Wei-Yin Loh, a professor of statistics at Wisconsin-Madison, to measure the effectiveness of what the construction industry calls Integrated Project Delivery.

Conventional project delivery systems in the construction industry have often been disjointed. Architects, engineers and contractors traditionally provide design and construction services separately in different phases of a building project, El Asmar says.

The new integrated system strongly emphasizes close collaboration among all contributors throughout the whole project lifecycle—from the inception of a building’s design to full completion of construction, he explains.

In February 2015 Arizona Technology Enterprises honored 75 ASU inventors at the AzTE Inventor Recognition Event who received a U.S. Patent, formed a start-up company, or licensed a technology during FY 2014. Three of those honored were Rolf Halden, Dean Kashiwagi and Bruce Rittmann from the School of Sustainable Engineering and the Built Environment.
SSEBE 2015 Outstanding Instructor Award goes to Dr. Shane Underwood

Congratulations to Dr. Shane Underwood on being selected for the Outstanding Instructor Award within the School of Sustainable Engineering and the Build Environment. **SSEBE Teaching Award Criteria:** “This award will be presented annually to a faculty member in the School of Sustainable Engineering and the Build Environment (lecturer or assistant, associate, or full professor) who has demonstrated excellence and innovation in effective teaching and knowledge transfer”. The nominator wrote, “Dr. Underwood's outstanding instruction in the classroom, mentorship of students within and beyond the classroom, leadership character in research activities and devotion to the local community make him worthy of this award. Shane exemplifies excellence within SSEBE and ASU.”

Shared water resources

For his scholarship in the area of shared water resources, ASU hydrologist Enrique Vivoni has been awarded a **2015 Leopold Leadership Fellowship**. Vivoni, an associate professor in ASU’s School of Sustainable Engineering and the Built Environment and the School of Earth and Space Exploration, is one of 20 recipients selected for the prestigious North American fellowship program that focuses on communicating scientific research to a wide audience. Water in the southwestern United States and northern Mexico is a contentious issue that traverses disciplinary boundaries. Vivoni’s research activities focus on the intersection of hydrology and its allied disciplines (ecology, meteorology and geomorphology) for improving our understanding of water resources in this region. Vivoni is internationally recognized in the fields of distributed hydrologic modeling, ecohydrology of semi-arid regions, North American monsoon studies, and integration of engineering tools for advancing hydrologic science.

Each year, the program selects up to 20 mid-career academic environmental scientists as fellows. The fellows were chosen for their outstanding scientific qualifications, demonstrated leadership ability and strong interest in sharing their knowledge beyond traditional academic audiences. The fellows will receive two weeks of intensive communication and leadership training in how to deliver information about their research to journalists, policymakers, business leaders and the public.

A meteorological flux tower assembled by three ASU students was deployed at various campus sites to study factors that impact urban desert climates. Checking out sensing devices on the tower are (from left) SSEBE undergraduate Ivan Lopez-Castrillo, SESE doctoral student Adam Schreiner-McGraw, SSEBE PhD student Nicole Pierini and SSEBE/SESE professor Enrique Vivoni.
Seminar provides look at what it takes to be a leader in the construction industry

Construction management major Abby Boaz was one of 50 students from around the United States selected to attend the 2015 Women’s Construction Leadership Seminar hosted by Kiewit Corporation, a Fortune 500 company and one of the world’s largest construction and real estate development contractors.

The seminar organizers choose participants from among college sophomores and juniors who are demonstrating leadership skills and the drive to achieve success in construction and related engineering fields.

Boaz, a junior in the Del E. Webb School of Construction, is a member of Lambda Sigma Chi Society, a national honor society focused on leadership, scholarship and community service.

A graduate of Prescott High School in Prescott, Arizona, she has earned ASU’s New American University Dean’s Award scholarship, the Del E. Webb Memorial Scholarship and the Medallion Scholarship, the ASU Alumni Association’s signature scholarship.

Boaz joined other seminar students at the Kiewit headquarters in Omaha, Nebraska where she networked with women working in construction and related engineering industries.

Women employed by Kiewit spoke about their career paths and obstacles they have faced in the industry, and gave career advice to students. Kiewit CEO Bruce Grewcock added his perspective on the opportunities and challenges for women in construction fields.

During the two-day event this fall, students toured a major Kiewit project at the Henry Doorly Zoo in Omaha, and took part in hands-on activities and team-building exercises designed to provide insights on the demands of construction managers.

“It was an exceptional learning experience,” Boaz said. “The seminar demonstrated to us all the skills it takes to run a construction company, and gave us a comprehensive look at everything a manager is accountable for, from budgets to employee satisfaction. It definitely helped to build my leadership skills, and it was a lot of fun.”

Dean’s Fellowship

This prestigious award is for highly qualified incoming Ph.D. students. The Dean’s Fellowship provides tuition, health insurance and $27,500 of annual support. This award is a commitment for four academic years plus summers. Fellows will hold a 50% full-time equivalent Graduate Research Associate position working with faculty conducting research in their field of interest.

The 2015 fellowship recipients are: Adam Gushgari, Bilal Khaled, Joshua Steele, Douglas Rice, Erin Driver, Burcu Yavuz, Vivianna Gamez Molina, Justin Kidd, Anjali Mulchandani, Megan Altizer, Matthew Aguayo, Daniel Burillo, Linda Tello.
ASU students win first-place awards in geotechnical, construction engineering competition

A team of 17 civil engineering and construction engineering majors from the School of Sustainable Engineering and the Built Environment won top awards in the geotechnical engineering student competition at the International Foundation Congress and Equipment Exposition (IFCEE) in San Antonio, Texas.

The IFCEE is the world's largest exhibition dedicated solely to the building foundation construction industry. It showcases technology related to design and construction of foundations and ground improvement systems for bridges, buildings, dams and other civil infrastructure.

The event was co-sponsored by the Geo-Institute of the American Society of Civil Engineering (ASCE), the Deep Foundation Institute, the Association of Drilled Shaft Contractors, and the Pile Driving Contractors Association.

Student competitions were held in five areas: geo-video production; T-shirt design; geo-prediction; mechanically stabilized earth wall construction and a geo-poster competition.

The Fulton Schools team was the only one to qualify for all five competitions and to receive awards in three of them.

A T-shirt design by graduate students Nariman Mahabadi and Xianglei Zeng was selected for the official conference t-shirt. It was printed and distributed to all students at the event.

The best video production award went to graduate students Vel Palinivelu and Jesus Esquivel, and undergraduate Miriam Woolley, for a video to educate a K-12 audience on geotechnical factors affecting the strength of building foundations.

Nasser Hamdan, a civil engineering doctoral student, won the Geo-poster competition for his research poster “Enzyme Induced Carbonate Precipitation for Fugitive Dust Control.”

Graduate student Evan Benson and undergraduate Jake Andersen made up ASU’s Geo-prediction team. They had to predict the capacity of two test piles from laboratory and field test results.

The test piles had been installed for a major construction project and load tested for quality-assurance purposes. For the competition, predictions of pile settlement under the design load and of the load at failure for each pile were compared to the measured values.

The ASU Geo-prediction team placed among the finalists.

The mechanically stabilized earth wall team consisted of graduate students Yutong Lu and John Furniss, and undergraduates Devinne Ramirez and Miriam Wooley. The team finished in the top 10 for their event.

Funding to send the students to the industry exposition was provided by the Ira A. Fulton endowment for the Chair for Geotechnical Engineering, the School of Sustainable Engineering and the Built Environment, and the Ehret Student Team Competition Endowment.

ASU expects to organize a student team for similar competitions at the joint meeting of the American Society of Civil Engineers Geotechnical Institute and Structural Engineering Institute in February 2016 at the Phoenix Convention Center.
Monireh Mahmoudi and Dr. Xuesong Zhou receive the ITS (Intelligent Transportation Society) Arizona 2015 best graduate paper award


Optimization of on-demand transportation systems and ride-sharing services involves solving a class of complex vehicle routing problems with pickup and delivery with time windows (VRPPDTW). This paper first proposes a new time-discretized multi-commodity network flow model for the VRPPDTW based on the integration of vehicles carrying states within space-time transportation networks, so as to allow a joint optimization of passenger-to-vehicle assignment and turn-by-turn routing in congested transportation networks. Our three-dimensional state-space-time network construct is able to comprehensively enumerate possible transportation states at any given time along vehicle space-time paths, and further allow a forward dynamic programming solution algorithm to solve the single vehicle VRPPDTW problem. By utilizing a Lagrangian relaxation approach, the primal multi-vehicle routing problem is decomposed to a sequence of single vehicle routing sub-problems, with Lagrangian multipliers for individual passengers’ requests being updated by sub-gradient-based algorithms. We further test our algorithms on medium-scale and large-scale transportation networks, namely the Chicago sketch and Phoenix regional networks.

Monireh Mahmoudi is currently a PhD student working with Dr. Xuesong Zhou in the School of Sustainable Engineering and the Built Environment on the concept of ride-sharing.

The Pacific Southwest Conference (PSWC) is ASCE’s annual student chapter competition that puts civil engineering skills to the test. PSWC involves a wide range of events including concrete canoe, steel bridge, environmental design, geotechnical design, surveying, quiz bowl, technical paper, concrete bowling, and several sports tournaments. The competition features three full days of events with an awards banquet on the last day. Over 1000 Civil & Environmental Engineering students compete each year, representing 18 universities in California, Nevada, Arizona, and Hawaii.

This year’s conference was held April 9-11, 2015 at the University of Arizona in Tucson. Forty-five students, all members of the American Society of Civil Engineers, participated from ASU. They performed well in the Geowall and Kan Jam competitions, earning 3rd and 2nd place respectively. The Steel Bridge had a strong construction time score, but ultimately failed at 1900 lbs. which resulted in disqualification for not meeting the 2500 lbs. requirement. The Concrete Canoe team earned 11th place overall with the men’s sprint team earning 5th and 7th place in the design paper. Overall, the conference acted as a large scale team building experience that will drive many of the teams to work harder and prepare earlier for next year’s competition.

The team receives funding from SSEBE, including the Friends of Civil Engineering, and Ehret competition funds.
Kan Wu, a SSEBE Transportation graduate MS student won a Second Place in a national paper competition. Kan was recently notified by the Transportation & Development Institute of the American Society of Civil Engineers and the Federal Highway Administration (FHWA), for his contest entry paper entitled “A Methodology for PCI-Based Flexible Pavement Performance Modeling Using LTPP Data.” Kan’s paper was selected as a Second Place winner in the Challenge Category. Kan will receive monetary prize and the paper will be published by FHWA and made available to researchers worldwide.

Dr. Kamil Kaloush, who acted as his faculty advisor, says: “The paper contents are original and were developed exclusively for this competition. The potential use of the work by Kan to be included as part of the national LTPP InfoPave database is very promising and will prove to be of value to State agencies.”

Electrical challenge: ASU team excels in construction competition

The challenge: Come up with a viable, comprehensive plan for the electrical engineering tasks involved in construction of an Intelligent Transportation System for the Illinois State Toll Highway Authority.

The project calls for installation of a dynamic electronic message sign, a microwave system for vehicle detection, a roadway weather information system, a closed-circuit television system, building of truss structures and light poles, and installing more than 150,000 feet of fiber optic cable.

Full-fledged project planning, work scheduling and cost estimates are required along with a safety plan.

Time given to complete the assignment: 15 hours.

A team of students from ASU’s Del E. Webb School of Construction performed the demanding task well enough to earn a second-place prize in a student construction management competition.

Almost 200 students from top construction schools around the country made up the teams from 30 schools that participated in the competitions at the recent Associated Schools of Construction (ASC) Midwest Region conference in the Chicago area.

In addition to ASU construction management students who put their skills to the test in the Electrical Problem category, another ASU team took part in the Preconstruction Services Problem category.

“I’m proud of how our teams performed. The competition presented difficult problems based on the real-world challenges faced by construction and engineering professionals in our industry on a daily basis,” said ASU construction management lecturer Aaron Cohen, the team’s coach.

“When our students perform well, it instills confidence in the companies that recruit from our program. They see that our students are capable of meeting the challenges and thriving in today’s demanding work environment,” Cohen said.
Outstanding Graduates in the Class of 2015

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

- **Mason Phillips**, Construction Management (Spring 2015)
- **Steven Sherant**, Civil, Environmental and Sustainable Engineering (Spring 2015)
- **Jakob Bottcher**, Construction Management (Fall 2015)
- **Austin Kirkpatrick**, Construction Engineering (Fall 2015)
- **Claire Tilton**, Civil, Environmental and Sustainable Engineering (Fall 2015)

SSEBE Leadership and Service Awards

- **Gian Gonzalez**, Construction (Spring 2015)
- **Keila Lombardozi**, Construction (Spring 2015)
- **Nathan Schmidt**, Civil, Environmental and Sustainable Engineering (Spring 2015)
- **Ahn Tuyet Truong**, Construction (Spring 2015)
- **Amoryn Smith**, Civil, Environmental and Sustainable Engineering (Fall 2015)

SSEBE 4.0 Awards

- **Steven Sherant** (Spring 2015)
- **Francesco Ruta** (Spring 2015)

Leo Schlinger, a junior in Construction Management, received the first Beaver's John Lamberson Memorial Scholarship and gave a presentation to the 2015 Low Bidders Annual Dinner in Los Angeles in January 2015. Leo Schlinger also received the $5,000 Michael Argent Memorial Scholarship given by the North American Society for Trenchless Technology (NASTT).
Doctoral Graduates in 2015

Civil, Environmental and Sustainable Engineering

Claire Antaya
Integrating Sustainability Grand Challenges and Active, Experiential Learning into Undergraduate Engineering Education
Chair: Dr. Amy Landis and Dr. Kristen Parrish

Daniel Che
Optimization/Simulation Model for Determining Real-Time Optimal Operation of River-Reservoirs Systems during Flooding Conditions
Chair: Dr. Larry Mays

Wesley Collins
Development of the Project Definition Rating Index (PDRI) for Small Industrial Projects
Chair: Dr. Kristen Parrish

Sumanta Das
Synthesis, Characterization and Mechanical Behavior of a Novel Sustainable Structural Binder utilizing Chemistry of Iron Carbonation
Chair: Dr. Narayanan Neithalath

Everett Eustance
Assessing Outdoor Algal Cultivation in Panel and Raceway Photobioreactors for Biomass and Lipid Productivity
Chair: Dr. Peter Fox and Dr. Milton Sommerfeld

Tober Francom
Performance of the Construction Manager at Risk (CMAR) Delivery Method Applied to Pipeline Construction Projects
Chair: Dr. Samuel Ariaratnam and Dr. Mounir El Asmar

Arundhati Ghosh
Analyzing the Impact of Building Information Modeling (BIM) on Labor Productivity in Retrofit Construction: Case Study at a Semiconductor Manufacturing Facility
Chair: Dr. Allan Chasey

Yuanming Guo
Vapor Intrusion at a Site with an Alternative Pathway and a Fluctuating Groundwater Table
Chair: Dr. Paul Johnson

Nasser Hamdan
Applications of Enzyme Induced Carbonate Precipitation for Soil Improvement
Chair: Dr. Edward Kavazanjian, Jr. and Dr. Bruce Rittmann

David Hanigan
Identification of N-Nitrosodimethylamine Precursors to Improve their Control
Chair: Dr. Paul Westerhoff

Nikou Hesari Zonouzi
Biosensor Platform for Rapid Detection of E. coli in Drinking Water
Chair: Dr. Morteza Abbaszadegan

Chase Holton
Field-Studies of Vapor Intrusion and Related Processes at a House Overlying a Dilute Chlorinated Solvent-Impacted Groundwater Plum
Chair: Dr. Paul Johnson

Troy Hottle
Assessment and Solutions for Waste Handling of Compostable Biopolymers
Chair: Dr. Braden Allenby and Dr. Amy Landis

Binh Nguyen
Photoautotrophic Production of Biomass, Laurate, and Soluble Organics by Synechocystis sp. PCC 6803
Chair: Dr. Bruce Rittmann

Robert Oxley
Ecological, Environmental and Hydrological Integrity in Sustainable Water Resources Management
Chair: Dr. Larry Mays

Valentina Prado
Stochastic Multi Attribute Analysis for Comparative Life Cycle Assessment
Chair: Dr. Thomas Seager

Paulina Reina
Empirical Analysis and Modeling of Freeway Merge Ratios and Lane Flow Distribution
Chair: Dr. Soyoung Ahn

Thomas Roberts
Quantum Resilience: A generalized Theory
Chair: Dr. Braden Allenby

Isaac Roll
Novel Integrative Methods for Sampling Environmental Contaminants
Chair: Dr. Rolf Halden

Samuel Supowit
Methods and Devices for Assessment of Fiprole Pesticides in Engineered Waterways
Chair: Dr. Rolf Halden

Scott Unger
Sustainable Solutions for Medical Devices and Services
Chair: Dr. Amy Landis and Dr. Kristen Parrish
### 2015 Scholarship and Fellowship Awards Recipients

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<td>Achen-Gardner Mike Kolling Scholarship</td>
<td>Amber Pirkl</td>
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<tr>
<td>AGC Student Chapter Scholarship</td>
<td>Andrew Ortiz, Leo Schlinger, Joseph Burrell</td>
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<td>Ames Family Scholarship</td>
<td>Genesha Gourdine</td>
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<td>Amy &amp; Kent Geiser Honorary Scholarship</td>
<td>Martha Weber</td>
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<td>Andrew Hanneman Scholarship</td>
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<td>Arlo Richardson Scholarship</td>
<td>Jonathan Edgington</td>
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<td>AZ Society of Civil Engineers AZSCE Scholarship</td>
<td>Ivan Bonilla, Juan Solis Jr., Diana Gonzalez</td>
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<td>Bechtel Corporation Scholarship</td>
<td>Miranda Retelle, Amber Pirkl</td>
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<td>Ben C. Griggs Memorial Scholarship</td>
<td>Robert Ferrar</td>
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<td>Betty Hum Graduate Assistant Scholarship</td>
<td>Tasmia Khan</td>
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<td>Briston Veteran Advancement Scholarship</td>
<td>Thomas Fyffe II</td>
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<td>C &amp; N Obannon-Construction Scholarship</td>
<td>Abram Joslin</td>
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<td>Carl and Jean Wolcott Meng Memorial Scholarship</td>
<td>Rachel Von Gnechten</td>
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<td>CEAS-DEW Construction Scholarship</td>
<td>Mario Ramirez, Andrew Ortiz, Christopher Sauer, Brooks Solberg, Oswaldo Robledo, Christopher Ortega, Sean Osborne, Richard Carman, Nolan Schamberger, Carlos Torres</td>
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<td>CEE Graduate Study Incentive Scholarship</td>
<td>Akash Dakhane</td>
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<td>CFMA/ Joseph J. Quigley Scholarship</td>
<td>Keegan Abele, Vanessa Sanchez</td>
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<td>Charles &amp; Nancy O’Bannon Scholarship</td>
<td>Nicholas Coronado</td>
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<tr>
<td>Civil &amp; Environmental Engineering General Scholarship</td>
<td>Chris Lavoie</td>
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<td>Civil &amp; Environmental Engineering Grad Study Incentive</td>
<td>Benjamin Wender, Troy Hottle, Megan Altizer</td>
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<td>Friends of Civil Engineering (FOCE) Scholarship</td>
<td>Jared Bentley, John Shipman, Zachary Lambros, Jessica Allison, Roy Sims, Claire Tilton, Zachary Handy, Tyler Schafer, Amanda Stubblefield, Ankit Gupta, Satya Tata, Rudra Upadhyay, Dana Bennewitz, Daniel Ascencio, Brandon Robinson, Dylan Walker, Alan Camou, Diego Ortiz, Danielle Goossens, Michael Laukenmann, Dirk Begell, Michael Logan, Helene Florento, Adam Brown, Christopher Sidor, Akshay Gundla, Jaesik Choi, Nicholas Brabender, Jesse Udall, Wei Hii, Michael Albretnsen</td>
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<td>College of Engineering Alumni Association</td>
<td>Martha Weber</td>
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<td>D.L. Withers Scholarship</td>
<td>Brooks Solberg</td>
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<td>Daniel and Katherine Mardian Scholarship</td>
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<td>Dave Clifton Memorial and ASPE Chapter 6 Scholarship</td>
<td>Abram Joslin</td>
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<tr>
<td>Del E. Webb Finance &amp; Acct. Scholarship</td>
<td>Taylor Mount</td>
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**School of Sustainable Engineering and the Built Environment**
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<tr>
<th>Scholarship</th>
<th>Recipients</th>
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<tr>
<td>Del E. Webb Foundation Graduate Scholarship</td>
<td>Anthony Pesek, Jolene Walters, Kristen Hurtado, Jake Gunnoe, Richard Standage, Mohammad Jamali</td>
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<td>Del E. Webb Foundation Scholarship</td>
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<td>Del E. Webb Foundation Women Scholarship</td>
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<td>Del E. Webb Memorial Scholarship</td>
<td>Cory Thellmann, Abby Boaz, Alexis Butscher</td>
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<td>DeTommaso Endowed/Engineer NAmU Scholarship</td>
<td>Marlene Tapia</td>
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<td>Sandra L. Weber Memorial Scholarship</td>
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<td>Edd &amp; Gail Gibson M&amp;G Leaders Scholarship</td>
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<td>Elyse &amp; Paul Johnson Scholarship</td>
<td>Benjamin Havens, Olivia Brancati</td>
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<td>Engineering Internship Program</td>
<td>Rubelle Garay, Michelle Contreras, Alejandra Charcas</td>
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<td>FNF Construction Award</td>
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<td>Frank Chandler Memorial Scholarship</td>
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<td>Harold &amp; Lucille Dunn Memorial Scholarship</td>
<td>Virginia Counts, Linda Tello</td>
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<td>Jan Bennett Endowed Scholarship</td>
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<td>Jan Tuma Scholarship</td>
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<td>Jason McElroy Memorial Scholarship</td>
<td>Richard Carman</td>
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<td>Jerry King Memorial Scholarship</td>
<td>Jodelle Bitloy</td>
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<td>Jim Bebout Memorial Scholarship</td>
<td>Carlos Torres</td>
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<td>John Lamberson Memorial Scholarship</td>
<td>Leo Schlinger</td>
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<td>Kavazanjian Fellowship</td>
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<td>Kimley Horn Civil Engineering Scholarship</td>
<td>Jenna Stevens</td>
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<td>Kitchell Contractors Scholarship</td>
<td>Christopher Sauer, Sean Osborne</td>
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<td>L. C. Jacobson Graduate Fellowship</td>
<td>Jason Hailer, John Cribbs, Alfredo Rivera, Yasir Alhammadi, Mohammad Jamali</td>
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<td>Marilyn &amp; James A. Schmidlin Scholarship</td>
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<td>Marvin Sheldon Memorial Scholarship</td>
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<td>Mike Kolling Memorial Scholarship-Civil Engineering</td>
<td>Cooper Lewis</td>
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<td>Native American Construction Scholarship</td>
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<td>Nellie &quot;Jean&quot; Randle Scholarship</td>
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<td>Opus West Scholarship</td>
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<td>Paragon Structural Design Scholarship</td>
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<th>Recipients</th>
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<td>Phoenix Scottsdale Groundwater Scholarship</td>
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<td>Pulte Home Corporation Scholarship</td>
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<td>Robert H. Johnson Scholarship</td>
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<td>Rod J. McMullion SRP Water Res Scholarship</td>
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<td>Silver Shield Systems Scholarship</td>
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<td>Smeca Scholarship</td>
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<td>Structural Engineers Association of Arizona Scholarships</td>
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<td>Terry Bourland NAmU Scholarship</td>
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<td>Terry Bourland NAmU Scholarship</td>
<td>Aaron Chee, Eric Lao, Robert Richards III</td>
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<tr>
<td>The Beavers Heavy Construction Scholarship</td>
<td>Antonio Gutierrez</td>
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<tr>
<td>Tom &amp; JoAnn Prescott NAMU Scholarship</td>
<td>Kahla Vitz</td>
</tr>
<tr>
<td>Vietnam Ed Fnd Fellowship Scholarship</td>
<td>Thuy Thi Nguyen</td>
</tr>
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</table>

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

$314,660
The Future is Now: SSEBE launches new online MSE degree program in Sustainable Engineering

Recognizing that in the future, companies, clients, and governments will be demanding more expertise in sustainable engineering designs and solutions, SSEBE in 2015 launched a new online degree, the Masters in Sustainable Engineering (http://ssebe.engineering.asu.edu/prospective-students/gradstudies.html).

This unique degree, one of only three in the world, helps practicing professionals and students understand how to integrate complex social, environmental, policy, political and economic factors in order to create elegant environmentally, socially and economically efficient engineering solutions.

Working from anywhere in the world, students learn to better understand and work with complex, multidisciplinary engineering and technological systems; develop deep knowledge of core sustainable engineering principles; hone their expertise in natural and man-made system modeling, dynamics and adaptive behavior; and build a working knowledge of key environmental and social considerations, and how they can be integrated into technology design.

The degree is structured to enable students worldwide to select program areas that suit their needs and interests, such as life cycle assessment and other technical sustainability assessment tools, energy conservation and alternative energy technologies, green buildings science and construction practices, transportation, industrial ecology, and earth systems engineering and management.

Rapidly growing demand for sustainable engineering solutions, the convenience of a completely online program taught by the world class experts who have written the first textbooks on sustainable engineering, all backed by the incomparable resources of SSEBE and the Ira A. Fulton Schools of Engineering, make this an excellent choice not just for students seeking that critical edge in a competitive marketplace for talent, but also for continuing education for engineering professionals of all types.

Brad Allenby, SSEBE professor
Arizona State University will lead a new National Science Foundation (NSF) Engineering Research Center to pioneer advances in geotechnical engineering that promise solutions to some of the world's biggest environmental and infrastructure development challenges.

The consortium of university, industry and government partners has been awarded $18.5 million to establish the Center for Bio-mediated and Bio-inspired Geotechnics (CBBG) to expand the emerging field of biogeotechnical engineering.

CBBG's researchers will focus on "nature-compatible" approaches to boosting the resiliency of civil infrastructure, improving the effectiveness of environmental protection and ecological restoration methods, and developing ways to make infrastructure construction and natural resource development operations more sustainable.

CBBG's director is ASU Regents' Professor Edward Kavazanjian. He is a member of the National Academy of Engineering and the Ira A. Fulton Professor of Geotechnical Engineering in the School of Sustainable Engineering and the Built Environment.

The center's university partners are the Georgia Institute of Technology, New Mexico State University and the University of California, Davis. Engineers and scientists at those institutions will collaborate with ASU researchers to investigate the use of natural underground biological processes for engineering soil in ways that reduce construction costs while mitigating natural hazards and environmental degradation.

ASU is now one of only two universities in the country leading currently NSF-funded Engineering Research Centers. The coveted distinction of leading two Engineering Research Centers places ASU among the country's top research institutions in advancing innovation and discovery designed to benefit people around the globe.

A range of expertise across engineering and science disciplines will be needed to better understand the nature of the biogeochemical processes on which the center's work will focus. In addition to Fulton Schools of Engineering faculty members, ASU's team includes researchers from the university's School of Earth and Space Exploration, the School of Life Sciences and the Mary Lou Fulton Teachers College.
Environmental protection and restoration aspects of the research will be directed by Rosa Krajmalnik-Brown, an associate professor in the School of Sustainable Engineering and the Built Environment and one of the center’s co-principal investigators.

The potential global impact of CBBG's work has attracted more than a dozen companies to sign on to the center’s industrial affiliates program to lend support to the research. In addition, 15 universities from around the world – including some in Europe, Asia and South America – are expected to collaborate with CBBG on research and educational programs. A number of agencies that manage large public infrastructure systems – including the Arizona and New Mexico transportation departments, the Los Angeles Department of Water and Power and the Port of Los Angeles – have also agreed to collaborate with the center on research and field-testing.
Quest to boost microalgae growth promises more sustainable energy

SSEBE faculty members Bruce Rittmann and Klaus Lackner will lead a new research project to aid U.S. Department of Energy (DOE) efforts to boost production of a promising source for clean, renewable energy.

DOE has awarded ASU a three-year $1 million grant to fund the Atmospheric Carbon Dioxide (CO2) Capture and Membrane Delivery project aimed at enabling more large-scale cultivation of microalgae.

Microalgae are species of microscopic single-cell organisms such as Spirulina and Chlorella that exist in fresh water and sea environments and can be used to make biofuels and an array of consumer products, using only sunlight and CO2.

Besides renewable biofuel production, microalgae biomass is being used for a suite of products, ranging from food supplements to feed mammals and fish, to therapeutics and cosmetics.

“Our goal is to develop systems to make growing microalgae more affordable and sustainable and to produce it on scales large enough to meet growing demands in the United States and globally,” Rittmann said.

ASU’s collaborative spirit

Rittmann is director of the Swette Center for Environmental Biotechnology at ASU’s Biodesign Institute. Lackner is director of ASU’s Center for Negative Carbon Emissions.

Their centers will join forces with researchers in the Arizona Center for Algae Technology and Innovation (AzCATI) on atmospheric CO2 enrichment and delivery systems. AzCATI, located at ASU’s Polytechnic campus, is part of the SSEBE. The project team will focus on two technologies: moisture swing sorption for capturing CO2 from the atmosphere and membrane carbonation for delivering the CO2 more efficiently to microalgae.
An ASU research team working to boost the growth of Microalgae for use in fuels and other bio-based products will test techniques and technologies in algae cultivation ponds at the Arizona Center for Algae Technology and Innovation (AzCATI). Located at ASU’s Polytechnic campus, AzCATI is part of the School of Sustainable Engineering and the Built Environment. Photo courtesy of AzCATI
Providing clean water to millions

No other resource is as necessary for life as is water, and providing it safely and universally is a grand challenge inextricably linked to public health, energy production and sustainable development.

Arizona State University and a consortium of industry, university and government partners have awarded $18.5 million to establish one of the National Science Foundation’s (NSF) prestigious Engineering Research Centers to develop compact, mobile, off-grid water treatment systems that can provide clean water to millions of people who lack it and make U.S. energy production more sustainable and cost effective. ASU researchers have been allocated $3.2 million for their role in the center.

The Nanotechnology Enabled Water Treatment Systems Center, or NEWT, will be led by and based at Rice University in Houston, Texas. It is funded by a five-year renewable NSF grant. NEWT brings together experts from ASU, Rice, University of Texas at El Paso and Yale University to work with more than 30 partners, including Shell, Baker Hughes, UNESCO, the U.S. Army Corps of Engineers and the National Aeronautics and Space Administration.

NEWT deputy director is Paul Westerhoff, ASU vice provost for academic research and professor in the School of Sustainable Engineering and the Built Environment.

"ASU is uniquely positioned to play a key role in this innovative center. Our school’s civil engineering curriculum focuses on sustainable engineering as a revolutionary approach to solve key human needs," said G. Edward Gibson, Jr., director of the School of Sustainable Engineering and the Built Environment. Paul Westerhoff has garnered wide recognition for his work related to the treatment and occurrence of contaminants in water and for his multidisciplinary research. NEWT has the potential to create disruptive technology to improve the quality of life for millions of people and fits squarely into our vision for the school.

According to Westerhoff the new modular water-treatment systems, which will be small enough to fit in the back of a tractor-trailer, will use nanoengineered catalysts, membranes and light-activated materials to change the economics of water treatment.

"NEWT’s vision goes well beyond today’s technology," said Westerhoff, a senior scientist in ASU’s Julie Ann Wrigley Global Institute of Sustainability and co-principal investigator on the NSF grant. "We’ve set a path for transformative new technology that will move water treatment from a predominantly chemical treatment process to more efficient catalytic and physical processes that exploit solar energy and generate less waste."
Urban water sustainability

A consortium of 14 academic institutions and key partners across the United States is addressing the challenges that threaten urban water systems in the U.S. and around the world. With support from a $12 million cooperative agreement from the National Science Foundation, Arizona State University is part of the Sustainable Research Network called the Urban Water Innovation Network (UWIN).

The mission of UWIN is to create technological, institutional and management solutions to help communities increase the resilience of their water systems and enhance preparedness for responding to water crises.

Researchers at ASU will address a spectrum of issues related to hydroclimate, engineering and socioeconomic aspects that are required to comprehensively examine urban sustainability solutions.

Principle investigator Matei Georgescu, assistant professor in the School of Geographical Sciences and Urban Planning is joined by co-principal investigators Zhihua Wang, assistant professor in the School of Sustainable Engineering and the Built Environment, and Elizabeth Mack of the School of Geographical Sciences and Urban Planning.

Extreme events and global climate change can have profound impacts on water security, shattering the most vulnerable communities and instilling enormous costs on governments and economies. Effective response to these challenges requires transitioning to both technological and management solutions that protect water systems from pressures and enhance their resilience.

The integrated research, outreach, education and participatory approach of UWIN will produce a toolbox of sustainable solutions by simultaneously minimizing pressures, enhancing resilience to extreme events and maximizing co-benefits. These benefits will reverberate across other systems, such as urban ecosystems, economies and arrangements for environmental justice and social equity.
Building better roads

ASU engineers are ratcheting up research for more resilient concrete pavements

Aging roadways pose a growing threat to transportation infrastructure systems that are critical to the health of economies throughout the world. Beyond the daunting task of funding extensive restoration efforts, there’s an equally pressing challenge to find ways to rebuild major roads that are more sustainable. These needs are one of the main motivating factors behind a new international initiative called Infravation – a combination of infrastructure and innovation.

The European Commission – an offshoot of the European Union – initiated the effort, inviting engineers and scientists in Europe and the United States to propose research projects to develop technological solutions. The commission considered around 100 proposals. Fewer than 10 have been selected, including two projects to be led by researchers in the United States – one of them by Arizona State University engineer Narayanan Neithalath, who is a faculty member in SSEBE.

High-performance concrete materials in demand

Neithalath has been experimenting with what are called phase-change materials to produce more resilient concrete surfaces for roads and bridges.

Working with colleagues at the University of California, Los Angeles (UCLA), he is finishing up a National Science Foundation-funded project that is exploring the use of a phase-change material solutions for reducing or preventing temperature-related cracks in concrete pavement.

Through the new Infravation project, he and his UCLA partners will expand their work in collaboration with researchers at Delft University in the Netherlands, the Swiss Federal Institute for Materials Science (commonly known as EMPA) and the Tecnalia Research and Innovation organization in Spain.

Since cement concrete is a major component of transportation infrastructure, countries throughout the world are extremely interested in long-lasting and high-performing concrete materials, Neithalath said. His Infravation group has been awarded $1.6 million to find out if concrete solutions containing a phase-change material can significantly enhance the durability of concrete pavements and bridge decks.

Fellow ASU civil engineering faculty members on the project team, Subramaniam Rajan and Mikhail Chester, will apply their specific expertise to aid Neithalath in pursuit of answers and solutions.

School of Sustainable Engineering and the Built Environment
Creating a safer infrastructure system

Aging infrastructure is among the most pervasive and critical global challenges. Countries around the world face potentially perilous consequences from the corrosion of structures on which their transportation, resource management and public safety systems depend.

ASU engineer Pingbo Tang wants to extensively employ advanced technologies as tools for more comprehensive and precise methods of detecting the onset of structural breakdown, predicting its spread and providing data to ensure the most effective repair strategies.

Tang’s work in this area will now be supported through a National Science Foundation (NSF) Career Award he recently received. These awards go to young engineers and scientists in the early part of their careers who are considered potential education and research leaders in fields of expertise that could serve national interests.

Pingbo Tang is an assistant professor in the Del E. Webb School of Construction in the School of Sustainable Engineering and the Built Environment. His research involves the use of advanced sensing and information modeling technologies to produce the analytics necessary for construction-quality management and maintenance of civil infrastructure systems.

The NSF award is providing him about $500,000 over five years for a project titled “Risk Monitoring of Civil Infrastructure Using Correlated Change Patterns in Spatiotemporal Data”.

Tang will use the latest laser-scanning technology to produce three-dimensional images that more meticulously track changes over time on the surface and within various structures. Advanced computational tools will then be used to analyze the data provided by such imaging. The data will in turn be used to guide development of solutions to structural deformation and decay.

The project will focus primarily on bridges, but also look at water towers and offshore drilling structures. Tang’s goal is to vastly improve the ability to predict what degree of threat is posed by even the smallest changes in the materials that make up those structures.

“We want to be able to understand, for example, how specific kinds of cracks will grow, how certain crack formations may be related to each other, and how different cracks might impact an entire structure,” Tang said.

Tang's project will involve studies of at least 25 bridges in China and Korea, and in New Mexico – and possibly additional ones in Arizona and Pennsylvania – places where there are various types of bridges offering a broad spectrum of structural problems to examine.
ASU study: Cities need to limit parking to decrease automobile use and encourage public transit

If burgeoning cities wish to decrease automobile use to relieve congestion, reduce air pollution, and encourage public transit they need to develop strategies to reduce the number of parking spaces.

A research project led by Arizona State University, in partnership with UCLA and Georgia Tech, analyzed the change in the types of spaces, number of spaces, and location of spaces in Los Angeles from 1900 to present. The researchers found that most parking was constructed between 1950 and 1980 and there are currently 18.6 million spaces or 3.3 spaces for each of the 5.6 million vehicles.

“It appears that abundant and underpriced parking infrastructure impacts automobile ownership and use,” said the study’s lead author Mikhail Chester, assistant professor of civil, environmental and sustainable engineering in the School of Sustainable Engineering and the Built Environment.

According to the authors, these spaces are often underpriced, lowering the time and money costs of driving. This leads to higher vehicle ownership, more traffic congestion, poor air quality, more household spending on mobility, and underused land.

“We found that since 1975, the number of residential off-street parking spaces is equal to the number of vehicles in Los Angeles,” Chester said. “This has important implications. If we want to manage automobile use at a time when many cities are struggling with managing growing congestion, then we should consider reducing parking or pricing it directly.”

Major reforms are needed to ensure that cities build the appropriate amount of parking infrastructure and redevelop the existing parking supply, the authors suggest. Cities should more strongly consider the use of maximum parking restrictions to reduce automobile congestion, while also redeveloping neighborhoods to encourage more transit use, biking, and walking.

Minimum off street parking standards introduced around the middle of the twentieth century have dramatically affected land use. Land that is often more economically productive for other purposes must be used as parking and the cost of this parking is typically bundled into the price of goods and services distorting our travel choices.
College Avenue Commons awarded Gold ‘green building’ certification

College Avenue Commons (CAVC), the newest Arizona State University building used primarily by the Ira A. Fulton Schools of Engineering and the School of Sustainable Engineering and the Built Environment, has earned one of the leading honors for achievement in “green building” and sustainable construction.

The U.S. Green Building Council (USGBC) awarded the five-story, 137,000-square-foot structure its Gold Leadership in Energy & Environmental Design (LEED) certification.

The council’s certification rating system encompasses the quality of the design and construction phases of the building’s life cycle.

In a letter announcing the Gold LEED rating, the council describes CAVC as “a showcase example of sustainable design” and says the structure “demonstrates (ASU’s) leadership in transforming the building industry.”

The new ASU building has also recently won a Distinguished Building Award of Merit from the American Institute of Architects (AIA) Western Mountain Region organization, the Goodwin Award from the Arizona affiliate of the American Institute of Architects (AIA) and the Phoenix Metro Design Award.

The annual regional awards recognize excellence in architectural design, planning and construction of projects involving AIA architects registered and licensed in Arizona, Colorado, New Mexico, Nevada, Utah and Wyoming.
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Western OSHA Education Center has new director

The Del E Webb School of Construction is home to the Western OSHA Education Center at Arizona State University is under new leadership. In 2015 Lisa G. Hogle was appointed Director. Her background in higher education, adult learning and continuing education programs is a great foundation to move the center forward. The objectives of the center are to increase the offerings of safety credentials to ASU students, increase the demographics of those being served by the center and expand the reach of the center to be a resource to the community and region. The center is actively working to expand the center, partner with other organizations and groups to increase availability and reach of safety training.

The center serves the OSHA Region IX which includes Arizona, Nevada, California, and Hawaii. The OTI Education Centers are a National network of nonprofit organizations authorized by OSHA to deliver occupational safety and health training to private and public sector personnel, organizations and agencies. The center is established through an agreement between ASU and the US Department of Labor to ensure that Region IX has high quality training and education related to worker safety and health. The center provides open enrollment classes as well as contract classes.

Lab manager honored for commitment to culture of safety

Stan Klonowski recently won ASU’s Environmental Health and Safety (EH&S) Award for Excellence, the highest recognition bestowed for significant contributions to safety and sustainability at the university.

Klonowski is a lab manager for the School of Sustainable Engineering and the Built Environment who oversees use of the laboratories for research by graduate students and teaching of undergraduates.

He maintains the environmental engineering teaching labs and the chemical inventories for the labs, and keeps track of student lab use and safety training records.

He also maintains EH&S registration for the labs, as well as special registrations for labs using biological materials and other kinds of materials. In addition, he assists graduate students with solving problems related to their research.

In giving him the award, EH&S cited Klonowski’s efforts in addressing hazardous materials issues, specifically by minimizing the need for hazardous waste disposal by finding alternative uses for the research materials that are reusable.

Klonowski graduated from ASU with a bachelor’s degree in chemistry. He has been an EH&S compliance officer since the program started at ASU in 2005 and served on committees that have helped to develop procedures for the transport and use of chemicals on campus.

Staff Award

The SSEBE Outstanding Service Award went to a team consisting of Susan Garrison, Jessica Jensen, Nancy Osgood, Teri Candelaria, Jeff Ahlstrom, Alicia Stiers, Mike Sever, Lisa Hogle and Brian Dyar for their efforts during the move of the School of Sustainable Engineering and the Built Environment to their new location in College Avenue Commons. The team did an outstanding job above and beyond their normal job functions to make this happen.

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Alumni Achievement

ASU grad combines art, construction skills to help honor fallen firefighters

Joshua Marriott graduated from ASU in 2012 with a degree in construction management. He now works for McCarthy Building Companies, one of the largest building contractors in the country.

Ronald M. Fedrick, a construction management alum, is one of 26 new inductees to the National Academy of Construction, chosen from more than 250 industry leaders who were considered for induction. The academy recognized him for “leadership in the construction industry through industry organizations.”

Fedrick has been chief executive officer and chairman of the board of Nova Group, Inc., since 1976. He is a recipient of the Ted Kennedy Contractor of the Year Award and USA Distinguished Public Service Achievement Award, both from ABC. He has been honored as an Arizona State University Engineering Distinguished Alumni, received the Small Business Association’s Dwight D. Eisenhower Award for Excellence, and is the first recipient of the John Lamberson Memorial Low Bidder Award, recognizing his lifelong commitment and success in the construction industry.

A recently completed memorial dedicated to those who gave their lives fighting fires in Arizona owes some of its visually striking elegance and structural stability to the construction and artistic talents of an Arizona State University graduate.

Joshua Marriott had studied art and architecture in college before coming to ASU and earning a degree in 2012 in construction management—with a concentration in concrete industry management—in the Del E. Webb School of Construction.

Marriott’s performance at the university helped him land a job with the Phoenix-based Southwest division of the McCarthy Building Companies, one of the largest building contractors in the country. The company called on him to help with the contribution of its services to building the Arizona Fallen Firefighters & Emergency Paramedics Memorial on the Wesley Bolin Plaza on the Arizona State Capitol grounds in Phoenix.

The memorial was officially dedicated in October 2015 during an annual ceremony to honor Arizona firefighters.

Marriott helped with some of the design and cost estimating for the project, and took the lead on creating and crafting one of the key features of the memorial: a circular concrete slab about 25 feet in diameter with an engraved representation of the Maltese Cross, an international symbol of firefighters’ commitment to risk their lives to protect others from the dangers of fire.
Faculty

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 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 three patents, co-authored five textbooks, and is active in numerous professional organizations. Received the Young Civil Engineer Achievement Award from the University of Illinois at Urbana-Champaign (2003), past recipient of the John O. Bickel Award from the American Society of Civil Engineers and was named to the Phoenix Business Journal’s prestigious “Top Forty under 40” list in 2006. Currently, serves as the Chairman of the International Society for Trenchless Technology. Ariaratnam was named the “2012 Trenchless Technology Person-of-the-Year” by Trenchless Technology Magazine. 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 joined the School of Sustainable Engineering and the Built Environment at ASU in 2014. Prior to joining ASU, he completed his MAE and PhD degrees as well as his postdoctoral research at The Pennsylvania State University in the Architectural Engineering Department. At Penn State, Ayer worked in the Computer Integrated Construction research group exploring how computers can enhance construction processes.
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 third conference in 2014 and attended by over 300 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
**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.  

G. Edward (Edd) Gibson, Jr., PhD, PE, NAC
Professor and Director of SSEBE
Sunstate Chair of Construction Management and Engineering
PhD, Auburn University
GEEdwardGibsonJr@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 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 190 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.

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 Politecnica 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 ASEE 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: Urban metabolism, environmental monitoring/ remediation, sewage epidemiology, green chemistry/engineering, exposure assessment

Halden has led over $11M in sponsored research (NIH, EPA, DOD, NSF and DOE) at Livermore National Lab, Johns Hopkins and ASU. He has authored over 150 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.


Keith Hjelmstad, PhD
Professor
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.
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 2015 Daniel Jankowski Legacy Award, 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
PhD, Arizona State University
Kamil.kaloush@asu.edu

**Research Expertise:** Pavements, materials characterization, crumb rubber 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 25 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:** 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; member of the Transportation Research Board Design and Construction Group Executive Board; member of the International Road Federation (IRF) Board of Directors; member of the 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
Fulbright Professor
Director, Performance Based Studies Research Group
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 $12.5M in grants over 18 years, and has successfully run over 975 project tests, delivering over $47B of construction and other services.

**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.
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 17 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: Microbial ecology of important anaerobic systems such as: microbial communities for bioremediation and bioenergy production, and the human intestinal microbial ecology and its relationship to obesity, bariatric surgeries, and autism.

Krajmalnik-Brown received her B.S. (1996) in Industrial Biochemical Engineering from Autonomous Metropolitan University in Mexico City and her M.S. (2000) and Ph.D. (2005) in Environmental Engineering from Georgia Institute of Technology. She is author of 5 patents and more than 60 peer reviewed publications. Her research has been published in prestigious journals such as: Proceedings of the National Academy of Science, Cell, Nature Microbial Reviews, Applied and Environmental Microbiology, Environmental Science and Technology, among others.


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).
Faculty

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.

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.

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 215 peer-reviewed and proceeding papers, over 70 chapters in books he edited, and another invited 10 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 University of Illinois at Champaign-Urbana, a fellow of ASCE, IWRA, and IWA, ASCE Julian Hinds Award, 2014 Prince Sultan Bin Abdulaziz International Water Prize – Surface Water, a Lifetime Member of ASCE, and the 2015 Warren Hall Medal from the Universities Council on Water Resources.

Narayanan Neithalath, PhD
Associate 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. http://faculty.engineering.asu.edu/neithalath

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.

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).

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

Research Expertise: Dr. 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: 2014 Best paper award in Environmental Science & Technology Letters, Natural Sciences and Engineering Research Council of Canada Postdoctoral Fellow; Francine Beaudoin-Denizeau Excellence Award in Biochemical Toxicology; Saint-Lawrence Center Excellence Award in Environmental Sciences.

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.

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 Ecohappiness and Faculty Expert for the Indo-US Collaboration for Engineering Education.
Faculty

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, construction and facility management, 3D imaging for quality; control, quality assessment of BIM and spatial data, 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). He is an associate editor of ASCE Journal of Computing in Civil Engineering.

Honors and Distinctions: Best Paper Award Construction Research Congress, ASCE (2009), Best Poster Award of Construction Industry Institute Annual Conference (2011), and the CEE Recent Alumnus Achievement Award of Carnegie Mellon University (2013).
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.

Enrique R. Vivoni, PhD, PE
Associate 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
Professor and Vice Provost of Academic Research Programming
PhD, University of Colorado
p.westerhoff@asu.edu

Research Expertise: detection and treatment of emerging pollutants in water and wastewater
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 150 peer reviewed journal article publications and has been involved in over 250 conference presentations.

Honors and Distinctions: Member of the USEPA Science Advisory Board; 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  
aviwiezel@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; and the environmental effects on soil behavior.  
A member of the ASU faculty since 2006, Zapata has actively participated in several NCHRP research projects, including the development of the most current ME Pavement Design Guide. Current research activities include the study of fundamentals behind fluid flow due to thermal gradients and how it affects airfield pavement structures; and the introduction of unsaturated soil principles into undergraduate curriculum.  

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 Soils.

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.
Research Faculty

**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 ASU-Lightworks and Principal Investigator of the Realization of Algae Potential (REAP) Project funded by DOE (2014-2016).

**Della M. Roy, PhD, NAE, WAC**
Research Professor
Della.Roy@asu.edu

Part-time joint appointment in the School of Sustainable Engineering and the Built Environment and the School of Mechanical Aerospace, Chemical and Materials

**Research Expertise:** Materials synthesis, processing characterization in inorganic, ceramic, cement and mineral systems

**Thomas Schleifer, PhD**
Assistant Research Professor
Del E. Webb School of Construction
PhD, Heriot-Watt University, Scotland
Thomas.schleifer@asu.edu

**Research Expertise:** Construction management and economics

**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

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.

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.

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.

Kristen Ward, PhD
Lecturer
PhD, University of Arizona
Kward6@asu.edu
Teaching/Research Expertise: Structural Engineering, Engineering Mechanics, Earthquake Engineering, Numerical Methods

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.
Professor of Practice

**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.

**Thomas Roberts, PhD**
Professor of Practice
PhD, Arizona State University
twroberts@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.

**Jeffrey Goss, MA**
Professor of Practice
Executive Director for the Office of Global Outreach and Extended Education
Assistant Dean in the Ira A. Fulton Schools of Engineering
MA, George Washington University
Jeffrey.Goss@asu.edu
**Research Expertise:** Global workforce development learning models and the development and application of new technologies and distributed-media models for adult learning

Farewell

**Amie Baisley**, lecturer, resigned her position at ASU effective December 2015 as she relocated to Utah with her family. We wish her well.

**Apostolos Fafitis**, associate professor, retired on May 15, 2015 after 30 years of service to ASU and has been granted **Emeritus status** by President Crow. We congratulate Fafitis and thank him for his support and service to the university during his time on the faculty.

**Amy Landis**, associate professor, resigned her position at ASU effective June 30, 2015 to accept an **Endowed Chair** position at **Clemson University** in South Carolina. We congratulate her on this new position.

**Paul C. Johnson**, dean of the Ira A. Fulton Schools of Engineering and professor in SSEBE, has been named as the **17th president of the Colorado School of Mines**. Johnson became dean of Fulton Engineering in January 2011 after serving as executive dean for five years. He has been a member of the SSEBE faculty since 1994. Johnson was granted **Emeritus status** by President Crow. We congratulate him and wish him well in this new position.