SCHOOL OF sustainable engineering and the built environment

Ira A. Fulton Schools of Engineering

ARIZONA STATE UNIVERSITY

ANNUAL REPORT 2012

delivering **sustainable** solutions

Dean
Paul C. Johnson

Transcending the traditional

Focusing on the student experience and student success

Inspiring future engineers

Pursuing use-inspired research

Attracting top faculty

school of sustainable engineering and the built environment

School Director
G. Edward Gibson, Jr.

Biofuels

Waste conversion to energy

Public health-technology-environment interactions

Microorganism-human health connections

Infrastructure and product lifecycle analysis

Earth systems engineering

Water purification

Resource-climate interactions

Indoor air quality

Sustainable Construction

Transportation Materials And Systems

Project Performance

Underground Infrastructure

school of computing, informatics, and decision systems engineering

School Director
Ronald G. Askin

Personalized learning

Educational gaming

Energy-efficient data storage and computing

Health informatics

Haptic interfaces

Assisting devices

Health care system logistics

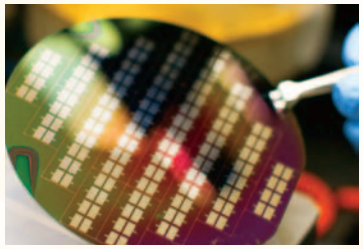
Information assurance

Production logistics

Artificial intelligence

Transportation

Production logistics



school of electrical, computer and energy engineering

School Director
Stephen M. Phillips

Photovoltaics

Power and energy systems

Biosignatures discovery automation

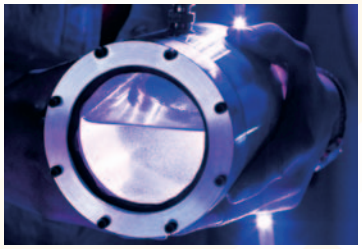
Wireless implantable devices

Sensors and signal processing

Flexible electronics

Power grid management and stability

Sensors and sensing



school for engineering of matter, transport and energy

School Director
Kyle Squires

Personalized learning

Engineering education

K-12 STEM

Electrical energy storage

Thermal energy storage and conversion

Energy production separations

Therapeutics and bioseparations

Rehabilitation and robotics

Adaptive and intelligent materials

High-performance computing simulations

Atmospheric processes

school of biological and health systems engineering

School Director
Marco Santello

Medical diagnostics

Rehabilitation

Neuroengineering

Biomaterials and therapeutics delivery

Synthetic and systems biology

Healthcare technology

Ira A. Fulton Schools of Engineering
ARIZONA STATE UNIVERSITY

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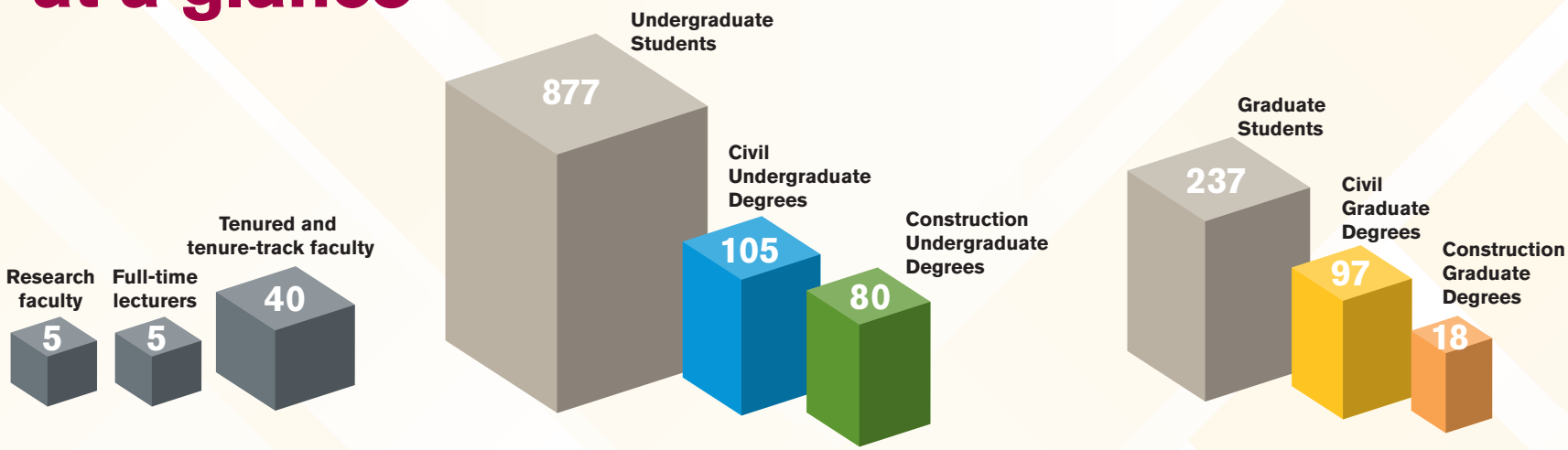
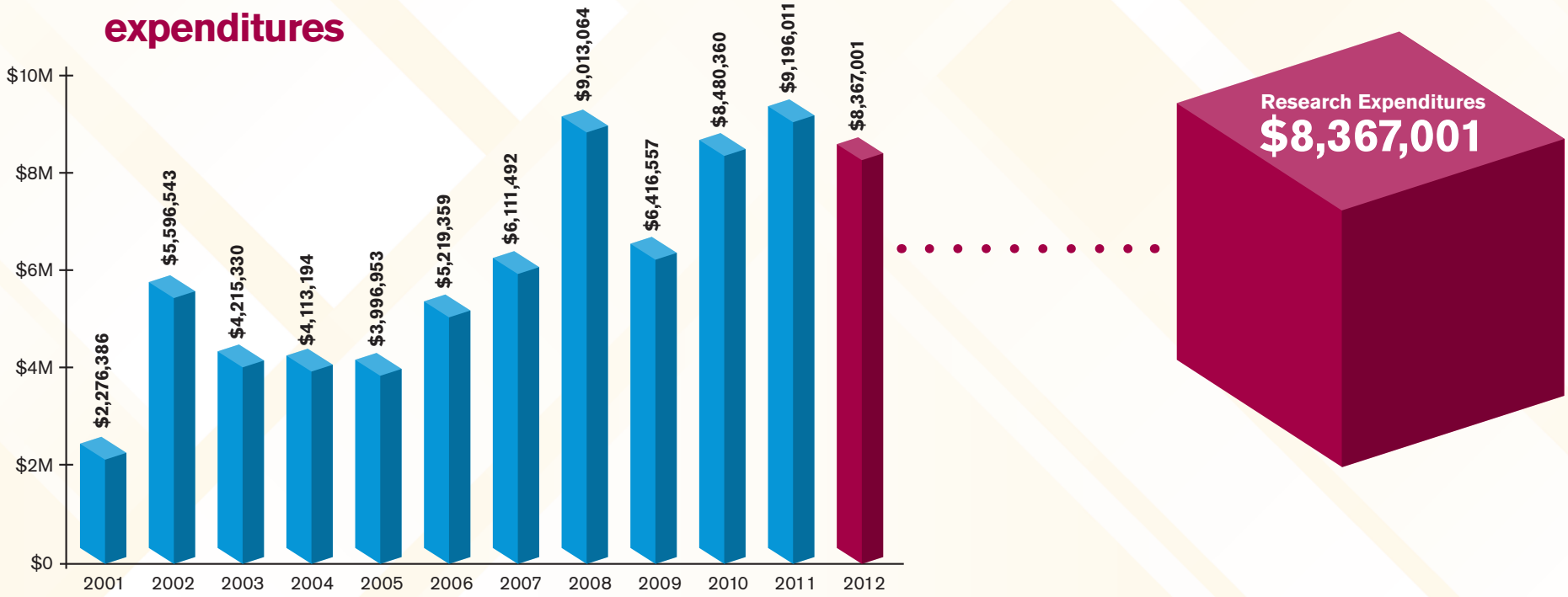
at a glance



ssebe research expenditures



Greetings! 2012 has again been a fruitful year for our students, staff, faculty, and alumni. We continue to focus our efforts on redefining how we approach the problems that will challenge our future. This annual report highlights the progress made this past year as we strive to become a world changing enterprise that is responsive to our students, faculty and community. We are excited about the changes that have occurred recently and opportunities in front of us in 2013.

Our students have again won a number of prestigious awards and competed very successfully at regional and national competitions. During 2012, we matriculated 185 undergraduate and 115 graduate students with these students going to work for many of the best engineering and construction firms in the country. Included in these graduates are the School's first Construction Engineering undergraduate and graduate students. Best of all, our students are engaged in helping our community, region and the world in a number of outreach activities. I am sure that 2013 will be just as fruitful.

I am very proud of our staff members. Although the financial outlook for Arizona is beginning to improve, the fiscal constraints of the past few years have been difficult. They have done a stellar job in supporting our students, faculty and alumni during this time.

Our alumni, young and old, continue to do amazing things in their careers. They, along with other professionals in our community, have been very generous with their time and treasure in supporting many of the things that are essential to our programs.

Our faculty members continue to win teaching and service awards, and at the same time, they expended over $8.3 million on cutting-edge research during the year. We continue to work on our curricula and on ways to engage our students in engineering and construction opportunities from their first day on campus. Their efforts in addressing changes to our curricula, research focus and outreach have been outstanding.

We continue to actively recruit faculty members and during 2012 welcomed five outstanding new faculty members. The coming year promises more hiring, as we are pursuing faculty members for as many as five additional positions.

In May, eight of our faculty members moved into the new ISTB IV building. This state of the art research facility now hosts our Sustainable Water Initiative and includes some of the best wet laboratory facilities in the country. Rolf Halden founded and was named director of the new Center for Environmental Security that is housed in this building. Our group occupies much of the 3rd and 4th floors of this building and we also fill a high bay research space.

Early in 2013, a number of our faculty will consolidate in the ISTB II building, which currently houses most of our experimental laboratories for materials, structures, and geotechnical research and teaching. This will help facilitate collaboration in sustainable infrastructure research and enhance our teaching capabilities.

Finally, we will break ground on a new facility, College Avenue Commons, on January 24, 2013. We will be the primary academic tenant in this new building, occupying most of the top three floors. The Del E. Webb School of Construction, SSEBE administration, some Civil Engineering faculty, and the Alliance for Construction Excellence will all be shifting operations to this facility as it comes on line in summer 2014. The support to teaching, research and service provided by this facility will allow our programs to expand and improve dramatically.

All of these changes are very exciting; if you are in Tempe, please contact me and come by for a visit so we can catch up on what is happening in the School.

G. Edward Gibson, Jr., PhD, PE
Professor and Sunstate Chair
Director, School of Sustainable Engineering and the Built Environment

Civil, Environmental & Sustainable Engineering (CESE)

Mike Mamlouk, PhD, PE, FASCE
Professor and CESE Program Chair

This year, the Civil, Environmental and Sustainable Engineering (CESE) program at ASU has continued interaction with the local community on several fronts. We recently updated the Industry Advisory Board membership in order to cover the different areas of civil engineering more uniformly. The new board met last July and discussed ways to improve employment opportunities for our graduates. Also, our Friends of Civil Engineering (FOCE) members have been working hard to improve the connection between the CESE program and industry. We are continuously working with local community to organize the annual Arizona Pavements/ Materials Conference which has been attracting a larger audience each year and receiving excellent feedback from the local industry.

Our academic program has been growing with about 637 undergraduate students this year, 174 graduate students, and 32 teaching and research faculty. Starting fall 2012, we have been trying a new method in teaching the mechanics courses (statics, dynamics and deformable solids), in which we differentiate the learning environment into lecture, recitation, rehearsal, and assessment. To realize this model it is useful to imagine the courses as comprising modules with fixed set of components and durations. Each module is built around a minimal lecture format and tries to maximize student engagement through recitation sections.

Recently, the CESE program started allowing students of the senior design class to replace their project with an alternative project such as Engineers without Borders and the ASCE Concrete Canoe and Steel Bridge national competitions. These alternative projects provide undergraduate students with a diverse learning experience and promote ASU as a leading school.

This year, we started the Witczak endowment scholarship program and secured the first $5,000. We would like to encourage our alumni and industry groups to participate in this endowment in order to enhance our academic program and attract top students.

We would like to keep in touch with our alumni and get them involved in our academic activities. I want to sincerely thank all of you who stand by our CESE program in so many ways. Your support has been crucial in helping us provide an excellent academic and research environment and enhance the opportunities for our graduates. We welcome new ideas for improving our program performance and creating endowment funds to recognize our outstanding faculty. Please stay in touch!

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 and its various programs are entering an exciting era! We are starting our new signature space (affectionately known as Block 12), we have hired new faculty, and we are revitalizing our industry relations through our Industry Advisory Council (IAC).

First, our new building: Located on the corner of 7th Street and College Avenue, across from the Fulton Center, the facility will house the DEWSC programs, new computer labs, BIM labs, research labs, and state of the art classrooms to enable DEWSC to expand beyond our borders. We invite you to visit us in our new home next year.

Second, our new faculty: DEWSC was fortunate to hire three extremely talented young professors that will provide the school with great new advantages in the classroom and in the advancement of knowledge. You can find out more about them reading their bios and introductions in this report. They are quickly becoming engaged with the students. You can meet them at our IAC meeting next year.

Third, our IAC: We are re-engaging our industry partners through a revitalized Industry Advisory Council. We held our first meeting in August, and our next one is scheduled for January 31, 2013. They have been engaged in our Strategic Planning effort, our recruitment program, and our curriculum revisions. We need your assistance to make our program the best construction program in the US.

With the program improvements, we still face our challenges: our student population (or lack thereof). The downturn the past few years has resulted in a decline in the student numbers in the program. The number of graduates will be reduced the next few years when the need for new hires will be increasing. If you know of potential students, please have them contact us.

Our students continue to do very well in the annual Associated Schools of Construction Student Competition in Reno. Your direct support is evident: in 2012, the school brought home trophies in five of the seven categories in which we competed, including 1st place for Design Build, and 2nd place for Commercial, Concrete, and BIM. Finally, a team of four CM students took 1st place in the Pacific Region for the DBIA Annual Student Competition.

While we wait for our new space, we are not standing still with our programs. Recognizing the value of collaboration between students, faculty and industry, we opened a new teaching lab named DECIMaL (Design Engineer Construct Integrated Management Lab) that uses a collaborative approach for instruction. We are reinvigorating our on-line programs and streamlining our curriculum for ACCE accreditation requirements.

Industry support remains strong – volunteers in the classroom, faculty associates, site visits, additional scholarships, and recruiting assistance. The challenges are great, but that is what has made the Del E Webb School of Construction even better, and I consider it a privilege to be the Program Chair at this important time.

Come! Join us as we move the School to new heights!

Construction Engineering

Samuel T. Ariaratnam, PhD, PE
Professor and Construction Engineering Program Chair

The Construction Engineering program continues to grow as we continue to work towards building a world-class degree offering at ASU. Enrollment almost doubled from last year. Currently, we have 35 students and expect a significant increase in enrollment for fall 2013. The program focuses on planning, design, and management for the construction of infrastructure projects including bridges, airports, pipelines, and other systems that are vital to our nation. Being an integration of Civil Engineering and Construction Management provides our students with exposure to engineering design and management of construction projects.

I am proud to announce our first graduates of the program at both the undergraduate and graduate levels. Jon Serfilippi has the distinction of being our first undergraduate to obtain a Bachelor's degree in Construction Engineering. Jon, a member of the Barrett Honors College, received numerous job offers to consider prior to graduation. Pugazhvel Thirthar Palanivelu and Bhagirath Andapali are the first two students to receive their M.S.E. in Construction Engineering. I am confident that both of them will excel in their future pursuits.

This past year, I convened our Industry Advisory Board consisting of eleven individuals representing owners, engineering design, and construction stakeholders. This group of industry leaders will help me in shaping the Construction Engineering program to ensure that we produce the best possible graduates and leaders in the industry. I personally want to ensure that all of our graduates are well positioned to pursue either employment or continue with post-graduate studies.

Thank you to everyone that has supported the program this past year. I look forward to the upcoming year and welcome feedback on how I can continue to improve the Construction Engineering at ASU.

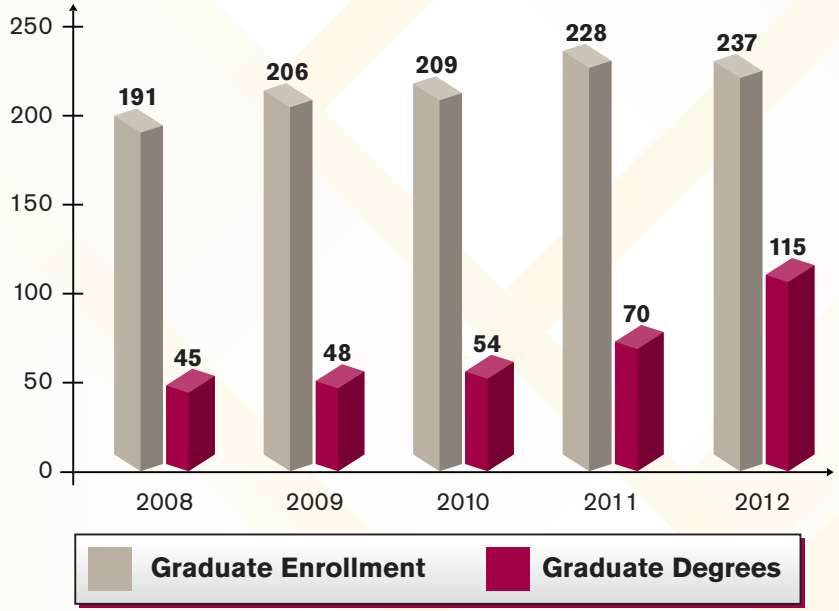
Graduate Program

Subramaniam ('Subby') Rajan, PhD, PE
Professor and Graduate Program Chair

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

We received a record number of applications - 403, for the fall 2012 semester, enabling us to select highly qualified applicants to our programs. Currently there are 237 graduate students - 55 pursuing the CESE and Con Eng MSE degree, 84 pursuing the CESE and CON MS degrees and 98 pursuing the CESE and CON PhD degrees. We have also seen a small increase in the number of enrolled under-represented groups and our goal is to make our program more diverse and inclusive.

Our research expenditure for the 2013 calendar year is projected to cross $10 million for the first time ever. This funding increase will enable us to financially support a large number of our MS and almost all of our PhD students either as research assistants or as teaching assistants. Finally, our plan to retain our best undergraduate students is working well. There are currently 55 Accelerated Bachelor's-Master's (aka "4+1") degree students.



New Faculty Join SSEBE

New programs chair for Del E. Webb School of Construction

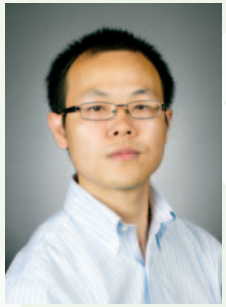
Allan Chasey, an associate professor in the Del E. Webb School of Construction, assumed the Programs Chair for the Del E. Webb School of Construction on May 16, 2012. Chasey has an exciting vision to integrate sustainable construction and building information modeling concepts into a revised undergraduate curriculum. This curriculum will help lead the undergraduate program into the future of construction. Chasey's passion for technology will help bring the graduate program to a larger community.

New faculty in the Del E. Webb School of Construction Programs

Kristen Parrish joined the School of Sustainable Engineering and the Built Environment as assistant professor in August 2012. Her research focuses on integrated project delivery-integrating different phases of the life cycle of a building including design, construction, operations and end of life and simultaneously integrating the people that work on buildings.

Parrish holds B.S. and M.S. degrees in civil and environmental engineering with a focus on structural engineering from the University of Michigan and a Ph.D. in civil engineering systems from the University of California, Berkeley. As a graduate student, she worked on integrating the design and building of concrete structures to enable efficient construction, from a time and budget perspective.

As a doctoral student, Parrish became interested in the interactive elements of building design and construction and how teams worked together to achieve project goals. Her postdoc work at Lawrence Berkeley National Lab focused more on the integration of designers and operators, looking at how to design buildings that use less energy once they are built and in use.



Pingbo Tang is an assistant professor in the Del E. Webb School of Construction within the School of Sustainable Engineering and the Built Environment. He obtained his Bachelor Degree of Civil Engineering in 2002, and his Master Degree of Bridge Engineering in 2005, both from Tongji University, Shanghai, China. He obtained his PhD from the group of Advanced Infrastructure Systems at Carnegie Mellon University in 2009. Before joining ASU in July 2012, he completed his postdoctoral training in the Mapping and GIS lab at The Ohio State University from September 2009 to August 2010, and then worked as an assistant professor of the Civil and Construction Engineering Department at Western Michigan University from August 2010 to July 2012. His research explores the remote sensing and information modeling technology to support spatial analyses needed for effective management of construction job sites, constructed facilities, and transportation infrastructure systems.

He has published more than 40 peer-reviewed journal articles, reports, book chapters, and conference papers and holds membership in several professional organizations. He is serving as an associate editor of ASCE Journal of Computing in Civil Engineering, as well as a reviewer of multiple top journals and conferences in the general area of IT and Computing in Civil and Construction Engineering. He won a Best Paper Award of the 2009 ASCE Construction Research Congress, and the best poster award of Construction Industry Institute's 2011 Annual Conference.

Mounir El Asmar joined the School of Sustainable Engineering and the Built Environment in 2012 as an assistant professor. His research activities have focused on evaluating the performance of sustainable construction, innovative project delivery systems, and cost engineering. The studies he recently completed include developing the conceptual cost estimating tools now required for all high-profile Wisconsin Department of Transportation projects, developing mathematical models to support decision making for design-build team selection, and performing the first quantitative performance assessment of the Integrated Project Delivery (IPD) system.

El Asmar is teaching classes on innovative project delivery methods and sustainable construction at ASU. He holds Ph.D. and M.S. degrees in civil and environmental engineering from the University of Wisconsin-Madison, and a B.E. in mechanical engineering from the American University of Beirut.

New faculty in the Civil, Environmental and Sustainable Engineering Program

B. Shane Underwood joined the School of Sustainable Engineering and the Built Environment in April 2012 as an assistant professor. Before taking his current position, Underwood was a research scientist in the Department of Civil, Construction and Environmental Engineering at North Carolina State University. He received his B.S., M.S. and Ph.D. degrees in civil engineering from North Carolina State University.

Underwood's research involves multi-scale modeling of asphalt concrete, looking at the material as an assemblage of different scales of materials rather than a homogenous mass to assess the performance characteristics of materials affected at the local scale. By experimenting on different assemblages of materials, then developing constitutive models, he is working to gain a better understanding of the way the materials behave.

Through this technique, Underwood is looking at materials reported to be environmentally friendly to evaluate both the initial footprint, but also the long-term performance. The goal is to develop analysis of pavements that are truly sustainable in both the short-term and over the product lifecycle.

T. Agami Reddy joined the SSEBE faculty on a 50% appointment. Reddy will also hold a 50% appointment with the Design School. His areas of expertise are focused on sustainable engineering, design, and construction. Reddy is interested in technological pathways towards energy sustainability, renewable energy (solar thermal) and PV technology), building energy systems, and energy efficiency and conservation in buildings.

His research focuses on advanced data analysis and inverse modeling methods; decision-support engineering tools for optimal operation of building energy systems which include condition monitoring, fault detection, supervisory control and dynamic load control; sustainable and low-energy cooling technology for buildings; solar thermal power systems; and the development of automated design and calibration methods using detailed building energy simulation programs.

Agami is a 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 a member of the American Solar Energy Society (ASES). He has written two textbooks "The Design and Sizing of Active Solar Thermal Systems", Oxford University Press (1987) and "Applied Data Analysis and Modeling for Energy Engineers and Scientists, Springer (2011).

Faculty Honors and Awards

Soyoung Ahn, assistant professor in the Civil, Environmental and Sustainable Engineering program in SSEBE, has been promoted to **associate professor with tenure** effective with the 2012/13 academic year.

Braden Allenby was honored as one of three new **2011 President's Professors** at the 2012 Faculty Excellence Awards banquet. Allenby is now one of only 21 such recipients at ASU and only the second faculty member from the Ira A. Fulton Schools of Engineering. The title is reserved for tenured faculty whose contributions to the teaching mission of the university are both substantial and distinctive. Allenby, along with Daniel Sarewitz is also the recipient of **The Lewis Mumford Award for Outstanding Scholarship in the Ecology of Technics** for his book The Techno-Human Condition.

Barzin Mobasher has received the **Best Paper Award of 2011 by the Japan Concrete Institute** in the field of advanced concrete technology. Mobasher is a professor in the Civil, Environmental and Sustainable Engineering program.

Samuel Ariaratnam, has been named the **2012 Trenchless Technology Person of the Year** by Trenchless Technology magazine, the leading North American publication in this field of construction. Ariaratnam is a professor in the Del E. Webb School of Construction Programs within the School of Sustainable Engineering and the Built Environment. He serves as chair of the construction engineering program.

Paul Johnson *(above left)* and **Kenneth Sullivan** *(above right)* have been named as **Ira A. Fulton Schools of Engineering Top 5% Teaching Award recipients for 2012**. This award is based on nominations by students, an evaluation by the Quality of Instruction Faculty Committee and final selections based on input from the School Directors.

Krajmalnik-Brown selected for Phoenix Business Journal's 'Forty Under 40' leadership honors

The Phoenix Business Journal has named ASU's **Rosa Krajmalnik-Brown** to its 2012 **"Forty Under 40"** list recognizing young leaders in the metropolitan area. Krajmalnik-Brown is a researcher who uses new genomic-based tools to enable microscopic organisms to clean water, produce energy and improve human health.

"My fascination with small life forms and their potential to help solve societal problems drives my research," says Krajmalnik-Brown, who conducts her research at the Biodesign Institute's Swette Center for Environmental Biotechnology.

Krajmalnik-Brown is an assistant professor in the School of Sustainable Engineering and the Built Environment. She is studying the link between differing microbial populations in the human gut and body weight among normal-weight individuals, those who have undergone gastric bypass surgery, and patients classified as morbidly obese.

She hopes her research in partnership with Mayo Clinic Arizona will lead to therapies to alter those gut microbes, enabling weight reduction and improved health. She is also exploring similar differences in gut microorganisms between patients with autism and those not diagnosed with the disorder.

Creativity in teaching sustainable engineering earns award

Innovative work in advancing sustainability engineering education has earned **Amy Landis** a **Carnegie Science Award**. The awards are given by the Carnegie Science Center in Pittsburgh "to recognize and promote innovation in science and technology." Landis shares the award with Melissa Bilec, an assistant professor in the Swanson School of Engineering at the University of Pittsburgh. Landis was a faculty member at the University of Pittsburgh from 2007 until this year, when she joined ASU as an associate professor in the School of Sustainable Engineering and the Built Environment.

In the past several years Landis has developed research and community outreach programs in sustainable engineering, as well as four new sustainability courses. She has won four educational excellence awards and drawn more than $750,000 to support her work in creating education programs designed to promote engineering innovation.

Landis' success led her to be selected to participate in the 2011 National Academy of Engineering Frontiers in Engineering Education Symposium.

Bruce Rittmann has been welcomed into the **ASCE Distinguished Membership Class of 2012**. Rittmann is a professor in the Civil, Environmental and Sustainable Engineering program and Director of the Swette Center for Environmental Biotechnology in the Biodesign Institute.

Amy Landis watches as a student deconstructs a chair in one of her classes. It's one of the assignments Landis uses to teach students about sustainability. They learn about the sustainable aspects of the manufacturing process used to produce the chair, as well as its recyclability and reuse potential.

Faculty Honors and Awards

G. Edward Gibson, Jr. was named to the **National Research Council Board on Infrastructure and the Constructed Environment** in 2012 for a three-year term. Gibson is a professor and director of the School of Sustainable Engineering and the Built Environment and Sunstate Chair.

Cliff Schexnayder, emeritus faculty, was elected into the **National Academy of Construction** and will be inducted in Puerto Rico. Schexnayder is a faculty associate in the Del E. Webb School of Construction program. Schexnayder has also been selected by the editor of ASCE's Journal of Construction Engineering and Management, as a **2012 Outstanding Reviewer**.

Paul Westerhoff, professor in SSEBE and Associate Dean of Research in the Ira A. Fulton Schools of Engineering has been invited to continue serving as a member of the **U.S. Environmental Protection Agency Science Advisory Board's Environmental Engineering Committee** for a three-year term ending September 30, 2015. He will serve as a special government employee providing independent advice on technical issues underlying the EPA's policies and decision making. Westerhoff has also been selected for the **2012 AZ Water Nathan Burbank Environmental Educator Award**.

T. Agami Reddy has received an **ASHRAE Technical Paper Award** at the Society's 2012 Annual Conference. The award recognizes the authors of the best papers presented at Society meetings. He received the award for "The Nearest Neighborhood Method to Improve Uncertainty Estimates in Statistical Building Energy Models." Reddy is SRP Professor of Energy and Environment with a joint faculty appointment in the Design School and the School of Sustainable Engineering and the Built Environment.

Ram Pendyala, Professor in SSEBE, served as a guest panelist on October 22, 2012 at the **International Road Federation** workshop on environmental protection and the impacts of climate change in Cordoba, Argentina, in conjunction with the XVI Argentine Congress of Road Administration and Traffic. The workshop addressed a topic of key concern to transportation planning and design professionals around the world.

As extreme weather events become more common, transport infrastructure is increasingly being tested by these events. Highway engineers are responding to the challenge by correcting vulnerabilities in the existing road network and factoring changing weather patterns in the design of new roads.

Creative teaching approaches put spotlight on ASU engineers

Based on their work to develop and implement innovative approaches to teaching engineering, ASU faculty members Jeffrey LaBelle, **Thomas Seager** and Aviral Shrivastava have been selected to participate in the **National Academy of Engineering's Frontiers of Engineering Education Symposium**.

The academy chooses participants from a highly competitive group of applicants nominated by fellow engineers and deans of engineering schools.

More than 70 university and college engineering faculty from across the country gathered in Irvine, California in October 2012 to share ideas, research findings and teaching methods.

Thomas Seager is a professor in the School of Sustainable Engineering and the Built Environment and a senior sustainability scientist with ASU's Global Institute of Sustainability. At the symposium, Seager presented his work on developing games for teaching engineering ethics.

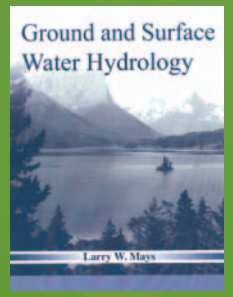
Kamil Kaloush *(above left)* and **Edwin Weaver** *(above right)* have been invited to participate in the **Task Force Committee Meeting for the Civil PE Exam Professional Activities and Knowledge Survey (PAKS)** in Atlanta, GA. The function of PAKS, which is normally conducted at six- to eight-year intervals, is to evaluate the content of a potential examination to ensure that the National Council of Examiners for Engineering and Surveying (NCEES) examinations are relevant and valid. Engineers and surveyors from across the U.S. meet to perform this vital function of exam development. Kaloush is an associate professor in the Civil, Environmental and Sustainable Engineering program and Weaver is a senior lecturer in the Del E. Webb School of Construction program.

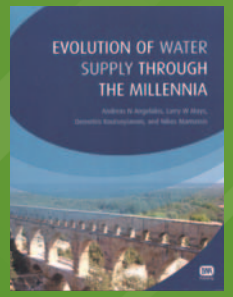
The **ASU ASCE Student Chapter**, under the guidance of faculty advisor **Kamil Kaloush**, has been selected by the Committee on Student Activities to receive a **Certificate of Commendation** for its outstanding activities as recorded in the 2011 Chapter annual report. Kaloush is an associate professor in the School of Sustainable Engineering and the Built Environment.

A joint maintenance project in Brazil nominated by Arizona State University, Dr. Kamil Kaloush, Consulpav International, Dr. Jorge Sousa and Rubberized Asphalt Foundation, George Way, received the **International Road Federation (IRF) 2012 Maintenance Management Award**. The award is given to a maintenance project that, for the first time, used an asphalt rubber structural overlay and an asphalt rubber friction course. The award winners will be officially recognized at the Annual IRF Awards Luncheon which will be held in January 2013 during the 92nd Annual Meeting of the Transportation Research Board (TRB) in Washington DC.

Recent books by faculty

During 2012 **Larry W. Mays** added two more books to his list of 23 books as author, co-author, or editor. **Ground and Surface Water Hydrology** is a new textbook published by John Wiley & sons, Inc. This is the first textbook to provide a balance treatment of both groundwater and surface water hydrology. A rigorous, unified, numerical, and analytical approach is used throughout the book bringing together a balance between theory and application. This book reflects the author's 37 years of experience as a professor teaching hydrology and water resources engineering.





Evolution of the Water Supply through the Millennia, published by the International Water Association Publishing, presents the major achievements in water technologies and management, providing valuable insights into ancient water technologies. The book was co-edited by Mays along with Andreas Angelakis, Demetris Koutsoyiannis, and Nikos Mamassis. This book was part of the continuing effort by Mays in his study of ancient water systems and the relation that these systems could have on solving present and future problems of water resources sustainability, particularly for the poor, using the concepts of traditional knowledge. His first book on this topic was ***Ancient Water Technologies***, published by Springer in 2010.

Student News

Associated Schools of Construction (ASC) Student Competition 2012

ASU teams participating in the **2012 Associated Schools of Construction Reno Competition** had a great showing this year taking home trophies in five of the seven problem categories that they competed in.

1st place in the Design Build problem category
2nd place in the Commercial problem category
2nd place in the Concrete problem category
2nd place in the Building Information Modeling problem category
3rd place in the LEED Construction problem category

While our BIM team took 2nd place, the problem sponsor judges (Webcor) recognized one specific team member, **John Safstrom**, and awarded him outstanding performance award accompanied by an internship/job offer for this upcoming summer.

Additionally, the 2nd place Commercial team was recognized with the Ingenuity/ Innovation Award this year by Mortenson and **Chris Freier** was recognized with a Superintendents Award.

Kim Rahberger of the 2nd place Concrete team was given a special recognition award for the outstanding work she did on the safety portion of their project.

Other noteworthy accomplishments included **William Fugett's** participation on the team that took **1st place in the Alternate Problem** category. (Competing teams were comprised of six members and many of the teams carried an alternate team member. This year, teams' alternate members had the opportunity to form teams with other alternates from various schools and compete in a special problem category. Over 150 students formed 20 teams for this problem category and William was a member of the team that took first).

Insights from an internship

ASU senior **Mathew Watson** spent the past summer working as an intern with Greeley and Hansen, a nearly century-old engineering company based in Chicago with more than 300 employees and 18 offices throughout the United States.

Watson, whose home is in Colorado, is majoring in civil engineering with a concentration in environmental engineering in the School of Sustainable Engineering and the Built Environment.

He's also a member of the ASU student chapter of Engineers Without Borders, an organization that aids developing countries in need of engineering solutions.

Among his career aspirations, he says, is "to improve urban environments around the world by building more sustainable water infrastructure."

The summer internship gave him an opportunity to collaborate on engineering design work, feasibility studies, master planning, construction management and more. He also participated in the company's Designing Your Future Leadership Conference, an interactive, two-day conference at the company's headquarters in Chicago that focuses on career management and leadership development for engineering students.

About his experience, Watson says, "I learned a lot about how the industry works, including that an engineering firm does a lot more than just design. I learned about the project planning and development process, and about client relations and budgeting. I was able to work on some really large and amazing projects."

Photo: Rosie Gochnour/ ASU

Jay Banna is exploring ways to integrate training in leadership and teamwork skills into engineering courses.

Student Snapshot: Developing wide range of experience

ASU senior **Jay Banna** is getting support from the American Association of Railroad Superintendents to help complete studies in the civil engineering program in the School of Sustainable Engineering and the Built Environment in ASU's Ira A. Fulton Schools of Engineering.

The organization recently awarded him a $500 scholarship, due in part to his interest in transportation engineering.

He's been gaining experience in the field through an internship he began in the summer of 2011 with the Arizona Department of Transportation (ADOT).

ADOT is giving him opportunities to delve into various aspects of engineering, including geotechnical analysis, materials testing, construction planning and management, and traffic-control planning and design.

In addition, Banna is getting experience as an educator, serving as a teaching assistant for associate professor Thomas Seager. His work with Seager has enabled him to be among co-authors of a research paper on the use of games to teach engineering ethics.

Banna is also conducting an independent research project in engineering education. He's exploring ways to integrate training in "qualitative skills" such as communication, teamwork and leadership into the learning process in engineering courses.

He's been a member of the American Society of Civil Engineers for four years and is active in the steel bridge group of the organization's local section. The group brings together students to collaborate on designing and building a steel bridge model each year to enter in competitions with other student teams from schools around the country. Banna is the joint specialist for the ASU group.

Away from studies, the graduate of Mesquite High School in Gilbert, Arizona, is an accomplished practitioner of martial arts. He's won high-level competitions and taught martial arts for several years.

Del E. Webb School of Construction Programs students (from left to right) Arundhati Ghosh, Myles Morton, Todd Scott and Skyler Holloway, took the top prize in a regional design-build competition over teams from nine other universities.

Construction students shine in design-build competition

A team of four construction management majors in the Del E. Webb School of Construction recently placed first in the Western Pacific Region 2012 Design-Build Institute of America (DBIA) student competition.

Overall the ASU team placed fourth among about 30 teams from universities across the country.

The **accomplishment earns $2,000 from the DBIA for team** members to attend the industry organization's national conference in New Orleans in November.

Seniors **Skyler Holloway**, **Todd Scott** and **Myles Morton** and graduate student **Arundhati Ghosh** took on the competition's challenge to develop a design-build proposal based on stipulations for a real-life architectural design and construction project.

Competitors had a little over a week to complete their proposals, with the requirement to integrate all aspects of project design and construction. The ASU team came out on top in the regional competition against teams from nine other universities, including the University of California-Berkeley, Cal Poly Pomona, Cal Poly San Luis Obispo and San Diego State University.

Holloway, the team captain, says the training ASU construction school students are given in a wide range of construction- and engineering-related disciplines – as well as hands-on experiences in the field – helped prepare the team to go up against tough competition.

New initiative for CESE students

This trip exemplifies the mission of the Ira A. Fulton Schools of Engineering by inspiring the next generation of engineers to think big.

ASU Chi Epsilon, the Civil Engineering Honor Society, started a new initiative in 2012 to offer technical tours to statewide engineering projects.

In 2013 they plan to have one major technical tour each semester that truly inspires our student engineers and enhances their engineering education by way of physical interaction with remarkable engineering projects.

On January 12th students will take a technical tour of the **Hoover Dam** which will consist of a privately guided tour inside the dam and power generation room, followed by a visit to the newly constructed US 93 bypass. The Hoover Dam comprises of a multitude of civil engineering disciplines such as structural, hydrological, environmental, and geotechnical.

This initiative comes as a result of many requests from civil engineering students to visit the dam. Unfortunately, many of our student members are from out of town and have no means of transportation to and from the dam therefore this trip offers those students the ability to see the dam at a relatively low cost.

The trip will also encourage faculty, student and professional interaction but more importantly, open students' minds to a truly amazing feat of engineering.

DEWSC scholarship students tour high profile construction projects

On March 1st, 2012, ten students, as recipients of the 2012 Professional Development Scholarship, departed for San Francisco to tour four high profile construction projects being performed in the area. First stop was the Bay Bridge project where the group took a boat tour to see how this project was being constructed. Next was the Cal Berkley Football stadium seismic retrofit project, followed by dinner in downtown San Francisco with a few select members of industry that were involved in these projects. The following day the group walked through the Presidio Parkway tunnel project and finally concluded the trip with a tour of the Golden Gate Bridge seismic retrofit project. The group wishes to extend a special thank you to Dr. Cliff Schexnayder, Eminent Scholar/ Professor at ASU and John Lamberson, longtime advocate for Construction Industry Education and friend of the program, for working with the folks that made this trip possible.

Top: Students getting ready for a tour of the Bay Bridge project. Pictured in the back and used in the construction of this project is the largest barge mounted crane on the west coast.

Left: Students touring the Golden Gate Bridge Seismic Retrofit Project.

Right: Students touring the Presidio Parkway Tunnel Project.

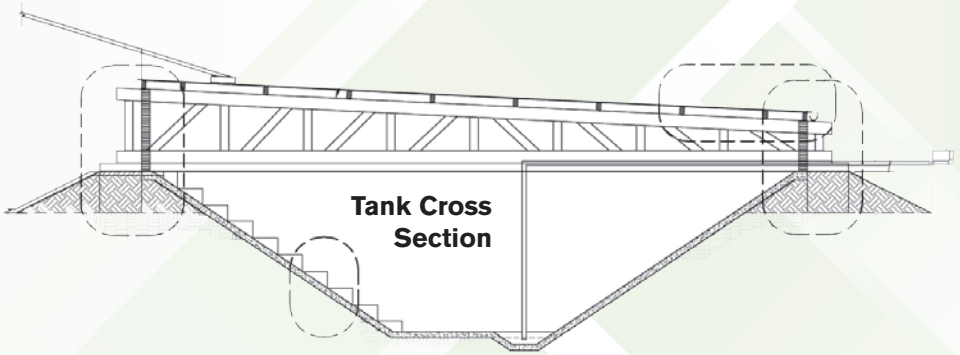
ASU Engineers Without Borders in Action

In July and August, 2012, the ASU EWB chapter traveled to Kenya to construct a rainwater catchment system at the Bondo Teacher's Training college as part of their continuing effort to enhance the water supply for the villages of Maranda, Saradidi, and Nyakasumbi communities of Bondo-Rarieda district. The catchment system included a roof-top collection system of gutters and downspouts, a concrete-lined undeground storage tank, and a "first-flush" system to divert sediment-laden runoff from the first rainfall at the end of each dry season. Bondo-Rareida has a semi-arid climate characterized by two distinct rainy seasons separted by long periods of no rain. Current water suppply options include an unreliable pipeline connected to Lake Victoria to the west, inadequate and leaky rainfall catchement tanks, and hand-dug wells a substantial distance from many of the homes in the area and of uncertain water quality.

Project Location

Local Water Supply

The system was designed by SSEBE student members of ASU EWB with assistance from professional mentors Greg Rodzenko, City Engineer for Glendale, Arizona, and Jack Moody of Cardno WRG, Inc. of Phoenix (for water supply aspects of the project) and Joel Anderson of the Phoenix office of HDR, Inc. (for sturctural design). **Dr. Edward Kavazanjian, professor in the Civil, Environmental and Sustainable Engineering program, is the ASU Chapter Advisor. SSEBE students participating in the project design and implementation included project lead Matt Watson, Health and Safety officer Joshua Steele, and travel team members Lauren McBurnett and Tania Ibarra.** Under new guidlelines developed by the Civil and Environmental Engineering program curriculum committee, Lauren and Tania received senior design project credit for their role in the project.



In keeping with the philospophy of EWB, the system was designed using locally available materials and technologies and implemented as a capacity builiding project. Community members participated actively in construction and were trained by ASU students and their professional mentor in the techniques employed to construct the system.

Excavation of the below grade tank, with a capacity of approximately 150,000 gallons, had already started when the EWB travel team arrived. The tank was lined with locally-purchased PVC geomembrane overlain by concrete mixed by hand on site. The roofing system for the tank employed a wooden truss system and the same type of corrugated metal sheeting employed for local buildings. The gutters and downspouts were fabricated using sheet metal available locally. EWB members also instructed commmunity members in operation and maintenance procedures for the system.

The rainwater catchment system was only the first phase of the ASU EWB Kenya Water Supply project. The team plans to return to Kenya this summer for the second phase of the project, rehabilitation of a dam that was breached by over-topping several years ago.

Gutter and Downspout Installation

Tank Construction

ASU EWB students in Keyna in front of the partially completed project

L to R: Joshua Steele, Jack Moody, Joel Anderson, Mathew Watson, Tania Ibarra, Amy Shaw, Ray McBurnett and Lauren McBurnett (missing Greg Rodzenko) Moody, Anderson and McBurnett are the mentors that accompanied the travel team.

Project Location

In addition to the Kenya water supply project, the ASU EWB chapter is also engaged in an initiative to work with the **Havasupai Indians** *(see below)* on improving the infrastructure in and around Supai village in the Grand Canyon. ASU students **Matthew Conklin**, **Liliana Pinedo**, and **Ryan Furcini** completed preliminary design of a water line to water horses along the trail from Hualapai Hilltop to the Supai campsite for their senior design project in fall 2012. The chapter hopes to complete the water line design in the spring semester and begin construction this summer.

Water Line Alignment

First graduate of new construction engineering program

As the first graduate of the Construction Engineering Program, **Jon Serfilippi** is graduating Cum Laude and a semester early with honors from Barrett, The Honors College. His honors thesis discussed the integration of high speed rail between Phoenix and Tucson.

Serfilippi was one of 35 students nationwide selected to attend ASCE Pipelines Conference, as well as one of 12 ASU students selected to attend four projects in San Francisco (Golden Gate Bridge Seismic Retrofit, Presidio Parkway, Oakland Bay Bridge, University of California – Berkeley Stadium Renovations).

As an engineering student, he served as a Fulton Ambassador, School of Sustainable Engineering and the Built Environment Ambassador, ASU Student Mentor, teaching assistant for ASU 101 for Civil Engineers, interned with Granite Construction, and passed his FE Exam this past April.

2011/12 Scholarship Awards

Advancing Women in Construction Mentorship Grant	Ashley Bernardez, Madison Gerecke, Natalie Griego-Pavon, Lindsay Keever, Aliesche Kessler, Keila Lombardozzi, Kristin Moore, Taylor Mount, Marlynn Radford-Brown, Jocelyn Ramos, Whitney Roberts, Paige Rosenberg, Bailey Ruff, Sabrina Scott, Alexa Tate, Anh Truong,
A.G.C. Construction ASU Student Scholarship	Justin Kinsler, Jonathan Meek, Whitney Roberts, Daniel Steddum
The Ames Family Scholarship	Sabrina Scott, Phillip Smith
Andrew Hanneman Scholarship	Sabrina Scott, Natalie Wilkins
Arizona Society of Civil Engineers (AzSCE) Scholarship	John Barfoot, Allen Rishel, George Whitten
The Beavers Heavy Construction Scholarship	Alen Parkerson
Bechtel Group Foundation Award	Brian Aronson, Myles Morton
Ben C. Griggs Memorial Award	Andrew Beaufeaux
Carl L. and Jean Wolcott Meng Memorial Scholarship	Adriana Ruiz
CFMA Joseph J. Quigley Memorial Scholarship	Brian Aronson, Benjamin Swanson
Charles and Nancy O'Bannon Scholarship for Construction	James Padilla
CIRC Scholars Program	Melissa Archer, Edith Lem, Ivan Ramirez, Breeann Sharma, Ashley Welton
CIRC/METS Scholars Program	Lauren McBurnett, Erick Ponce
Civil and Environmental Engineering General Scholarship	Amoryn Martin
D.L. Withers Construction Company Award	Robert Kong
Daniel and Katherine Mardian Award	Cynthia Barela, Alejandro Gurrola-Montoya

Congratulations to the following students on their achievement and a special thank you to the donors for their contributions. Total scholarships were awarded in the amount of $303,322

Dave Clifton Memorial and ASPE Scholarship	Nassar Sobh
Dean's Exemplar Student Award	Natalie Wilkins, Isha Mehta
Del E. Webb Foundation Finance and Accounting Scholarship	Natalie Greigo-Pavon
Del E. Webb Foundation Undergraduate Student Scholarship	Todd Scott
Del E. Webb Foundation Women in Construction Scholarship	Kimberly Rahberger
Del E. Webb Memorial Scholarship	Skyler Holloway, Michael Larsen, Alen Parkerson
Del E. Webb School of Construction Scholarship for Freshmen	Elizabeth Madsen, Christopher Ortega, Leo Schlinger, Alexa Tate
Elyse and Paul Johnson Award	Joshua Steele
FNF Construction, Inc. Scholarship	Alejandro Gurrola-Montoya
Frank M. Chandler Memorial Scholarship	Che Chavez, Kyle Griffin
James Fann Memorial Scholarship	Justin Kilduff
Jan J. Tuma Memorial Scholarship	Matthew Hann
Jim Bebout Memorial	Andrew Beaufeaux
Kimley-Horn and Associates, Inc. Scholarship	Tate Jensen
Mark Lee Miller Scholarship	Esteban Martinez
Martin H. Rosness Memorial Scholarship	Edgar Hurtado
Marvin J. Sheldon Memorial Scholarship	Stephanie Bone
METSTEP Scholars Program	Matthew Aguayo, Derek Foulk, Eric Johnston, Brannon Maldonado
Native American Construction Management Scholarship	Leonard Black, Joshua Litson, Aaron Maze, Napolean Osorio, Darrell Stanley, Kristen Tsosie, Sylvester Yazzie
Opus West Construction Corporation Undergraduate Scholarship	Cassandra Hudec, Kristin Livingston
Panhuise Engineering Scholarship	Michelle Medina
Paragon Structural Design, Inc. Scholarship	Andrew Chill
PENTA Building Group, Inc. Scholarship	Ashley Bernardez, Skyler Holloway, Cassandra Hudec, Christopher Ortega, Chase Roberts
Pulte Home Corporation Scholarship	Blake Nielson
R. Glen Schoeffler Memorial	Bryan Langdorf, Mason Phillips
Robert H. Johnson Undergraduate Scholarship	Michael Krejci, Myles Morton, James Padilla
Robert J. Wheeler Memorial Scholarship	Megan Branson, Michael Larsen, John Lysiak, Benjamin Swanson
Ron Pratte Memorial Scholarship	Sterling Smith
Samuel F. Kitchell Undergraduate Leadership Award	Cynthia Barela, Myles Morton, Jared Stradling
SMECA Scholarship	Wesley Scatena
Stanley Consultants Scholarship	Matthew Thompson, George Whitten
Terry Bourland Memorial Scholarship	Andrew Chill
William A. Pulice Construction Scholarship Endowment	Leo Schlinger

Doctoral Graduates in 2012

Civil, Environmental and Sustainable Engineering

Ali Alboloushi
Impact of Copper Nanoparticles on Inactivation and Toxicity Pathway on a Variety of Bacteria
Chair: Dr. Morteza Abbaszadegan

Chao-An Chiu
Organic Matter Occurrence in Arizona and Innovative Treatment by GAC
Chair: Dr. Paul Westerhoff

Elsy Escobar Melendez
Transport and Biodegradation of Petroleum Hydrocarbon Components in the Subsurface: A Laboratory Soil Column Study
Chair: Dr. Paul Johnson

Tingting Gao
Chemical Interactions of Air Pollutants: Air Pollutant Control and Sensing Applications
Chair: Dr. Jean Andino

Leila Kabiri-Badr
The Use of Bacteroides Genetic Markers to Identify Sources of Fecal Contamination in Natural Water
Chair: Dr. Morteza Abbaszadegan

Karthik Konduri
Integrated Model of the Urban Continuum with Dynamic Time-Dependent Activity-Travel Microsimulation: Framework, Prototype, and Implementation.
Chair: Dr. Ram Pendyala

Hernan Moreno Ramirez
Improvements in Flood Forecasting in Mountain Basins through a Physically-Based Distributed Mode
Chair: Dr. Enrique Vivoni

Mena Souliman
Integrated Predictive Model for Healing and Fatigue Endurance Limit for Asphalt Concrete
Chair: Dr. Michael Mamlouk and Dr. Matthew Witczak

Youneng Tang
Biofilm Reduction of Oxidized Contaminants
Chair: Dr. Bruce Rittmann

Waleed Zeiada
Impact of Copper Nanoparticles on Inactivation and Toxicity Pathway on a Variety of Bacteria
Chair: Dr. Kamil Kaloush and Dr. Matthew Witczak

Michal Ziv-El
Linking Structure and Function to Manage Microbial Communities Carrying Out Chlorinated Ethene Reductive Dechlorination
Chair: Dr. Bruce Rittmann and Dr. Rosa Krajmalnik-Brown

Construction Management

Brad Carey
Utilization of Metaheuristic Methods in the Holistic Optimization of Municipal Right of Way Infrastructure Management
Chair: Dr. Jason Lueke

Jin Sung Cho
Post-Installation Behavior of High-Density Polyethylene Pipe in Submerged Saturated Silty Soils
Chair: Dr. Sam Ariaratnam and Dr. Jason Lueke

Cynthia King
Project Management Skills of the Future
Chair: Dr. Avi Wiezel

Doug McDonald
Predictive Equipment Failure Methodology with Sustainable Change
Chair: Dr. Kenneth Sullivan

Babak Memarian
Development of High Reliability Construction Work Systems: Lessons from Production Practices of High Performance Work Crews
Chair: Dr. Howard Bashford

Kalyan Piratla
Investigation of Sustainable and Reliable Design Alternatives for Water Distribution Systems
Chair: Dr. Sam Ariaratnam

Brian Stone
Foundational Analysis in Initiative-Based Change Management Modeling an Interdisciplinary Study of Organizational Change in the Built Environment
Chair: Dr. Kenneth Sullivan

Student awards

Andrew Berardy, PhD student in the School of Sustainability and **Ben Wender**, PhD student in Sustainable Engineering have won $500 travel awards from the Society of Environmental Toxicology and Chemistry (SETAC), as well as $120 registration fee waivers, to attend the Annual North American meeting in Long Beach, CA in November 2012. Associate professor Thomas Seager, in the School of Sustainable Engineering and the Built Environment, is their faculty advisor.

Jie Sheng received his PhD in Environmental Engineering under Dr. Bruce Rittmann in December 2011. Last year Jie was selected as one of the outstanding PhD graduates from China. He was a member of the Photobioreactor Team and the Swette Center for Environmental Biotechnology under Bruce Rittmann.

David Hanigan, graduate research associate working with Dr. Paul Westerhoff, was selected by the scholarship review committee to receive a $1,000 scholarship from the AZ Water Association. Winners will be honored during the luncheon program at the AZ Water Conference.

Ira A. Fulton Schools of Engineering team wins 2012 ASU Academic Bowl

In the final match Engineering defeated the College of Liberal Arts and Sciences, 315-120, to become the Academic Bowl champion for the first time since 2006. The winning team will take home $24,000 in scholarship money, divided among its members.

The ASU Academic Bowl champions: the Ira A. Fulton Schools of Engineering team is comprised of *(left to right)* **Wesley Fullmer**, **John Ernzen**, **Albert Stanton**, **Pradyumma Kadambi** and **Katelyn Keberle** *(not pictured)*.

Albert Stanton is an undergraduate student in the Civil, Environmental and Sustainable Engineering program in the School of Sustainable Engineering and the Built Environment and John Ernzen is the son of Dr. Jim Ernzen, associate professor in the Del E. Webb School of Construction.

New facilities

College Avenue Commons project plan provides new facilities for SSEBE

The ASU Office of the University Architect recently released construction documents for the 130,000 square-foot College Avenue Commons project which is slated for a LEED silver designation or above from the U.S. Green Building Council.

ASU's new mixed-use project expands the Tempe campus beyond University Drive and includes enhancements to the surrounding areas. The five-story complex is planned to maximize pedestrian activity on the ground level and to tie into the existing campus urban fabric.

The building project will serve as the new home for the Del E. Webb School of Construction (DEWSC), administrative offices for the School of Sustainable Engineering and the Built Environment (SSEBE) and faculty offices for the civil and environmental engineering program.

These programs will occupy the top three floors of the building. The project also encompasses ground-level eateries; a 200-seat auditorium for "Experience ASU" tours that will double as a classroom when not in use for tours; and several general classrooms that can support smaller class sizes.

The state of the art spaces for DEWSC and SSEBE will include advising areas, seven research and teaching spaces, faculty offices, collaborative spaces, outreach space and administrative offices.

Some of the "green" features under review for implementation include:

- a ventilated façade to reduce exterior surface temperatures
- opportunities for building integrated photovoltaic/solar-thermal technologies
- natural ventilation of atrium spaces
- solar hot water heating for domestic and/or building heat
- LED lighting in some or all areas
- water harvesting for storage and reuse

Additional energy saving initiatives under review for incorporation also exceeded requirements beyond those required by the LEED rating system. For instance, small urban plazas on the structure's perimeter create cooling microenvironments that help to reduce building temperatures and serve as small areas of respite for students and visitors.

College Avenue Commons has been approved by the Arizona Board of Regents and is scheduled to break ground in late January 2013. June 2014 is the target completion date.

DEWSC students visit the construction site.

ASU's College Avenue Commons breaks ground in late January 2013.

New science and engineering building will push boundaries of exploration


Morteza Abbaszadegan


Peter Fox

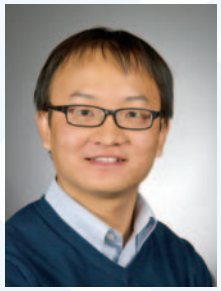

Rolf Halden


Paul Johnson


Amy Landis


Tom Seager


Enrique Vivoni


Zhihua Wang


Paul Westerhoff

ASU's newest science building – the Interdisciplinary Science and Technology Building IV (ISTB 4), on the Tempe campus – is designed to advance research and discovery, and to encourage children to explore their futures as scientists and engineers. The building will do this through a mixture of high-tech labs, interactive environments and open spaces that will allow the public to witness research and technology advancement as it happens.

The seven-story, 293,000-square-foot building is designed to provide flexible laboratories for ASU's School of Earth and Space Explorative (SESE), ASU's Security Defense Systems Initiative, and research laboratories and centers of the Ira A. Fulton Schools of Engineering.

The new **Center for Environmental Security (CES)** is co-located in ISTB-4 with **Rolf Halden** as its Director. Faculty from the School of Sustainable Engineering and the Built Environment, including sustainability and water research experts **Morteza Abbaszadegan, Peter Fox, Paul Westerhoff, Tom Seager, Zhihua Wang, Enrique Vivoni, Amy Landis** and Fulton Schools of Engineering dean **Paul Johnson** are also housed in ISTB-4. Their effort is focused on sustainable water initiatives.

Through innovative architecture, the building incorporates various types of laboratory spaces, clean rooms, administrative and office spaces, high bay spaces and a 250-seat auditorium.

For ASU engineering, ISTB 4 will help with facing today's challenges and building a better society for tomorrow. "This signature facility reflects our core research themes of energy, health, security, sustainability and education through the five main engineering centers housed in the building," said Paul Johnson, dean of the Ira A. Fulton Schools of Engineering.

The formal opening of ISTB 4 was on September 19.


McAllister

Halden named director of new Center for Environmental Security

ASU engineering professor **Rolf Halden** has been appointed to lead a new effort to protect human health and critical ecosystems, called the Center for Environmental Security (CES).

"The goal of CES is to protect human populations and our planet by detecting, minimizing and ultimately eliminating harmful chemical and biological agents through engineering interventions," said Halden, a professor in the School of Sustainable Engineering and the Built Environment.

Halden is also a researcher at the Biodesign Institute and senior sustainability scientist for the Global Institute of Sustainability at ASU.

"We will be utilizing a proactive approach to examine chemical and biological threats in the environment locally and globally, to track human diseases caused by environmental exposure, and to develop intervention strategies suitable for mitigating these threats," Halden explains.

The new Center is being established as the 11th research center at ASU's Biodesign Institute, and the first partnership to leverage expertise and resources of ASU's Security and Defense Systems Initiative (SDSI), led by ASU Professor Werner Dahm.

Halden sees the necessity for the Center to work on a regional, national and global scale to protect environmental quality and human health using both traditional and innovative public health strategies:

"Public health engineering holds the answer to numerous present-day sustainability challenges, whether it's food and drinking-water safety or containing the risk of emergence and spread of communicable diseases," said Halden. "More than half of humanity's health problems are dependent either directly or indirectly on environmental factors. People get exposed to potentially harmful agents through food, air, water and soil. We are looking at all relevant exposure routes with the goal to intervene early. Public health engineering saves lives and money. Stemming wastewater-borne environmental pollution and communicable diseases is a case in point. Whereas the full range of chemical and pathogenic threats in sewage is still unknown, we know how to design and implement biological sewage treatment systems that can recycle precious water resources while keeping the public safe. Similar management strategies are needed to deal with emerging issues of, for example, endocrine disruptors in consumer products and biological agents in ambient air that are linked to, respectively, developmental and respiratory diseases which come at a huge cost to quality of life and economic productivity. Anticipating threats and preventing avoidable environmental diseases is a public health priority offering tremendous return-on-investment."

To maximize synergies, CES is co-located in ISTB-4 with other SDSI facilities and faculty of the School of Sustainable Engineering and the Built Environment, including sustainability and water research experts Morteza Abbaszadegan, Peter Fox, Paul Westerhoff, Tom Seager, Zhihua Wang, Amy Landis, Enrique Vivoni and Fulton Schools of Engineering dean Paul Johnson.

Developing new sources of "clean" energy

There are a lot of "ifs" revolving around endeavors to realize the potential benefits of developing new sources of "clean" energy.

Efforts to reduce dependence on conventional energy sources such as fossil fuels and coal is spurred by the desire to alleviate the harmful environmental impacts of carbon dioxide emissions that result from the production and use of these sources.

Mikhail Chester, assistant professor in the School of Sustainable Engineering and the Built Environment, develops economic and environmental cost-benefit analyses to assess the impacts of producing and using various energy resources.

Researchers are working on using sunlight as a catalyst for a process to produce clean hydrogen fuels, or looking at converting biomass (plant materials) as a clean fuel for power plants.

Other efforts include developing new kinds of batteries to enable automobiles to be fueled solely by electricity instead of a hybrid gasoline-electric power system.

But there remain technological advances to be made before the environmental benefits of such clean energy sources can significantly outweigh the costs of producing and using the alternative fuel sources.

Chester weighs in along with other noted experts on alternative-energy issues in a recent article in a prominent international science magazine.

His research involves determining the overall "lifecycle" costs involved in the uses of various kinds of fuels, as well as the costs of technologies needed to produce and distribute those fuels.

What power sources will ultimately offer the best environmentally beneficial options remains a complex question, Chester says.

Should we be building down instead of up?

Growing cities around the world sometimes encourage development of taller and taller buildings as a strategy for alleviating urban congestion and sprawl. Are they overlooking what in many cases may be a more effective solution: building down instead of building up?

Samuel Ariaratnam talks about the possible advantages of developing our underground "real estate" in an extensive discussion broadcast recently on the Australia Radio National network. On the program, Ariaratnam joins a group of experts to examine what underground construction could provide in not only reining in urban congestion but in public safety, efficient land use, environmental sustainability and protection from extreme heat, cold and natural disasters.

Ariaratnam is chair on the construction engineering program for the Del E. Webb School of Construction Programs in the School of Sustainable Engineering and the Built Environment.

Research: engineering efficiency

Research that led to significant improvements in efficiency in operations at an Intel Corp. semiconductor manufacturing facility has earned national recognition for an ASU engineer and a doctoral student.

Kenneth Sullivan *(above left)* and **Doug McDonald** *(above right)* have won the ASCE 2012 Leadership and Management in Engineering-Best Feature Article Award from the American Society of Civil Engineers for the article they co-authored about their research and its application at the Intel plant in Chandler, AZ.

Sullivan is an associate professor in the Del E. Webb School of Construction Programs in the School of Sustainable Engineering and the Built Environment. McDonald, who is set to complete work for his Ph.D. in construction management in December 2012, works as a facilities manager at the Intel Ocotillo site in Chandler.

Their report "Leadership Principles and Performance Measurement in Facilities Management: A Case Study" appeared in the ASCE journal Leadership and Management in Engineering. The report details their development of a system to predict failure and other potential malfunctions of plant equipment. The predictive preventative maintenance program enabled the manufacturing facility to avoid any costly interruptions to its production process for more than a year after it was implemented.

"This is a direct application of sustainable engineering, and a good example of academia and industry working together to accomplish something that directly improves efficiency and profitability," Sullivan says.

"Everybody walks away with a win."

Future of major high-speed rail project looks green

A study co-authored by an Arizona State University engineer says California's ambitious plan for a high-speed rail system can become a sustainable and environment-friendly transportation alternative.

California has reason to be optimistic that the state's proposed high-speed rail project, due to begin construction next year, can prove to be a viable transportation alternative from environmental and sustainability standpoints.

That's the conclusion of research by **Mikhail Chester**, assistant professor in the School of Sustainable Engineering and the Built Environment and University of California, Berkeley, professor Arpad Horvath reported in a study published in the journal Environmental Research Letters.

Chester and Horvath compared the future sustainability of high-speed rail with that of competing modes of transportation, namely automobiles and air travel. They determined that in terms of energy consumption and greenhouse gas emissions, a mature high-speed rail system wins out when it deploys state-of-the-art trains powered by greener electricity. This was true even after accounting for the emergence of more fuel-efficient airplanes and automobiles.

Faculty Profiles

Kristen Parrish with students in CON 252 at the construction site of the new building for the W.P. Carey School of Business. Through a photo scavenger hunt, students learn about steel in the construction process.

Kristen Parrish joined the School of Sustainable Engineering and the Built Environment as assistant professor this year. Her research focuses on integrated project delivery – integrating different phases of the life cycle of a building including design, construction, operations and end of life and simultaneously integrating the people that work on buildings.

"I am looking at the broader picture," Parrish says. "We want to know not just how the building is built, but how does it get used."

Parrish is working to see if the same principles used to facilitate design for constructability can be applied to "design for operations," or making operations more energy-efficient. She notes that it is a very interdisciplinary, collaborative effort – bringing together architectural, civil, mechanical, electrical and structural engineers on the technical side as well as business and psychology colleagues on teaming strategies.

"There is no one discipline that controls all of the elements in a building," she explains. "For example, if the mechanical designer collaborates with the lighting designer early in the process, we can look at putting in lower lighting power density in a building and reducing the size of the air conditioner at the same time."

She notes that collaboration is one of the reasons she came to ASU.

Assistant professor Zhihua Wang, doctoral student Jiyun Song, and master's students Jiachuan Yang and Tina Pourshams install a meteorology station on the roof of the Engineering Research Center.

Zhihua Wang, assistant professor in the School of Sustainable Engineering and the Built Environment and co-director of climate systems research for the National Center of Excellence on SMART Innovations, is working to further the long-term sustainability of cities by studying the effects of rapid global urbanization on the natural environment and the changing climate.

"Urban areas have a small footprint, but a big impact. They are like 'hotspots' on Earth" Wang says. Through field measurement and numerical modeling, his goal is to gain a better understanding of the transport and storage of energy within an urban environment and evaluate mitigation strategies to reduce the impact on temperature and reduce energy use.

"Man-made materials have high heat storage capacity and buildings change wind patterns. Humans put heat into the environment and produce pollutants," he explains.

Wang has installed meteorology stations on the roof of the Engineering Research Center and at a lot that Tempe-based Creative Paving Solutions has provided for the experiment. Ultimately there will be 12 stations at varied levels and locations on campus and in the Phoenix metropolitan area.

Industry Outreach

The Alliance for Construction Excellence (ACE) resides in the Del E. Webb School of Construction and serves as a mechanism to assist its members in assimilating technological change and research innovations that will invariably impose themselves upon the construction industry. Dedicated to the improvement of productivity, quality, profitability and effectiveness of the construction industry, members of ACE promote research, collect, analyze, manage and disseminate information, and provide continuing education and training that firms and practitioners do not have the capacity to do on their own.

2012 was a very productive and successful year for ACE. A series of "think tanks" were held that served as brainstorming sessions related to current challenges facing the design and construction industry. Partnerships with ADOT Disadvantaged Business Enterprises and Phoenix Workforce Development provided leadership and project management training. The first Job Order Contracting (JOC) Certificate Program was established and an eBook on Advanced Integrated Practice was produced and is currently in the publication stage. Website and online training development continued to meet the industry's future needs with social media presence on Twitter, Facebook and LinkedIn and a year's worth of task force meetings available in a video archive. The very successful Public Private Partnership (PPP) monthly Task Force Meetings continued and have paved the way to implementing PPP's for eight years in the state of Arizona and elsewhere.

ACE continued to work with both public and private industry users on several project delivery accomplishments including formal training of thousands in the use of alternate project delivery methods, along with work at the national level with input to the Associated General Contractors and Design-Build Institute of America. Current funding by ACE for a PhD thesis in this area will provide a critical assessment of alternate project delivery methods. A Future Trends Luncheon Series designed to keep attendees "in the know" for potential game changers in technology like 3D printing and manufactured buildings was begun.

Two fundraising events, the Annual Golf Tournament and the Annual Reception/Dinner, provided special opportunities to network and celebrate the accomplishments of the past year.

Industry giving back

The civil engineering program at ASU is committed to student success, providing opportunities for an exceptional education both in and out of the classroom. Experiential opportunities like research, travel to conferences, industry mixers and student organizations are all part of the student experience and an important piece in creating the workforce of tomorrow.

Annual donations by the Friends of Civil Engineering (FOCE) enable the civil engineering program to support a variety of activities that encourage our engineers, including:

- Scholarships for promising young engineers
- Travel to research meetings
- Mixers to help students make industry connections
- Student organizations' projects, competitions and outreach in the community
- Commencement luncheon honoring new graduates

Students and FOCE members attend the annual industry mixer.

Thank you to our 2012 FOCE members:

Black & Veatch
Carollo Engineers
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Dibble Engineering
Entellus
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FNF Construction
HilgartWilson
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RBF Consulting, a Baker Company
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Government Members:

ADOT
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FNF Donation

On behalf of the **Beavers/Ames endowment**, Edd Gibson, Director of the School of Sustainable Engineering and the Built Environment and Wink Ames accept a donation in the amount of $75,000 from David James, Chief Financial Officer of FNF Construction, Inc. The gift was presented at the FNF golf tournament in May 2012. To date, the fund now has donations over **$1.1million** and we again want to thank the Beavers for initiating this fundraising effort with the Del E. Webb School of Construction.

Industry Advisory Boards

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Tom Sands, *Senior Principal Engineer,* Salt River Project (SRP) (retired)
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Engineering alum sets course for leadership role in sustainability

Jeremy Meek earned a degree in construction management from the Del E. Webb School of Construction Programs in ASU's Ira A. Fulton Schools of Engineering in 2009, and went on to earn a master's degree in an international engineering and sustainability program in England.

Meek chose to major in construction management after graduating from Scottsdale Christian Academy, where he was a top academic performer who had served as president of student government and the school's National Honor Society chapter.

His achievements gave him a lot of options among top-ranked universities across the nation. He had offers of support from every school to which he applied. His choice was Arizona State University's Del E. Webb School of Construction, now part of the School of Sustainable Engineering and the Built Environment.

"It gave me everything I wanted in terms of what I would study as a construction major and in quality programs for a business minor and study abroad," he says.

His record earned him the Del E. Webb Memorial Scholarship to support his studies, as well as scholarships from the Construction Management Association of America, the Urban Land Institute, the Associated General Contractors and the Sigma Lambda Chi Construction Honors Society, among several others.

While at ASU he took leaderships roles in student chapters of three construction industry organizations, and took advantage of one of the university's foreign exchange programs to study for a semester at Queensland University of Technology in Australia. He traveled to Mexico and South Africa as a volunteer for construction projects to aid developing countries, and founded the Construction Students Abroad group at ASU.

He received an ASU Star Award, given to students for their community service efforts in addition to academic success.

Meek was chosen as the construction school's graduate of the year when he earned his degree in 2009, and selected as the featured student speaker at the engineering schools' commencement ceremony.

He gained a deeper understanding of sustainability as far more than an industry niche. "It is a complex subject, and being sustainable is a holistic challenge," he says, "but it comes down to common sense about being responsible with the resources you have, keeping the long-term consequences and a growing global population in mind."

With his degree from Cambridge, Meek "is more prepared to become a visionary leader in the construction industry," says his primary mentor at ASU, associate professor Avi Wiezel, in the Del E. Webb construction school programs.

"His success shows the opportunities in the construction profession that can open up for motivated students who capitalize on our culture of integrating rigorous academic studies with internships and other experiences in the field beyond the classroom," Wiezel says.

Meek is applying his advanced studies as the sustainability programs manager for Desert Star Construction. His training at ASU aids him in also handling business development, marketing and project management for the company.

He's also teaching a Sustainability in Construction course at ASU to seniors and graduate students. He co-taught in the 2011 spring semester with Howard Bashford, associate professor in the Del E. Webb construction program. Meek is teaching the course solo in the 2012 fall semester.

Owen "Big O" Childress
8/15/30 – 4/14/12

Owen Childress was employed by the Del E. Webb Construction Company in 1951 as a Mail Clerk. He had several promotions and in 1960 was promoted to Executive Vice President of Finance and Administration for their Sun City, Arizona project. In July of 1975 he was promoted to Executive Vice President of the parent corporation with responsibility for all financial affairs of the corporation and its subsidiaries. He was also Chairman of the Profit Sharing Committee and a member of the Audit and Finance Committees. Owen left the Del Webb Corporation in 1994. In 1983 he was appointed to the Board of Directors for the Del E. Webb Foundation serving as Vice President and Grant Administrator.

Vern Hastings
8/4/17 – 7/19/12

After retiring from the Air Force in 1966, Vern Hastings became Assistant Dean for Purdue University's newly created School of Technology and in 1973 he accepted the position of Professor and Director for the School of Construction at Arizona State University where he focused on building the relevance, size and stature of the Construction Management Program. Under his leadership the program grew and ultimately became a master's degree granting program. Hastings retired as Director of the program in 1987 but remained active as Professor Emeritus. In this capacity he was instrumental in raising millions of dollars in endowed scholarships for the Del E. Webb School of Construction. In 2002 the Del E. Webb Foundation funded an $80,000 endowment in Professor Hastings' name. Today the Del E. Webb School of Construction annually disburses $300,000 in scholarships to students, due in large measure to the efforts of Professor Hastings.

Kyle Martin Randich
8/11/60 – 3/4/12

Kyle graduated from Arizona State University with a degree in Construction Engineering in 1982. He moved to Alaska in 1983 and started his career in commercial construction with Davis Constructors & Engineers, Inc. He was President of Davis Constructor for four years and retired in 2008. During his 22 years at Davis he managed 58 construction projects throughout Alaska. He spearheaded the 2008 Davis Relay for Life team and raised $350,000, the most raised by any team internationally. His other philanthropic activities included starting the Davis Constructor and Employees Fund, Randich Family Foundation and contributing to the Providence Alaska Foundation. He was awarded the Anchorage Chamber of Commerce Gold Pan award for Individual Philanthropy.

Robert Reynolds Wooding
10/3/16 – 4/11/12

Robert Wooding graduated from the United States Naval Academy in 1940 with a Bachelor of Science degree in Electrical Engineering followed by the Bachelor and Master of Civil Engineering degrees from Rensselaer Polytechnic Institute in Troy, New York. He was a Registered Professional Engineer in the State of Rhode Island and a member of Tau Beta Pi, Sigma Xi and Chi Epsilon honor fraternities. After a distinguished career in the Navy and the recipient of several medals, Rear Admiral Wooding retired from the Navy in 1970. He then became an Associate Professor of Construction Engineering at Arizona State University in its newly formed School of Construction Management until his retirement in 1987.

Morteza Abbaszadegan, PhD
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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. He has developed many new techniques for the detection of viruses, bacteria and parasites in water environments.

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. The NSF Center provides a platform to address issues as diverse as water quality by capitalizing the strengths of partner organizations. He joined the school in 1999 after spending more than six years as a microbiology research manager in private industry. He developed three different courses for the program including an Environmental Microbiology course (CEE 467/567) for engineers.

Honors and Distinctions:
Abbaszadegan has authored more than 100 research manuscripts, book chapters and reports in the area of environmental microbiology and engineering. He serves as Editor of the Journal of Water and Health, an IWA publishing, and successfully established NSF Centers in Water Quality and Environmental Technology at ASU. He has also 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.

Selected Publications:
Abbaszadegan, M., A. Alum, H. Abbaszadegan and V. Stout. 2011. Cell Surface Display of Poliovirus Receptor on E. coli: A Novel Method for Concentrating Viral Particles in Water. Applied and Environmental Microbiology. 77:5141-5148.

Mayer, B., H. Ryu, and M. Abbaszadegan. 2008. Treatability of U.S. EPA Contaminant Candidate List viruses: removal of coxsackievirus and echovirus using enhanced coagulation. Environmental Science & Technology. 42:18:6890-6896.

Abbaszadegan, M., M. LeChevallier, and C. Gerba. 2003. Occurrence of viruses in US ground waters. J. Am Water Works Assoc. 95:107-120.

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Research Expertise: Traffic flow analysis and modeling, safety effects of traffic flow features, congestion management and mitigation, applications of intelligent transportation systems for mobility and safety improvements

Honors and Distinctions:
Ahn is a recipient of the National Science Foundation CAREER award (2012-2017). Ahn serves as a member of the Traffic Flow Theory and Characteristics committee of the Transportation Research Board and a member of the Editorial Board of Transportation Research Part B.

Selected Publications:
Duret, A., Ahn, S., Buisson, C., 2012. Lane-flow distribution on a three-lane freeway: Empirical observation and model implementation. Forthcoming in Transportation Research Part C.

Ahn, S., Vadlamani, S., Laval, J., 2012. A method to account for non-steady state conditions in measuring traffic hysteresis. Forthcoming in Transportation Research Part C.

Zheng, Z., Ahn, S., Chen, D., Laval, J., 2011. Freeway traffic oscillations: microscopic analysis of formations and propagations using wavelet transform. Transportation Research Part B 45 (9), 1378-1388.

Duret, A., Ahn, S., Buisson, C., 2011. Passing rates to measure relaxation and impact of lane-changing in queue. Computer-Aided Civil and Infrastructure Engineering 26 (4), 285-297.

Bar-Gera, H., Ahn, S., 2010. Empirical macroscopic evaluation of freeway merge-ratios. Transportation Research Part C 18, 457-470.

Zheng, Z., Ahn, S., Monsere, C.M., 2010. Impact of traffic oscillations on freeway crash occurrences. Accident Analysis and Prevention 42 (2), 626-636.

Ahn, S., Cassidy, M. J., 2007. Freeway traffic oscillations and vehicle lane-change maneuvers. In: R.E. Allsop, M.G.H. Bell, B.G. Heydecker (Eds.), 17th International Symposium of Transportation and Traffic Theory, Elsevier, Amsterdam, 691-710.

Ahn, S., Cassidy, M. J., Laval, J., 2004. Verification of simplified car-following theory. Transportation Research Part B 38 (5), 431-440.

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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:
Brad 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; and Associate Director of the Lincoln Center for Applied Ethics.

Selected Publications:
In the past year, Allenby has had four books published:

Industrial Ecology and Sustainable Engineering (with Tom Graedel, published by Pearson/Prentice-Hall);

The Theory and Practice of Sustainable Engineering (published by Pearson/Prentice-Hall);

The Techno-Human Condition (published by MIT Press); and

The Growing Gap Between Emerging Technologies and Legal/Ethical Oversight (co-edited with Gary Marchant and Joe Herkert, published by Springer).

Samuel Ariaratnam, PhD, PE, P.Eng.
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Research Expertise: Sustainable urban underground infrastructure systems with an emphasis on horizontal directional drilling and trenchless pipe replacement

Samuel Ariaratnam is a professor in the Del E. Webb School of Construction in the School of Sustainable Engineering and the Built Environment. He received his B.A.Sc. in Civil Engineering from the University of Waterloo (Canada) and his M.S. and Ph.D. from the University of Illinois at Urbana-Champaign.

Honors and Distinctions:
Ariaratnam has published over 200 technical papers, holds three patents, co-authored five textbooks, and is active in numerous professional organizations.

In 2003 he was presented with the Young Civil Engineer Achievement Award from the University of Illinois at Urbana-Champaign. He is a past recipient of the John O. Bickel Award from the American Society of Civil Engineers (ASCE) and was named to the Phoenix Business Journal's prestigious "Top Forty under 40" list in 2006. Currently, he 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).

Selected Publications:
Piratla, K., and S.T. Ariaratnam (2012). "Reliability Based Optimal Design of Water Distribution Networks Considering Life Cycle Components", *Urban Water Journal*, Taylor & Francis, Vol. 9, Issue 5, pp. 305-316.

Piratla, K., S.T. Ariaratnam, and A. Cohen (2012). "Estimation of CO2 Emissions from the Life Cycle of a Potable Water Pipeline Project", *Journal of Management in Engineering*, ASCE, Vol. 28, No. 1, pp. 22-30.

White, T., S.T. Ariaratnam, and J. Michael (2012). "Subterranean Infrastructure Reconnaissance for Manmade and Natural Hazards and Disasters", *International Journal of Disaster Resilience in the Built Environment*, Taylor and Spon, Vol. 3, Issue 1, pp. 66-86.

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Brigham Young University
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Research Expertise: Design of Production Systems for Construction Residential construction Residential construction issues

Howard Bashford owned and operated an engineering consulting firm for 19 years and a construction development company for 8 years before coming to DEWSC in 1991. He has been a faculty member ever since, spending two years at Brigham Young University and the remainder of the time at DEWSC.

Bashford has served as director of the graduate program since 1997. He has also worked with Drs. Walsh and Sawhney of DEWSC to develop a collaborative research program focused upon residential construction. This has led to the development of the Arizona Partnership for Advancing Technology in Homebuilding (AzPath), a partnership with five local home builders, National Science Foundation, and the US Department of Housing and Urban Development (HUD).

Honors and Distinctions:
Bashford is also the Director of the Housing Research Institute (HRI) at ASU. Bashford also heads the Master of Real Estate Development program at DEWSC. This accelerated program is part of a university wide trans-disciplinary degree, collaborating with the schools of design, law and business at ASU.

2003 Crescordia Award for Outstanding Excellence in Environmental Education

Selected Publications:
Palaniappan, S., Bashford, H.H., Fafitis, A., Li, K., Stecker, L. (2009). "Carbon emsiions based on ready-mix concrete transportation: A production home building case study in the Greater Phoenix Arizona area." *Proc. Associated Schools of Construction 45th Annual International Conference*, University of Florida, Gainesville, Florida, April 1 – 4, 2009.

"Benchmarking the Contribution of Labor in Production Homebuilding." *Proceedings, ASCE 2007 Construction Research Congress*, Grand Bahamas Island, May 6 – 8, 2007
Bashford, J., Sawhney, Felt, J. (2007)

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Research Expertise: Construction process for high-technology, controlled environment facilities, sustainable construction

Allan Chasey, an associate professor in the Del E. Webb School of Construction, received his Ph.D. from Virginia Tech, M.S. in Engineering Management from the Air Force Institute of Technology, and B.S. in Civil Engineering from ASU. He is the Sundt Professor of Alternate Delivery and Sustainable Development.

He is also the Director of CREATE, a research consortium of companies representing the Advanced Technology Facility design and construction industry.

He is developing the Building Information Modeling (BIM) curriculum for the School of Construction.

Honors and Distinctions:
Chasey is a registered Professional Civil Engineer in Arizona, an OSHA Construction Outreach Trainer, and a LEED AP. He is a member of the American Society of Civil Engineers (ASCE), the Association for the Advancement of Cost Engineering (AACE), International Society of Pharmaceutical Engineers (ISPE), and the Semiconductor Environmental, Safety and Health Association (SESHA). He also serves as the lead of the Facilities Working Group for the Factory Integration TWG for the International Technology Roadmap for Semiconductors (ITRS).

Selected Publications:
Chasey, A. D., W. E. Maddex, and A. Bansal. Comparison of Public-Private Partnerships and Traditional Procurement Methods in North American Highway Construction. In Transportation Research Record: Journal of the Transportation Research Board, No. 2268, Transportation Research Board of the National Academies, Washington, D.C., 2012, pp. 26–32.

Chasey, A., and Pindukuri, S., "Information Exchange Requirements for Capital Equipment and Facility Infrastructure," Proceedings Construction Research Congress, 2012, Purdue, IN, May, 2012, (pg 437-446).

Chasey, A., "Defining Sustainability for Resource Intensive Facilities," International Conference on Sustainable Design Engineering and Construction (ICSEDC) 2012, Fort Worth, TX, 7-9 Nov, 2012.

Mikhail Chester, PhD
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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

Mikhail Chester joined the School of Sustainable Engineering and the Built Environment in 2011. He has an affiliate appointment with the School of Sustainability. Previously, he was a post-doctoral researcher at the University of California, Berkeley, and guest researcher at Lawrence Berkeley National Laboratory.

Chester's research expands the assessment boundaries of complex systems to understand comprehensive effects of policies and decisions, including infrastructure interdependencies. Ultimately, 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 applied these research interests as a consultant for the National Research Council of the National Academies' Hidden Costs of Energy study.

Chester's transportation life-cycle assessment research project website with up-to-date results and in-depth methodological documentation is available at www.sustainable-transportation.com.

Honors and Distinctions:

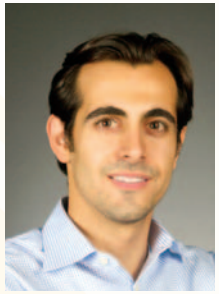
Chester's *Environmental Assessment of Passenger Transportation Should Include Infrastructure and Supply Chains* publication was recently selected as one of the journals top 3 manuscripts for 2009.

Selected Publications:

Yeganah Mashayekh, Paulina Jaramillo, Mikhail Chester, Chris Hendrickson, and Chris Weber, 2011, *Costs of Automobile Air Emissions in U.S. Metropolitan Areas*, Transportation Research Record, 2233, Transportation Research Board.

Roger Sathre, Mikhail Chester, Jennifer Cain, and Eric Masanet, 2011, *A Framework for Environmental Assessment of Carbon Capture and Storage Systems*, Energy, In Press.

Jeremy Michalek, Mikhail Chester, Paulina Jaramillo, Constantine Samaras, C.S. Norman Shiau, and Lester Lave, 2011, *Valuation of Plug-in Vehicle Life-cycle Air Emissions and Oil Displacement Benefits*, Proceedings of the National Academy of Sciences (PNAS), 108 (40).



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Research Expertise: Innovative project delivery systems such as integrated project delivery (IPD) and design-build (DB), performance analysis of sustainable construction practices, cost engineering

Mounir El Asmar joined the School of Sustainable Engineering and the Built Environment in 2012. He holds Ph.D. and M.S. degrees in civil and environmental engineering from the University of Wisconsin-Madison, and a B.E. in mechanical engineering from the American University of Beirut.

El Asmar's research activities focus on evaluating the performance of sustainable construction, innovative project delivery systems, and cost engineering. He recently completed studies involving the development of conceptual cost estimating tools now required for all high-profile Wisconsin Department of Transportation projects, as well as the development of mathematical models that support decision making for design-build team selection. Most recently, El Asmar completed the first quantitative performance assessment of the emerging Integrated Project Delivery (IPD) system.

El Asmar is teaching classes on innovative project delivery methods and sustainable construction at ASU. He also is the co-director of sustainable construction practices at the National Center for Excellence on SMART Innovations.

Honors and Distinctions:

El Asmar received the American Society of Civil Engineers (ASCE) 2010 Best Paper Award for the Journal of Construction Engineering and Management. He also received awards from the International Association for the Advancement of Cost Engineering in 2011 and the Wisconsin Transportation Builders Association in 2012.

Selected Publications:

Menassa, C., Mangasarian, S., El Asmar, M., and Kirar, C., (2012) "Energy Consumption Evaluation of United States Navy LEED Certified Buildings," *J. Perform. Constr. Facil.,* ASCE. Vol. 26, Iss. 1, pp. 46–53.

El Asmar, M., Hanna, A. S., and Whited, G., (2011) "A New Approach to Developing Conceptual Cost Estimates for Highway Projects," *J. Constr. Engrg. and Mgmt.*, ASCE. Vol. 137, Iss. 11, pp. 942–949.

El Asmar, M., Lotfallah, W., Whited, G., and Hanna, A. S., (2010) "Quantitative Methods for Design-Build Team Selection," *J. Constr. Engrg. and Mgmt.*, ASCE. Vol. 136, Iss. 8, pp. 904-912.

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University of Texas at Austin
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Research Expertise: Concrete materials and concrete production and construction operations, integrated project delivery methods

Jim Ernzen is an associate professor and Director of the Concrete Industry Management program at the Del E. Webb School of Construction. He joined ASU in 1996 after 22 years as a construction manager, project engineer, materials researcher, and civil engineering educator in the Army Corps of Engineers.

Ernzen serves as the Academic Co-chairperson of the Project Delivery Methods Task Force sponsored by the Alliance for Construction Excellence where he teaches a graduate course, conducts seminars, and performs research in integrated project delivery methods.

In 2004, he brought a new curriculum program to the School of Construction entitled Concrete Industry Management. This program has been funded with over $1.4M from the concrete industry and represents a significant industry-academia partnership that has brought increased national and international recognition to DEWSC and ASU. He currently serves as Director of the Concrete Industry Management program.

Honors and Distinctions:

In 2001 he was selected to participate on a joint FHWA-AASHTO sponsored International Scanning Tour to investigate innovative contracting methods in Europe. In 2002 he was designated as one of 75 charter Fellows of the Design Build Institute of America (DBIA). He is a member of several committees with the Transportation Research Board as well as DBIA and the American Concrete Institute. He has been recognized by American Institute of Steel Constructors, with their "Distinguished Service Award". From 2005-2009 he was director of the Del E. Webb School.

Selected Publications:

Performance in the Project Trailer: A Partnering Evaluation Tool: a Partnering Evaluation Tool" Ginger Murdough, Debra Drecksel, G. Sharp and J.J. Ernzen, Transportation Research Record, No. 1994 Transportation Research Board, National Research Council, August, 2007 pp 26-34.

"Design Build in the Desert; Innovative Contracting in a Rural Setting" D.Brisk, J. Livingston, D. Drecksell, and J.J. Ernzen, Transportation Research Record, Transportation Research Board, National Research Council, August, 2003.

"Contractor-Led QA/QC Plus Design-Build; Who is Watching the Quality?" J.J. Ernzen and T Feeney, Transportation Research Record, No. 1813, Transportation Research Board, National Research Council, August, 2002, pp. 253-259.

Apostolos Fafitis, PhD, PE
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Research Expertise: Constitutive modeling of brittle materials, elasto-plastic behavior of structures, time dependent nonlinear structural analysis and seismic isolation of structures

Apostolos Fafitis joined the faculty at ASU in 1984. He received his Ph.D. from Northwestern University. Prior to joining ASU, Fafitis worked for 15 years for various structural consulting companies in South Africa, Greece and the USA. He has been involved in the analysis and design of reinforced and prestressed concrete bridges and buildings.

Fafitis' teaching interests include: statics and strength of materials, reinforced and prestressed concrete design, nonlinear structural analysis and dynamics of structures.

Research interests: constitutive modeling of brittle materials, elasto-plastic behavior of structures, time dependent nonlinear structural analysis and seismic isolation of structures.

Selected Publications:

Yang, S.,Fafitis. A. and Wiezel, A. (2011). "Analytic Study on the Structural Behavior of the String Bed in a Tennis Racket", Journal of Mechanical Science and Technology, Vol.25,No.10,pp. 2615-2621

Yang, L, Zhu, H, and Fafitis, A. (2011). "Curvature Ductility of Singly Reinforced Crumb Rubber Concrete Beams", Journal of Advanced Materials Research, Vols. 168-170, pp. 2111-2115

Yue, J, Fafitis. A and Qian, J. (2010). "On the Kinematic Coupling of 1D and 3D Finite Elements: A Structural Model", Interaction and Multiscale Mechanics, Vol. 3, No. 2, pp 192-211.

Rong, B., Chen, Z. and Fafitis, A. (2009) "Axial Compression Stability of a Crisscross Section Column Composed of Concrete-Filled Square Steel Tubes", J. of Mech. Of Mater. and Struct. Vol. 4, pp. 101-113.

Attard, T. and Fafitis, A. (2007) "Optimal Seismic Analysis of Frames", Engineering Structures Parts 1 and 11,29(8),pp.1990-2000.

Fafitis, A. (2005) "Nonlinear truss Analysis by One Matrix Inversion", ASCE J. of Str. Eng. Vol. 131, pp. 701-705.

Fafitis, A. (2001) "An Application of Green's Theorem in the Analysis of Reinforced Concrete Sections Under Biaxial Stress", ASCE J. of Str. Eng. Vol. 127, pp. 840-846.

Peter Fox, PhD, PE
Professor, PhD, University of Illinois
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Research Expertise: Water reuse, biological treatment processes and brine disposal/desalination

Peter Fox has been a faculty member in Civil, Environmental and Sustainable Engineering at ASU for 20 years. He received his Ph.D. in Environmental Engineering from the University of Illinois in 1989, his M.S. in Environmental Engineering from the University of Illinois in 1985 and his B.S. in Chemical Engineering with Honors from the University of Illinois.

His professional interests are primarily in water reuse, biological treatment processes and brine disposal/desalination. He has focused his work on natural treatment systems, groundwater recharge and indirect potable water reuse for the last fifteen years.

Honors and Distinctions:

Fox served on the National Academy of Science ad-hoc committee that published the National Research Council report entitled "Prospects for Managed Underground Storage of Recoverable Water" in 2008. He also authored the groundwater recharge chapter in the Metcalf and Eddy textbook on water reuse. In addition, Fox was an executive committee member for the development of the national roadmap for desalination and water purification.

Fox was awarded the Quentin Mees Research Award from the AzWater Association in 1991, 1994, 1997 and 2003. He was awarded for his special contribution to students at Arizona State University in 1997 and 1998.

Selected Publications:

Nalinakumari, B., Cha, W and P. Fox (2010), Effects of Primary Substrate Concentration On N-nitrosodimethylamine (NDMA) During Simulated Aquifer Recharge, *ASCE Journal of Environmental Engineering*. 136:4, 373-380.

Mohammadesmaeili, F., Kabiri-Badr,, M. Abbaszadegan, M. and P. Fox. (2010). By-Product Recovery as Part of Zero Liquid Discharge with Reclaimed Water. *Water Environment Research*. 82:4 576-584

Lim, S.J., Kim, S.H. and P. Fox (2009). Biological Nutrient and Organic Removal from Meat Packing Wastewater with a Unique Sequence of Suspended Growth and Fixed-Film Reactors. *Water Sci. and Tech.* 60:12 3189:3197.

Makam, R. and P. Fox (2009), An Analysis of Surface Area and Travel Time Relationships During Sub-Surface Flow, *Water Environment Research* 81:11, 2337-2443.

Fox, P., Aboshanp, W and B. Alsmadi (2008). Comparison of Reclaimed Water Application Methods on Receiving Soil Composition. *Journal of Environmental Quality* 37:785-794.

Matthew Fraser, PhD
Associate Professor, PhD, Caltech
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(480) 965-3489

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

Matt Fraser is the Executive Director of the Quantum Energy and Sustainable Solar Technologies Engineering Research Center (QESST ERC), as well as an Associate Professor in the School of Sustainable Engineering and the Built Environment and the School of Sustainability at ASU. The QESST ERC is an interdisciplinary team consisting of multiple universities, world-renowned companies, and leading PV entrepreneurs focused on building a strategic partnership to generate innovative solutions to sustainable electricity generation. More details at www.qesst.org.

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. To tackle this complex problem, Fraser's research group has been involved in field monitoring programs, source characterization studies, emission inventory preparation, and analytical method and instrument development projects. Fraser teaches courses related to energy and the environment, renewable energy, and the scientific basis for global environmental change.

Fraser received his Bachelors of Science in Chemical Engineering from Carnegie Mellon University and his Masters and Ph.D. in Environmental Engineering Science from Caltech.

Honors and Distinctions:

Presenter "University/City Partnerships in Promoting Urban Sustainability" presentation at the White House Office of Science and Technology Policy Workshop on Energy Efficiency, March 2011, Washington DC.

Panelist at the American Association for the Advancement of Science and Brookings Institute Forum on "Eco-Engineering: Building Sustainable Cities", Washington DC, October 2011.

Selected Publications:

Danadurail, S.; Chellam, S.; Lee, C-Y; Fraser, M. P. (2011) "Trace elemental analysis of airborne particulate matter using dynamic reaction cell ICP-MS: Application to monitoring episodic industrial emission events", Analytica Chimica Acta 686, 40-49.

Jia, Y.; Fraser, M. P. (2011) "Saccharides in Ambient Particulate Matter and Two Biologically Derived Sources – Soil and Primary Biological Aerosol Particles", Environ. Sci. Tech., 45, 930–936.

Fraser, M. P. "The Science of Particulate Matter Health Effects" (2011), accepted for publication in the Arizona State Law Journal.

G. Edward (Edd) Gibson, Jr., PhD, PE, NAC
Professor and Director of the School,
Sunstate Chair of Construction Management and Engineering, PhD, Auburn University
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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. He was named director of the School of Sustainable Engineering and the Built Environment in 2011. He is Professor and Sunstate Chair of Construction Management and Engineering in SSEBE.

Gibson has led over $9 million in funded research during his career from sponsors such as NSF, Construction Industry Institute, NRC, Alfred P. Sloan Foundation, and others. He has taught on the university level for over 20 years and has delivered more than 180 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 & 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. National Society of Professional Engineers, Sustaining Universities Program, Outstanding Engineering Educator Award, 2002.

Selected Publications:
Shrestha, P., O'Connor, J., and Gibson, G. E., "Performance Comparison of Large Design Build and Design Bid Build Highway Projects", ASCE Journal of Construction Engineering and Management, accepted for publication, 2011.

Gibson, G. E.(coordinating author), Podesta, T., Carlsson, E., Mitroscak, R. (2010). Project Definition Rating Index, Infrastructure Projects, The Construction Industry Institute, Instructor's Manual, Education Module 268-2, 128 pp., August.

Le, T., Caldas, C. H., Gibson, G. E., and Thole, M. (2009) "A Method for Assessing Project Scope and Managing Risk in Highway Construction." ASCE Journal of Construction Engineering and Management, 135(9), (September 2009), 900-910.

Le, T., Caldas, C. H., Gibson, G. E., and Thole, M. (2009) "A Method for Assessing Project Scope and Managing Risk in Highway Construction." ASCE Journal of Construction Engineering and Management, 135(9), (September 2009), 900-910.

Rolf Halden, PhD, PE
Professor, PhD,
University of Minnesota
Director, Center for Environmental Security
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Research Expertise: Environmental monitoring and remediation, wastewater treatment, green chemistry, impact of anthropogenic activities on environmental quality and human health

Rolf Halden is Professor in SSEBE, Director of the Center for Environmental Security at ASU's Biodesign Institute, and Interim Co-Director of the Center for Health Information and Research. Halden has led over $10M in funded research during his career at Lawrence Livermore National Laboratory, Johns Hopkins University and ASU, with sponsors including the NIH, EPA, DOD and DOE. He has published over 100 peer-reviewed journal articles, reports, book chapters, and patents as well as over 270 conference papers and presentations.

His works include a book on contaminants of emerging concern, the first map of the human cord blood proteome, and the whole genome sequence of a dioxin-degrading bacterium. The devices his team developed for groundwater monitoring and remediation have sparked startup companies and are currently being evaluated at hazardous waste cleanup sites across the nation.

Honors and Distinctions:
Congressional Briefing (2011); Leroy E. Burney Lecturer, Johns Hopkins School of Public Health (2011); Biodesign Impact Accelerator Program, Selected Startup Company, ASU (2010); Award for Research Excellence, Arizona BioIndustry Association's BIOFEST 2010, Nominee and Finalist (2010); Invited Member of the NRC Committee of the National Academies (2006-07); Food and Drug Administration's Nonprescription Drugs Advisory Committee (2005); Governor-appointed Maryland State Water Quality Advisory Committee Member (2003-05).

Selected Publications:
Chari, B. P. and R. U. Halden. 2012. Validation of Mega Composite Sampling and Nationwide

Mass Inventories for 26 Previously Unmonitored Contaminants in Archived Biosolids from the U.S National Biosolids Repository. Water Research 36:4814-4824.

Halden, R. U. 2010. Plastics and Health Risks.

Annual Reviews of Public Health. 31:179-194.

Keith Hjelmstad, PhD
Professor, PhD,
University of California, Berkeley
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Research Expertise: Computational mechanics, earthquake engineering, stability of structures, optimization, structural identification, nondestructive evaluation of large structures, and numerical simulation of complex structures

Keith Hjelmstad is Professor of Structural Engineering in the School of Sustainable Engineering and the Built Environment (SSEBE) in the Ira A. Fulton Schools of Engineering at Arizona State University.

Hjelmstad previously served as University Vice President and Dean of the College of Technology and Innovation at ASU. As the Dean he was responsible for the applied science and mathematics, engineering, engineering technology, cognitive science and engineering, and technological entrepreneurship and innovation management programs. As University Vice President, he served on the University leadership team of ASU and he championed further academic development of programs, activities and community relations for the Polytechnic campus.

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*. As a professor, he was recognized for his excellence in advising and teaching.

Hjelmstad is the author of the book *Fundamentals of Structural Mechanics* (Springer, 2/e). He is 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*.

Selected Publications:
Cochran, K. B., R. H. Dodds, and K. D. Hjelmstad. 2011. The role of strain ratcheting and mesh refinement in finite element analyses of plasticity induced crack closure. *International Journal of Fatigue*. 33(9). 1205-1220.

Haikal, G. and K. D. Hjelmstad. 2010. An enriched discontinuous Galerkin formulation for the coupling of non-conforming meshes. *Finite Elements in Analysis and Design*. 46(6). 496-503.

Nakshatrala, K. B., A. Prakash, and K. D. Hjelmstad. 2009. On dual Schur domain decomposition method for linear first-order transient problems. *Journal of Computational Physics*. 228. 7957-7985.

Sandra Houston, PhD, PE
Professor, PhD,
University of California, Berkeley
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Research Expertise: Advancement of methodologies for dealing with arid region problem soils, particularly collapsible and expansive soils

Sandra Houston is a long-standing member of the Civil, Environmental and Sustainable Engineering faculty at ASU and former chair of the department. Her primary area of expertise is 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 is the regular instructor of undergraduate and graduate level foundation engineering classes and teaches a graduate level course on Unsaturated Soil Mechanics.

A heavy emphasis on the advancement of unsaturated soil mechanics into the practice of geotechnical engineering is evident by her professional service activities, research, and publications.

Honors and Distinctions:

Houston has a long history of leadership in professional society organizations, particularly through participation in the American Society of Civil Engineers (ASCE), the Geo-Institute of ASCE, and the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE).

She is a recipient of the William H. Wisely American Civil Engineer Award, and serves as the chair of the Unsaturated Soils Committee of the Geo-Institute of ASCE, as a member of the ISSMGE Committee on Unsaturated Soils, and as chair of the ASCE Committee on Diversity and Inclusion.

Selected Publications:

Static and Dynamic Behavior of Hydro-Collapsible Soils (2011), Elkady, T., Houston, S., and Houston, W., ASTM Geotechnical Testing J.. Vol. 34, September. DOI: 10.1520/GTJ103576.

Effects of Testing Procedures on the Laboratory Determination of Swell Pressure of Expansive Soils (2011), Singhal, S., Houston, S., and Houston, W., ASTM Geotechnical Testing J, Vol. 34, September, DOI: 0.1520/GTJ10370.

Houston, S., Dye, H., Zapata, C, Walsh, K., and Houston, W. (2011). Study of Expansive Soils and Residential Foundations on Expansive Soils in Arizona, J. Of Constructed Facilities, ASCE, Jan/Feb, pp 335-346.

Paul C. Johnson, PhD, PE
Dean, Ira A. Fulton Schools of Engineering
Professor, School of Sustainable Engineering and the Built Environment, PhD, Princeton University
Paul.C.Johnson@asu.edu
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Research Expertise: Soil and groundwater remediation and risk assessment, specifically, the design, monitoring and optimization of soil and groundwater remediation systems and the monitoring and modeling of exposure pathways

Paul Johnson is the dean of the Ira A. Fulton Schools of Engineering at Arizona State University and a professor in the School of Sustainable Engineering and the Built Environment. Johnson has been a faculty member at ASU since 1994 and has previously served as the university's associate vice president for research, and as associate dean for research and as interim dean and executive dean for the Fulton Schools of Engineering. Prior to joining ASU, he was a senior research engineer at the Shell Oil/Shell Chemical Westhollow Technology Center in Houston, Texas.

Honors and Distinctions:

His research group recently received the 2011 Strategic Environmental Research and Development Program (SERDP) Project of the Year Award for their study of chemical vapor intrusion to homes overlying chlorinated-solvent impacted aquifers.

From 2003 through 2011, Johnson served as the editor for the National Ground Water Association's journal, *Ground Water Monitoring and Remediation*. In 2011, he received the Keith E. Anderson Award from the association for outstanding contributions to the NGWA's Scientists and Engineers division.

In 2011, Johnson was named the Outstanding Educator of the Year by the Arizona Professional Engineers Society.

Johnson is currently serving on the National Research Council Committee on Future Options of the Nation's Subsurface Remediation Effort.

Selected Publications:

Kingston, J.T, P.R. Dahlen, and P.C. Johnson. 2010. State of the Practice Review of In Situ Thermal Technologies. Ground Water Monitoring and Remediation. 30 (4). 64 – 72.

Johnson, P.C., C.L. Bruce, K.D. Miller. 2010. A Practical Approach to the Design, Monitoring, and Optimization of In Situ MTBE Aerobic Biobarriers. Ground Water Monitoring and Remediation. 30 (1). 58-66.

Luo, H., P. Dahlen, P.C. Johnson, T. Peargin, and T. Creamer. 2009. Spatial Variability of Soil-Gas Concentrations near and beneath a Building Overlying Shallow Petroleum Hydrocarbon–Impacted Soils. Ground Water Monitoring and Remediation. 29 (1). 81-91.

Kamil Kaloush, PhD, PE
Associate Professor, PhD, Arizona State University
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(480) 965-5509

Research Expertise: Pavements, materials characterization, crumb rubber applications, Urban Heat Island

Kamil 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 holds a Ph.D. degree specializing in pavements and materials from Arizona State University. 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:

Kaloush is a member of several professional organizations and has over 100 publications in his field. He is the chair of the Transportation Research Board subcommittee on Pavement Materials and the Urban Climate; a member of the Civil Engineering Examination Committee, National Council of Examiners for Engineering and Surveying; Vice Chair of the Technical Advisory Board of the Rubber Pavements Association, and Advisor for the ASU-ASCE student chapter.

Kaloush is also an associate editor of the Journal of Materials in Civil Engineering. In 2009 he was the recipient of the Community Service Award presented by the joint ASU, ADOT, Industry and Local Government Pavements/Materials Conference committee.

Selected Publications:

J. Stempihar, T. Pourshams-Manzouri, K. Kaloush, and M. C. Rodezno. "Porous Asphalt Pavement Temperature Effects for Urban Heat Island Analysis". *Journal of the Transportation Research Board*, (In press, 2012). Washington, D.C.

A. Zborowski and K. Kaloush, "A Fracture Energy Approach to Model the Thermal Cracking Performance of Asphalt Rubber Mixtures". *Road Materials and Pavements Design Journal*, Volume 12 Issue 2/2011, pp 377-395, Lavoisier, 2011.

P. White, J. Golden, K. Biligiri, and K. Kaloush. "Impacts of Alternative Pavement Designs on Climate Change", *Journal of Resources, Conservation and Recycling*, Elsevier, the Netherlands, Volume 54, Issue 11, pp. 776-782, September 2010.

K. Kaloush, K. Biligiri, W. Zeiada, M. C. Rodezno, and J. Reed, "Evaluation of Fiber-Reinforced Asphalt Mixtures Using Advanced Material Characterization Tests", *Journal of Testing and Evaluation, ASTM International*, Volume 38, No. 4, June 2010.

Dean T. Kashiwagi, PhD, PE
Fulbright Professor, PhD,
Arizona State University
Director, Performance Based Studies Research Group
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Research Expertise: Supply chain best value procurement risk minimization

Dean Kashiwagi is the worldwide expert in optimizing the delivery of construction and other services using performance information. His structures/processes simultaneously minimize project/risk management functions up to 90%, increased vendor profit as much as 100%, increased performance to 98%, and decrease costs.

His Performance Information Procurement System (PIPS) and Performance Information Risk Management System (PIRMS) is licensed by the U.S. Army Medical Command and the General Services Administration. Kashiwagi has generated over $12M in grants over 18 years, and has successfully run over 975 project tests, delivering over $4.7B of construction and other services.

Honors and Distinctions:

Kashiwagi is an accomplished author with over 206 refereed conference and journal papers and is a registered engineer in eight states. His research has been recognized by the industry and recently awarded the 2011 Silver Award for Procurement Excellence by NASPO. He was the 2009 International Facility Management Association Educator of the Year. In 2005, he was the recipient of the CoreNet Global Innovation of the Year Award for the research being tested at Harvard University and in 2001 his work received the Pono Technology Award for research work and results in the State of Hawaii. Kashiwagi's research has also expanded to Finland, Netherlands, Africa, and Malaysia.

Selected Publications:

Kashiwagi, D. (2011) "Best Value Procurement / Performance Information Procurement System Development." *Journal for the Advancement of Performance Information and Value*, Vol. 3 (1), pp. 12-45.

Mselle, P., Kashiwagi, J., Kashiwagi, D., Adeyemi, A. (2011) "Risk Management: A New Project Management Perspective." Journal of Civil Engineering and Architecture, Vol. 5 (6), pp. 505-512.

Kashiwagi, D. (2011) "Case Study: Performance Information Procurement System (PIPS) in the Netherlands." *Malaysian Construction Research Journal (MCRJ), Construction Research Institute of Malaysia (CREAM),* Vol. 8 (1), pp. 1-17.

Edward Kavazanjian, Jr., PhD, PE, GE
Professor, PhD,
University of California, Berkeley
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Research Expertise: Geotechnical earthquake engineering, waste containment, mechanical properties of municipal solid waste

Edward Kavazanjian is a geotechnical engineer with 20 years of experience in engineering practice and 14 years of university teaching and research experience. His research and teaching interests include geotechnical earthquake engineering, analysis and design of waste containment systems, and the emerging area of biogeotechnical engineering.

Honors and Distinctions:

Professor Kavazanjian has been honored by the American Society of Civil Engineers (ASCE) with the 2011 Karl Terzaghi Award for outstanding contributions to knowledge in soil mechanics, the 2010 Thomas A. Middlebrooks award for his paper on "Shear Strength of Municipal Solid Waste" and the 2009 Ralph B. Peck Award for outstanding contributions to the geotechnical engineering profession through the publication of thoughtful, carefully researched case histories on landfill engineering. In 2012 he was the recipient of a Community Service Award from the Arizona Pavements and Materials Conference committee. In 2009 he was selected as Engineering Educator of the Year by the Phoenix chapter of the National Society of Professional Engineers.

Kavazanjian is lead-author of the Federal Highway Administration guidance document on *LRFD Seismic Analysis and Design for Transportation Geotechnical Features and Structural Foundations*. He is a Past President of the Geo-Institute of ASCE and sits on the National Research Council Board of Earth Sciences and Resources, where he serves as chair of the standing Committee on Geological and Geotechnical Engineering. He also currently serves on the Board of Directors of the US University Council for Geotechnical Education and Research (USUCGER).

Selected Publications:

Kavazanjian, E., Jr., Arab, M.G., and Matasovic, N. (2012) "Performance Based Design for Seismic Design of Geosynthetics-Lined Waste Containment Systems," Proceedings, 2nd Int. Conf. on Performance Based Design in Earthquake Engineering, Taormina, Sicily, University of Catania, 21 pages. (on CD ROM).

Kavazanjian, E., Jr. (2010) "Sustainable Landfilling," Proceedings, 6th International Conference on Environmental Geotechnics, New Delhi, India, Tata McGraw Hill Education Private Limited, pp. 113-124.

Bray, J.D., Zekkos, D., Kavazanjian, E. Jr., Athanasopoulos G. A., and Reimer, M. (2009) "Shear Strength of Municipal Solid Waste," ASCE JGGE, Vol. 135, No. 6 (June), pp. 709-722.

Rosa Krajmalnik-Brown, PhD
Assistant Professor, PhD,
Georgia Institute of Technology
Dr.Rosy@asu.edu
(480) 727-7574

Research Expertise: Biotransformation and fate of environmental contaminants, bioremediation of soil, sediments, and groundwater, the use of microbial systems for bioenergy production with an emphasis on environmental applications of molecular microbial ecology

Rosa Krajmalnik-Brown is an assistant professor in Civil, Environmental & Sustainable Engineering (CESE). Before joining CESE she was a postdoctoral researcher at Biodesign working in the Center for Environmental Biotechnology. She 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.

Another area of research where she applies her molecular microbial ecology expertise is the human intestinal microbial ecology and its relationship to obesity.

Her research has been published in Proceedings of the National Academy of Science, Applied and Environmental Microbiology, Environmental Science and Technology, FEMS Microbiology Ecology and Environmental Microbiology.

Honors and Distinctions:

Forty under Forty, class of 2012, Phoenix Business Journal

NSF CAREER award 2011-2015

AEES Outstanding 2003 Ph.D. Candidate in Environmental Engineering

Fulbright Scholar 1997-2000

Best GPA of 1996 class "Medalla al Merito Universitario" UAM-I Mexico

Selected Publications:

Ziv-El M., Delgado A. G., Yao Y, Kang D.W., Halden Rolf U., Krajmalnik-Brown R. 2011 Development and characterization of DehaloR^2, a novel anaerobic microbial consortium performing rapid dechlorination of TCE to ethene. Applied Microbiology and Biotechnology.92:1063–1071.

E.I. Garcia-Peña[1*], P. Parameswaran[2], J. Miceli[2], M. Canul Chan[1] and R. Krajmalnik-Brown[2]. 2011 Anaerobic digestion and co-digestion process of vegetable and fruit residues: Process and microbial ecology. Bioresource Technology, 102: 9447–9455.

Torres C.I, Ramakrishna S., Chiu C.A., Muto K, Westerhoff P., Krajmalnik-Brown R. 2011 "Analysis of the Chemical and Biological Degradation of Sucralose in Synthetic Wastewater" Journal of Environmental Engineering and Science, 28 (5): 325-331

Amy E. Landis, PhD
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Research Expertise: industrial ecology, byproduct synergies, biofuels for bioremediation on marginal lands, biofuels, biopolymers, development of sustainability metrics, Life Cycle Assessment

Amy Landis is an Associate Professor in Civil, Environmental & Sustainable Engineering (CESE). Before joining CESE in January 2012, she was an Assistant Professor at the University of Pittsburgh's Department of Civil and Environmental Engineering.

Dr. Landis is dedicated to sustainability engineering education and outreach; she works with local high schools, after school programs, local nonprofit organizations, and museums to integrate sustainability and engineering into the undergraduate curriculum, communities, and K-12 education.

Honors and Distinctions:

Carnegie Science Post-Secondary University Educator Award (2012) and Honorable Mention (2011)

National Academy of Engineering: Nominated and selected to attend Frontiers of Engineering Education Symposium in Irvine CA (2011)

Fulbright Fellow to Switzerland (2004-2005)

Selected Publications:

Kullapa Soratana and Amy E. Landis (2011). "Evaluating Industrial Symbiosis and Algae Cultivation from a Life Cycle Perspective." Bioresource Technology. 102 (13) pp 6892-6901.

Xue, Xiaobo and Amy E. Landis (2010). "Eutrophication potential of food consumption patterns." Environmental Science & Technology. 44 (16), pp 6450- 6456.

Tabone, Michaelangelo, James Cregg, Eric J. Beckman, and Amy E. Landis (2010). "Sustainability metrics: Life cycle assessment and green design in polymers." Environmental Science & Technology. 44 (21), p 8264-8269.

Costello, Chris, Amy E. Landis, and Mike W. Griffin (2009). "Impact of Biofuel Crop Production on the Formation of Hypoxia in the Gulf of Mexico." Environmental Science & Technology. 43 (20), pp 7985-7991.

Michael S. Mamlouk, PhD, PE, F.ASCE
Professor and CESE Program Chair
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Research Expertise: Highway materials, pavement design and management, pavement evaluation, pavement maintenance and rehabilitation

Michael Mamlouk has over 30 years of research and teaching experience in the field of pavement/materials engineering. Prior to joining ASU, he worked at the State University of New York at Buffalo for 5 years. He received his Ph.D. degree from Purdue University in 1979.

He is currently working as the Co-PI of an $840,000 project funded by the National Cooperative Highway Research Program (NCHRP) dealing with the endurance limit of hot-mix asphalt.

Honors and Distinctions:

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 135 engineering schools worldwide. He has worked as a consultant and expert witness to many highway agencies and local industry and is a professional engineer in the State of Arizona. He received the community service award at the Arizona Pavements/Materials Conference in 2010.

Selected Publications:

Data Collection to Support Implementation of the Mechanistic-Empirical Pavement Design Guide for County Roads, Record No. 2225, J. of the Transp. Research Board, Washington, DC, 2011.

Temperature Gradient and Curling Stresses in Concrete Pavement with and without Open Graded Friction Course, Vol. 137, No. 10, ASCE, J. of Transp. Eng., Oct. 2011.

Necessary Assessment of Use of State Pavement Management System Data in Mechanistic-Empirical Pavement Design Guide Calibration Process, Record No. 2153, Vol. 1, J. of the Transp. Research Board, Washington, DC, 2010.

Effect of Vehicle Class Distribution on Predicted Performance of Flexible Pavement Using the AASHTO MEPDG METHOD, Int'l J. of Pavements, Vol. 8, No. 1-2-3, 2009.

Calibration of the AASHTO MEPDG for Designing Flexible Pavements in Arizona Conditions, Int'l J. of Pavements, Vol. 9, No. 1-2-3, 2010. Rational Modeling of Tertiary Flow for Asphalt Mixtures, Record No. 2001, J. of the Transp. Research Board, Washington, DC, 2007.

Larry Mays,
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Professor, PhD, University of Illinois
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Teaching and Research Expertise:
Hydrosystems engineering

Larry Mays has been a professor at Arizona State University since 1989, and former chair of the department from 1989-1996. He started his academic career at the University of Texas at Austin in 1976, and became Director of the Center for Research in Water Resources in 1988.

Research Expertise:

His areas of research interest are in the 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. His research has been published in over 95 refereed journal publications, over 100 proceeding papers, over 70 chapters in books he edited and another invited 8 book chapters. He has mentored 31 Ph.D. students.

Mays is the author, co-author, or editor-in-chief of 23 books including the well-known textbooks Water Resources Engineering; Groundwater Hydrology; Applied Hydrology; Hydrosystems Engineering and Management; and handbooks including Water Resources Handbook; Water Distribution Systems Handbook; Hydraulic Design Handbook; and others.

Honors and Distinctions:

Among his honors is a distinguished alumnus award from the University of Illinois at Champaign-Urbana. He is a Diplomat of the American Academy of Water Resources Engineers, a Fellow of ASCE and IWRA, and a past president of UCOWR.

Selected Publications:

Evolution of the Water Supply through the Millennia, co-editor, IWA Publishing, London, 2012.

Ground and Surface Water Hydrology, John Wiley and Sons, Inc., Copyright 2012.

Water Resources Engineering, 2nd Edition, John Wiley and Sons, Inc., Copyright 2011.

Ancient Water Technologies, L.W. Mays, Editor-in-Chief, Springer, Netherlands, Copyright 2010.

Integrated Urban Water Management in Arid and Semi-Arid Regions, L.W. Mays, Editor-in-Chief and author of six chapters, for UNESCO-IHP, published by Taylor and Francis, London, 2009.

Barzin Mobasher, PhD, PE
Professor, PhD, Northwestern University
Barzin@asu.edu
(480) 965-0141

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

Barzin 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 received his Ph.D. in 1990 from Northwestern University. His specific expertise is in the mechanics of composite materials, the development of new construction materials and the durability of building materials.

Mobasher 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:

In 2009 Mobasher was selected as a Fellow of the American Concrete Institute (ACI), one of the most prominent organizations in the concrete technology field.

He is a member of the American Society of Civil Engineers (ASCE) and American Ceramic Society and member of the International Editorial Board of Computers and Concrete.

Dr. Mobasher, is the author of a recent book "Mechanics of Fiber and Textile Reinforced Cement Composites", Taylor and Francis Group, CRC press, Sept, 2011, 451 pp.

His paper titled: Mechanical behaviour 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.

Selected Publications:

Soranakom, C., and Mobasher, B., "Modeling of tension stiffening in reinforced cement composites: Part I -Theoretical Modeling, *Materials and Structures,* (2010) 43:1217–1230 DOI 10.1617/s11527-010-9594-8, 2010.

Zhu, D., Mobasher, B., Rajan, S.D. , "Dynamic Tensile Testing of Kevlar 49® Fabrics," *ASCE Journal of Materials in Civil Engineering*, Vol. 23, No. 3, March 1, 2011. DOI: 10.1061/(ASCE)MT.1943-5533.0000156

Silva, F., Zhu, D., Mobasher, B., Toledo Filho, " Impact Behavior of Sisal Fiber Cement Composites under Flexural Load" ACI Materials Journal, V. 108, No. 2, March-April 2011, pp. 168-177.

Narayanan Neithalath, PhD.
Associate Professor, PhD,
Purdue University
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Research Expertise: Sustainable construction materials including high volume cement replacement materials for concrete, development of novel materials for desired performance levels such as pervious concretes, cement-free binder systems and lightweight aggregate concretes, and fundamental aspects of property development in conventional and novel cementitious (and cement-less or alkali activated) systems

Narayanan Neithalath is an Associate Professor in the School of Sustainable Engineering and the Built Environment at Arizona State University. He received his PhD in Civil Engineering (specializing in Concrete Materials) from Purdue University in 2004.

He is also interested in transport properties of concretes, electrical impedance sensing and sensor systems for concrete, and non-invasive and non-destructive testing of concrete. He has published around 100 papers in peer reviewed journals and conference proceedings, and has received several awards for his work on novel concrete materials including the NSF CAREER award, Bengt Friberg award for outstanding paper, and PCA fellowship. (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

Associate Editor – Journal of Materials in Civil Engineering

Member of the editorial board of Cement and Concrete Composites

Selected Publications:

Sumanasooriya, M.S., Deo, O., and Neithalath, N., (2012). "A particle packing based methodology for material design of pervious concretes", accepted for publication in ACI Materials Journal.

Sumanasooriya, M.S., and Neithalath, N., (2011). "Pore structure features of pervious concretes proportioned for desired properties and their performance prediction", Cement and Concrete Composites, Vol. 33(8), pp. 778-787.

Jain J., and Neithalath, N., (2011). "Electrical impedance analysis based quantification of microstructural changes in concretes due to non-steady state chloride migration", Materials Chemistry and Physics, Vol. 129, pp. 569-579.

Kristen Parrish, PhD
Assistant Professor, PhD,
University of California Berkeley
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(480) 727-6363

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

Kristen Parrish joined the School of Sustainable Engineering and the Built Environment in 2012. She has a 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 processes that financially and technically facilitate energy-efficient buildings. Her work also explores how principles of lean manufacturing facilitate energy-efficiency in the commercial building industry, through lean construction and innovative project delivery methods. Another research interest of Kristen's is engineering education, where she explores how project- and experience-based learning foster better understanding of engineering and management principles.

Kristen serves as the Faculty Adviser for the Construction Team of the Arizona State University-University of New Mexico Solar Decathlon team.

Honors and Distinctions:

Parrish received a Celebration of Engineering & Technology Innovation (CETI) award from FIATECH in 2007. She was awarded an Outstanding Performance Award at Lawrence Berkeley National Laboratory in 2010, and in 2012, she was awarded the Best Mentor Award for her work with Technovation, a program that seeks to develop math and science skills in high school girls.

Selected Publications:

Parrish, K., and Regnier, C. (2012). "A Proposed Design Process for Deep Energy Savings in Commercial Building Retrofit Projects." *Journal of Architectural Engineering*, in press.

Sanders, M. D., K. Parrish, S. Earni (2012). "Savings to Sustainability: Application of a Novel Approach to Delivering a Sustainable Built Environment." *Invited to the Special Issue of the ASCE Journal of Architectural Engineering: Sustainable Design & Construction*, In review.

Ram Pendyala, PhD.
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Research Expertise: Development and application of new methods for modeling and forecasting transportation demand and system performance under a wide variety of socio-economic, modal, and land use scenarios

Ram Pendyala joined ASU in 2006 after spending 12 years on the faculty at the University of South Florida. He received his Ph.D. from the University of California at Davis in 1992.

Pendyala teaches courses in transportation engineering, transportation systems analysis and modeling, and public transportation planning and design. He has conducted more than $5 million in sponsored research over the past 20 years for a variety of agencies including Federal Highway Administration, National Science Foundation, Florida Department of Transportation, Maricopa Association of Governments, Southern California Association of Governments, and Baltimore Metropolitan Council.

Honors and Distinctions:
Pendyala is currently Chair of the Transportation Research Board's Travel Analysis Methods Section and Past Chair of the International Association for Travel Behavior Research. He has published more than 100 articles in refereed journals, books, and conference proceedings. Pendyala has mentored over 50 M.S. and Ph.D. students.

Selected Publications:
Sener, I.N., R.M. Pendyala, and C.R. Bhat (2011) Accommodating Spatial Correlation Across Choice Alternatives in Discrete Choice Models: An Application to Modeling Residential Location Choice Behavior. Journal of Transport Geography 19(2), pp. 294-303.

Sana, B., K.C. Konduri, and R.M. Pendyala (2010) A Quantitative Analysis of the Impacts of Moving Towards a Vehicle Mileage-Based User Fee. Transportation Research Record 2187, Journal of the Transportation Research Board, pp. 29-35.

Plotz, J., K.C. Konduri, and R.M. Pendyala (2010) To What Extent Can HOV Lanes Reduce Vehicle Trips and Congestion? Exploratory Analysis Using National Statistics. Transportation Research Record 2178, Journal of the Transportation Research Board, pp. 170-176.

Eluru, N., A.R. Pinjari, R.M. Pendyala, and C.R. Bhat (2010) An Econometric Multi-Dimensional Choice Model of Activity-Travel Behavior. Transportation Letters: The International Journal of Transportation Research 2(4), pp. 217-230.

Subramaniam (Subby) Rajan, PhD, PE
Professor and SSEBE Graduate Chair, PhD,
University of Iowa
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Research Expertise:
Finite element based design optimization, parallel computations, constitutive material modeling

Subby 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:
Rajan's awards include Outstanding Engineering Educator of the Year awarded during Greater Phoenix Area Engineer's Week and Top Five Percent Faculty Award from Ira A. Fulton School of Engineering. He is a 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.

Selected Publications:
Rajan, S.D. (2011). Enhanced Protection via Composite Armor: Current & Future Trends, G3 Defence, 3:2, 24-26.

Zhu, D., Mobasher, B. and Rajan, S.D. (2011). Experimental Study and Modeling of Single Yarn Pull-Out Behavior of Kevlar 49 Fabric, Composites Part A, 42:7, 868-879.

Krishnan, K, Sockalingam, S., Bansal S. and Rajan, S.D. (2010). Numerical Simulation of Ceramic Composite Armor Subjected to Ballistic Impact, Composites Part B, 41, 583-593.

T. Agami Reddy, PhD, PE
Professor, PhD, Thermodynamics and Energy Laboratory,
University of Perpignan, France
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(480) 727-7417

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:
Reddy is SRP Professor of Energy and Environment with joint faculty appointments with The Design School and the School of Sustainable Engineering and the Built Environment. He also holds courtesy teaching appointments in the School for Engineering of Matter, Transport and Energy and the School of Sustainability. Reddy is a 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 incoming Chair of the ASHRAE Research Committee.

Books:
Reddy, T.A., 440 pages "Applied Data Analysis and Modeling for Energy Engineers and Scientists", Springer, August 2011.

Reddy, T.A., 400 pages "The Design and Sizing of Active Solar Thermal Systems", Oxford University Press (U.K.), September 1987.

Selected Publications:
Subbarao, K., Y. Lei and T.A.Reddy, 2011. The Nearest Neighborhood Method to Improve Uncertainty Estimates in Statistical Building Energy Models, *ASHRAE Transactions*, vol. 117(2),January (Best paper award).

Reddy, T.A., 2007. Application of a Generic Evaluation Methodology to Assess Four Different Chiller FDD Methods (RP1275), *HVAC&R Research Journal*, vol.13, no.5, pp 711-729, Sept.

Reddy, T.A., I. Maor and C. Ponjapornpon, 2007, Calibrating Detailed Building Energy Simulation Programs with Measured Data- Part I: General Methodology, *HVAC&R Research Journal*, vol. 13(2), March.

Bruce Rittmann, PhD, NAE
Regents' Professor, PhD, Stanford University
Director, Swette Center for Environmental Biotechnology
Rittmann@asu.edu
(480) 727-0434

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:
Rittmann's awards include 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. He has more than 510 publications and is on the ISI's List of Most Highly Cited Researchers.

Selected Publications:
Popat, S.C., D. Ki, B.E. Rittmann, and C.I. Torres (2012). Importance of HO-transport from cathodes in microbial fuel cells. ChemSusChem 15:1071-1079.

Tang, Y., H. Zhao, A.K. Marcus, R. Krajmalnik-Brown, and B.E. Rittmann (2012). A steady-state biofilm model for simultaneous reduction of nitrate and perchlorate—Part 2: parameter optimization and results and discussion. Environ. Sci. Technol. 46:1608-1615.

Rittmann, B. E., B. Mayer, P. Westerhoff, and M. Edwards (2011). Capturing the lost phosphorus. Chemosphere 84: 846-853.

Marcus, A. K., C. I. Torres, and B. E. Rittmann (2011). Analysis of a microbial electrochemical cell using the proton condition in biofilm (PCBIOFILM) model. Bioresources Technol. 102: 253 – 262.

Torres, C. I., Andrew K. Marcus, H.-S. Lee, P. Parameswaran, R. Krajmalnik-Brown, and B. E. Rittmann (2010). A kinetic perspective on extracellular electron transfer by anode-respiring bacteria. FEMS Microb. Rev. 34: 3 – 17.

Rittmann, B.E. (2010). The role of biotechnology in water and wastewater treatment. J. Environ. Engr. (ASCE) 136: 348-353.

Marcus, A.K., C.I. Torres, and B.E. Rittmann (2007). Conduction-based modeling of the biofilm anode of a microbial fuel cell. Biotech. Bioengr. 98: 1117-1182.

Rittmann, B.E. and P.L. McCarty (2001). Environmental Biotechnology: Principles and Applications. McGraw-Hill Book Co., New York.

Thomas P. Seager, PhD
Associate Professor, PhD,
Clarkson University
thomas.seager@asu.edu
(480) 727-0531

Research Expertise: ultra-low energy community infrastructure, ethics education and life-cycle environmental implications of single-walled carbon nanotubes in energy applications

Tom Seager joined the School of Sustainable Engineering and the Built Environment in August 2010. Seager is formerly a founding faculty member at the Golisano Institute for Sustainability at Rochester Institute of Technology and led development of their PhD curriculum in sustainability.

He works at the leading edge of an integrative, transdisciplinary approach to engineering education and research and is currently leading projects related to ultra-low energy community infrastructure, ethics education for science and engineering graduate students, and the life-cycle environmental implications of single walled carbon nanotubes in energy applications.

Selected Publications:
Linkov I, Bates ME, Canis LJ, Seager TP, Keisler JM. 2011. A decision-directed approach for prioritizing research into the impact of nanomaterials on the environment, human health. *Nature Nanotechnology*. 6:784–787.

Linkov I, Seager TP. 2011. Coupling multi-criteria decision analysis, life-cycle assessment and risk assessment for emerging threats. *Environmental Science & Technology*. 45(12): 5068–5074.

Mu D, Seager TP, Rao PSC, Park J, Zhao F. 2011. A resilience perspective on biofuels production. *Integrated Environmental Assessment & Management*. 7(3):348-359.

Canis LJ, Seager TP, Linkov I. 2010. Selecting nanomanufacturing technology using a integrated risk, life-cycle assessment and decision analytic framework. *Environmental Science & Technology*. 44:8704-8711.

Grant GB, Seager TP, Massard G, Nies L. 2010. Information and communication technology for industrial symbiosis. *J. Industrial Ecology*. 14(5):740-753.

Kenneth T. Sullivan, PhD, MBA
Associate Professor, PhD,
University of Wisconsin-Madison
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(480) 965-4213

Research Expertise: performance measurement and best value concepts to increase business efficiency and to minimize risk

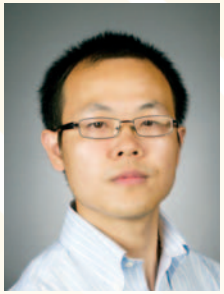
Kenneth Sullivan has conducted his research across the project life-cycle including design, construction, and facility management. The research is applied at both organization and project levels, including contracts, risk management, project management, and accountability systems. ASU has applied many of his concepts internally and estimates a value impact of over $10M/year due to the realized efficiencies.

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.

Top 5% of Engineering Faculty Award 2009, Deputy Director of the PBSRG, Director of FMRI, Research Secretariat for CIB W117-Performance Measurement in Construction.

Selected Publications:
Sullivan, K. and Michael, J. (2011). Performance Measurement Approach to Contracting and Delivering Design Services. ASCE Journal of Professional Issues in Engineering Education & Practice. 137 (4), pp 248-257.

Sullivan, K. (2011). Quality Management Programs in the Construction Industry: Best Value Compared with Other Methodologies. ASCE Journal of Management in Engineering. 27(4), pp 210-219.



Pingbo Tang, PhD
Assistant Professor, PhD,
Carnegie Mellon University
tangpingbo@asu.edu
(480) 727-8105

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

Honors and Distinctions:
Tang won one of the best paper awards of Construction Research Congress, ASCE, 2009, and the best poster award of Construction Industry Institute's 2011 Annual Conference. He serves as a member of TRB Committee on Bridge Management, ASCE, and ASTM Committee E57 (3D imaging systems). Tang is an associate editor of ASCE Journal of Computing in Civil Engineering.

Selected Publications:
Tang, P., and Akinci, B. (2012). "Automatic execution of workflows on laser-scanned data for extracting bridge surveying goals." Advanced Engineering Informatics (in press).

Tang, P., and Akinci, B. (2012). "Formalization of workflows for extracting bridge surveying goals from laser-scanned data." Automation in Construction, 22(3), 306–319.

Anil, E. B., Tang, P., Akinci, B., and Huber, D. (2011). "Assessment of Quality of As-Is Building Information Models Generated from Point Clouds Using Deviation Analysis", Society for Imaging Science and Technology (IS&T) and SPIE Electronic Imaging Science and Technology, Jan. 23 – 27, 2011, San Jose, CA.

Cho, Y. K., Wang, C., Tang, P., and Haas, C. T. (2012) "Target-focused Local Workspace Modeling for Construction Automation Applications." Journal of Computing in Civil Engineering. (in press)

Tang, P., and Akinci, B., Huber, D. (2011). "Characterization of Laser Scanners and Algorithms for Detecting Flatness Defects on Concrete Surfaces." Journal of Computing in Civil Engineering, Volume 25, Issue 1, 31-42.

Tang, P., Anil, E. B., Akinci, B., and Huber, D. (2011). "Efficient and Effective Quality Assessment of As-Is Building Information Models and 3D Laser-Scanned Data", 2011 ASCE Workshop of Computing in Civil Engineering, June 19 – 22, 2011, Miami, FL.

Tang, P., Huber, D., Akinci, B., Lipman, R., Lytle, A. (2010) "Automatic Reconstruction of As-Built 3D Building Information Models from Laser-Scanned Point Clouds: A Review of Related Techniques." Automation in Construction, Volume 19, Issue 7, Nov. 2010, Pages 829-843.

B. Shane Underwood, PhD
Assistant Professor, PhD.
North Carolina State University
Shane.Underwood@asu.edu
(480)965-1097

Research Expertise: Pavement materials characterization and design, performance modeling with multiscale constitutive techniques, advanced laboratory testing of construction materials, sustainable pavement strategies

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. His work has been published in more than 40 peer reviewed journal papers and conference proceedings.

Selected Publications:
Underwood, B.S. and Y.R. Kim (2012). "Microstructural Association Model for Multiscale Evaluation of Asphalt Concrete," ASCE Journal of Materials in Civil Engineering. Accepted for publication.

Underwood, B.S., C.M. Baek, and Y.R. Kim (2012). "Use of Simplified Viscoelastic Continuum Damage Model as an Asphalt Concrete Fatigue Analysis Platform," Transportation Research Record: Journal of the Transportation Research Board. Accepted for publication.

Underwood, B.S. and Y.R. Kim (2011). "A Viscoelastoplastic Continuum Damage Model for Asphalt Concrete in Tension," ASCE Journal of Engineering Mechanics, 137(11), pp. 732-739.

Underwood, B.S., and Y.R. Kim (2011). "Experimental Investigation into the Multiscale Behavior of Asphalt Concrete," International Journal of Pavement Engineering, 12(4), pp. 357-370.

Underwood, B.S., T.Y. Yun, Y.R. Kim (2011). "Experimental Investigations of the Viscoelastic and Damage Behaviors of Hot Mix Asphalt in Compression," ASCE Journal of Materials in Civil Engineering, 23(4), pp. 459-466.

Enrique R. Vivoni, PhD, PE
Associate Professor, PhD,
Massachusetts Institute of Technology
vivoni@asu.edu
(480) 965-5228

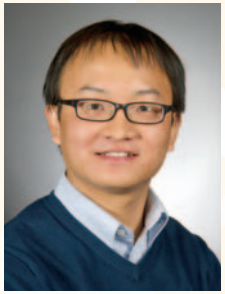
Research Expertise: watershed hydrology and its linkages with ecological, atmospheric and geomorphologic processes

Enrique Vivoni is well known for his research in watershed 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 surface hydrology and techniques for numerical and field studies.

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.

Selected Publications:
Mahmood, T.H. and Vivoni, E.R. 2011. A Climate-Induced Threshold in Hydrologic Response in a Semiarid Ponderosa Pine Hillslope. Water Resources Research. 47: W09529.

Vivoni and co-authors 2008. Observed Relation between Evapotranspiration and Soil Moisture in the North American Monsoon. Geophysical Research Letters. 35: L22403,



Zhihua Wang, PhD
Assistant Professor, PhD,
Princeton University
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(480) 727-2933

Research Expertise:
Sustainable urban environment under the changing climate

Zhihua 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.

Selected Publications:
Wang, Z.H. (2012) Reconstruction of soil thermal field from a single depth measurement. Journal of Hydrology, 464-465: 541-549.

Wang, Z.H. and Bou-Zeid, E. (2012) A novel approach for the estimation of soil ground heat flux. Agricultural and Forest Meteorology, 154-155: 214-221.

Wang, Z.H., Bou-Zeid, E. and Smith, J.A. (2012) A coupled energy transport and hydrological model for urban canopies evaluated using a wireless sensor network. Quarterly Journal of Royal Meteorological Society, DOI:10.1002/qj.2032 .

Wang, Z.H., Bou-Zeid, E., Au, S.K. and Smith, J.A. (2011) Analyzing the sensitivity of WRF's single-layer urban canopy model to parameter uncertainty using advanced Monte Carlo simulation. Journal of Applied Meteorology and Climatology, 50: 1795-1814.

Paul Westerhoff, PhD, PE
Professor, SSEBE,
Associate Dean of Research, IAFSE, PhD,
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Research Expertise: treatment and occurrence of emerging contaminants in water

Paul 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 lead research funded by AWWARF, USEPA, NIH, NSF and local organizations investigating reactions and fate of oxo-anions (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 and fate of nanomaterials in water. He has over 105 peer reviewed journal article publications and has been involved in over 250 conference presentations. He belongs to ASCE, AWWA, AEESP, ACS, IOA, IWA, AWPCA, and IHSS and serves on numerous voluntary committees for these organizations.

Honors and Distinctions:
Westerhoff has received several research awards including the 2005 ASCE Walter L. Huber Research Award and the 2006 WEF Paul L. Busch Award. He currently serves on the USEPA Science Advisory Board (Environmental Engineering Committee) and is Vice Chair of the WateReuse Research Foundation Research Advisory Board.

Selected Publications:
Benny F Pycke; Troy M Benn; Paul Westerhoff; Rolf U Halden, Strategies for quantifying C60 fullerenes in biological samples and implications for toxicological Studies, *Trends in Analytical Chemistry*, 30:1:44-57 (2011)

Upadhyay, N., Sun, Q., Allen, J.O., Westerhoff, P., Herckes, P. Synthetic Musk Emissions from Wastewater Aeration Basins, *Water Research*, 45:3: 1071-1078 (2011)

Tibaquirá, J.E., Hristovski, K.D., Westerhoff, P., Posner, J.D. Recovery and Quality of Water Produced by Commercial Fuel Cells, I*nt. Journal of Hydrogen Energy*, 36:6:4022-4028 (2011)

Chao, T-C, Song, G., Hansmeier, N., Westerhoff, P., Herckes, P., Halden RU, Characterization and LC-MS/MS based quantification of hydroxylated fullerenes, *Analytical Chemistry*, 83:5:1777-1783 (2011)

Benn, T.M., Pycke, B.F.G., Herckes, P., Westerhoff, P., Halden, R.U., Evaluation of extraction methods for the quantification of aqueous fullerenes in urine, *Analytical and Bioanalytical Chemistry*, 399:4:1631-1639 (2011)

Avi Wiezel, PhD, PE
Associate Professor and DEWSC
Interim Chair
PhD, Technion-Israel Institute of Technology
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(480) 965-4121

Research Expertise: Leadership in Construction Management, Buildability modeling, Construction education

A faculty member of ASU since 1995, Avi 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. His activities resulted in continuous productivity improvements averaging 15% per year for the units in which he was in charge. Wiezel taught in four languages on three continents (Asia, Europe, and America) to students of all levels, ranging from vocational education to doctoral students.

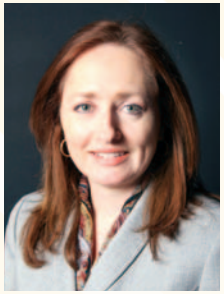
Wiezel is a true interdisciplinary researcher, with interests ranging from computer modeling of human skills in construction, to engineering education, and leadership. He served as the President of the Faculty Senate in the School of Engineering and as the Chair of the Education Committee of the Technical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

Honors and Distinctions:
Wiezel ranks among the top 5% of best teachers in the Ira A. Fulton Schools of Engineering and is the recipient of the Outstanding Faculty Member Award. He serves as the Coordinator of Construction Graduate Studies and the Interim Chairman of the Del E. Webb School of Construction Management Programs..

Selected Publications:
Wiezel, A, Maghiar, M, Jain, S., "Automatic sizing of wood-framing crews through BIM for training and educational purposes", Ecobuild America Conference, National Institute of Building Sciences, Washington D.C., December 5-9, 2011, pp 1-9

Wiezel, A., Badger, W., King, C., "New Research Methods in CII" 3rd International/9th Construction Specialty Conference, Canadian Society of Civil Engineering (CSCE), Ottawa, Ontario June 14-17, 2011 pp CN-197-1-10

Badger, W., Wiezel, A., Bopp, P., Dunn, S., "Leadership Transition and Growth", International Journal of Construction Education and Research, Vol. 6 No. 1, pp 46 – 69, 2010



Claudia E. Zapata, PhD
Assistant Professor, PhD, Arizona State University
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(480) 727-8514

Research Expertise: Characterization and modeling of fluid flow and volume change behavior of unsaturated soils and lab/field instrumentation

Claudia Zapata received her PhD from Arizona State University in 1999. She has particularly focused on the characterization of problem soils; applications related to the behavior of pavement subgrades due to dynamic loading and environmental conditions; and the assessment of fluid flow and volume change of soils under slabs on-ground residential foundation systems.

She has actively participated in several NCHRP research projects, including the development of the Mechanistic-Empirical Pavement Design Guide; the development of models to incorporate environmental effects into current pavement design practice; and the creation of a national database of unsaturated soil properties. She has also worked on NSF projects related to the determination of unsaturated properties of cracked clay soils, and characterization/modeling of swell behavior of expansive soils.

Honors and Distinctions:
She is the author of more than 40 technical papers and multiple research reports in the areas of unsaturated soil mechanics, expansive soil behavior, environmental effects in pavement design, and prediction of unbound material behavior.

Selected Publications:
Cary, C. and Zapata, C.E. (2011). Resilient Modulus for Unsaturated Unbound Materials. International Journal of Roads and Materials. Vol. 12, Issue 3, pp. 617 640.

Cary, C. and Zapata, C.E. (2010). Enhanced Model for Resilient Response of Soils Resulting from Seasonal Changes as Implemented in "Mechanistic-Empirical Pavement Design Guide". Transportation Research Record: Journal of theTransportation Research Board of the National Academies, No 2170, Geology and Properties of Earth Materials 2010, pp. 36-44.

Zapata, C.E. (2010). *Research Results Digest 347: A National Catalog of Subgrade Soil-Water Characteristic Curves and Selected Soil Properties for Use with the MEPDG*. National Cooperative Highway Research Program, Transportation Research Board, of the National Academies. ISSN 0077-5614. pp. 23.

Zapata, C.E., Perera, Y.Y. and Houston, W.N. (2009). Matric Suction Prediction Model in New AASHTO Mechanistic-Empirical Pavement Design Guide. Transportation Research Record: Journal of the Transportation Research Board, No. 2101, Geology and Properties of Earth Materials, pp. 53-62.

Research faculty

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

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Expertise: Seismic retrofit of already damaged structures using "Carbon Flex" which is a new patent-protected strength-sustainable composite that stabilizes crack growth in damaged substrates using an energy-dissipating mechanism

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

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

Thomas Schleifer, PhD
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Expertise: Construction management

Lecturers

Aaron Cohen, MS, CPC
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Associated General Contractors (AGC) Lecturer
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Teaching focuses on courses in the heavy/civil concentration for the DEWSC Construction Management degree program.

Kraig Knutson, PhD
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Teaching and research include historical construction methods, infrastructure security and application of industrial engineering techniques to construction processes.

Christopher Lawrence, PhD
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Lecturer in CESE and DEWSC programs
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Teaching areas include engineering mechanics, civil engineering materials, geotechnical engineering and civil engineering project management. Research and engineering focus on unsaturated soils theory and the design, development and fabrication of advanced soil testing systems.

Edwin C. Weaver, PE
Senior lecturer in DEWSC teaches and develops graduate and undergraduate courses in the Concrete Industry Management and Construction Management degree programs
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Research areas of interest include contracts and specifications for concrete construction, concrete paving for airfields and roadways and safety during concrete and masonry construction operations.

SSEBE Adjunct/Affiliate Faculty and Faculty Associates

Christopher Aulerich, Faculty Associate, Construction
Edward Fancher, Faculty Associate, Construction
Mark Felder, Faculty Associate, Construction
Danielle Feroleto, Faculty Associate, Construction
Michael Gilchrist, Faculty Associate, Construction
Fred Goldman, Faculty Associate, Civil, Environmental & Sustainable
Samuel Hanna, Faculty Associate, Civil, Environmental & Sustainable
Shawn Morman, Faculty Associate, Construction
Patrick Okamura, Faculty Associate, Construction
Eric Petrie, Faculty Associate, Construction
Matthew Pierce, Faculty Associate, Construction
Martin Ramirez, Faculty Associate, Construction
James Rogers, Faculty Associate, Construction
David Sabers, Faculty Associate, Civil, Environmental & Sustainable
Clifford Schexnayder, Faculty Associate, Construction
Michael Smith, Faculty Associate, Construction
William Washburn, Faculty Associate, Construction
James Willson, Faculty Associate, Construction
Clinton Wilkins, Faculty Associate, Construction

Jason Lueke, assistant professor in the Del E. Webb School of Construction, has taken a job with Associated Engineering in Canada where he will serve as the Trenchless Technology Practice Leader for Canadian operations. We wish to thank Jason for his hard work and conscientiousness in teaching our students and supporting the DEWSC over the past three plus years. We wish him the best of fortune as he pursues this new endeavor and moves back to Canada.

Brooke Mayer, lecturer in the civil, environmental and sustainable engineering program in SSEBE, has accepted a position as assistant professor at Marquette University in the Civil, Construction and Environmental Engineering department. We wish to thank Brooke for her service, hard work and conscientiousness in teaching our students and wish her well in her new position.

SCHOOL OF **sustainable engineering**
and **the built environment**

Ira A. Fulton
Schools *of* Engineering
ARIZONA STATE UNIVERSITY

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