FULL CIRCLE

engineering news for alumni and friends
Dear Friends,

I’d like to share some of the exciting changes happening in the Ira A. Fulton Schools of Engineering at Arizona State University.

We are reimagining our engineering school with emphases throughout our academic, research and outreach programs on discovery, design, innovation, use-inspired and translational research and societal impact. This is evident throughout our structure, academic programs and reward system. Some of these are covered in this report, including our non-traditional structure, emphasis on student success, growth in enrollment and significant investments in faculty and resources.

Effective January 1, 2011, I took on the role of Dean of the Fulton Schools of Engineering, after having served for four years as the Executive Dean. I look forward to working with all of you in advancing engineering education and impact.

Sincerely,

Paul C. Johnson, Ph.D.
Professor and Dean
DeanPaulJohnson@asu.edu
The Ira A. Fulton Schools of Engineering rank among the top 50 engineering schools in the United States. The Schools are home to more than 200 faculty, more than 7,000 students and more than $74 million in externally funded research. In 2009-2010, the Fulton Schools of Engineering granted 717 undergraduate degrees and 636 graduate degrees. Today, more than 31,000 Engineering alumni are advancing the fields of engineering and technology in Arizona and around the world.

We emphasize creativity in solving real-world problems, innovation, entrepreneurship, multidisciplinary interactions, societal context and connections. Our 14 undergraduate and 25 graduate degree programs are administered across five unique schools to enable innovative collaboration across disciplines, with faculty and students alike focusing their efforts on developing solutions that will have significant, lasting impact on our local and global communities.
Technology is changing every minute. William Ditto, director of the School of Biological and Health Systems Engineering (SBHSE), wants to see engineering curriculum keep pace.

His school has taken a radical approach in an effort toward more efficient, effective and engaging ways to deliver results.

“We have developed a skills-based modular curriculum which is unique to ASU,” Ditto says. “Rather than taking years to implement changes, we can modify or even start a new major over a weekend.”

“This keeps us on the leading edge with a highly efficient way of presenting and changing materials,” he says.

He cites changes in the teaching environment as a catalyst for the initiative. “Fifty years ago, there was far greater teaching capacity. Today, all faculty write grant proposals and perform cutting edge research in addition to teaching classes. That doesn’t mean that we devote less time to teaching. It means that we need to be more efficient.”

The redesign was completed in six months. Every existing course was eliminated, then rebuilt based on skill sets. Each of the new courses will be five weeks and one credit. The curriculum will be rolled out in fall 2011, subject to final approvals.

SBHSE students have exposure to hands-on engineering experience from day one. At many universities, students are not involved in product design until later years. At SBHSE, everything still culminates in capstone design senior year but freshmen are paired with senior design teams the very first semester. For example, teams in biomedical engineering are constructing and building prototypes of 3-D printers.

SBHSE is also implementing fundamental entrepreneurship. Every student and a majority of the faculty are involved in the full spectrum, from invention disclosures to building a business.

Students in SBHSE’s programs receive both core engineering expertise and very specific skills.

“We want our graduates to present future employers with not just a degree on a piece of paper, but a list of skills they have mastered—the ability to manipulate cells, signal processing in the brain, construction of artificial tissue,” Ditto says. “We believe this will give our students a significant advantage in whatever path they choose to take.”

Undergraduate to present paper at national meeting

Madeline Grade, a premedical student in the Barrett-Mayo premed scholars program, was chosen to present a research paper at the American Academy of Neurology annual meeting. “This is a tremendous honor, as only a very small number of abstracts are selected for platform talks as opposed to poster presentations,” said Dr. Katherine Noe, the Mayo neurologist who mentors Grade. “She’s an exceptional individual, extremely bright and a real self-starter.”

The AAN presentation will take the 20-year-old ASU biomedical engineering junior to Honolulu where she’ll present her work on the counseling of women of childbearing age who receive valproic acid, a seizure-treatment medication which can also cause birth defects. Grade says she loves clinical research and would like to be both a physician and a researcher.
Werner Dahm, an ASU Foundation Professor and professor of mechanical and aerospace engineering in the School for the Engineering of Matter, Transport and Energy, is leading an effort to establish a security and defense science institute at ASU that will focus on finding solutions to national and global security challenges.

Drawing on the expertise of ASU researchers in a variety of fields, the university-wide institute will address issues related to national defense, homeland security, border security, counterterrorism, cybercrime and related areas. “This is a tremendous opportunity to bring engineers, social scientists and legal experts together, so that beyond technology we can look at the root causes of the problems, the global disparities and tensions that lead to national and international threats,” he says.

“The way ASU has organized itself to address these kinds of global challenges is unique,” Dahm says “This is one of the few places where a collaborative effort to focus on problems of such a big scope is even possible.”

Dahm joined ASU from the U.S. Air Force, where he had been chief scientist for the past two years. Since 2008, he has worked full-time at the Pentagon as the chief scientific adviser to the chief of staff and secretary of the Air Force, consulting on a wide range of scientific and technical issues affecting the Air Force’s mission. Dahm previously worked in industry as a research engineer in the Transonic Wind Tunnel Section of the Propulsion Wind Tunnel Facility at the U.S. Air Force Arnold Engineering Development Center. He has been a member of the engineering faculty at the University of Michigan since 1985, where he became a professor of aerospace engineering in 1997 and head of the Laboratory for Turbulence and Combustion.

His primary research and teaching focus has been fluid dynamics, turbulent flows, combustion and propulsion. He holds several U.S. patents in these areas.

He earned his doctorate in aeronautics from the California Institute of Technology, a master’s degree in mechanical engineering from the University of Tennessee Space Institute, and a bachelor’s degree in mechanical engineering from the University of Alabama in Huntsville.
Researcher’s sustainability work earns NSF CAREER Award

Rosa Krajmalnik-Brown, an assistant professor in the School of Sustainable Engineering and the Built Environment, is researching “management of microbial communities” as a source of clean energy and way to improve environmental safety. By identifying microorganisms that can be combined to work together to break down toxic chemical compounds, these “teams” can be used in systems that remove contaminants and pollutants from soils and groundwater. For example, this process can be used for the cleanup of health-threatening substances such as trichloroethylene—a commonly called TCE—an industrial solvent used in decades past that has contaminated significant amounts of groundwater in Arizona, particularly in the Phoenix area.

Krajmalnik-Brown’s promising research in this area recently earned her an NSF CAREER Award.

CAREER awards recognize young engineers and scientists who are demonstrating potential to be research and education leaders in their fields. Krajmalnik-Brown is the 20th ASU engineering faculty member to receive a CAREER award in the past five years.

The award will provide more than $430,000 over five years to help fund research Krajmalnik-Brown is conducting in the Center for Environmental Biotechnology in ASU’s Biodesign Institute.

Engineering professor Bruce Rittmann, director of the Center for Environmental Biotechnology, says Krajmalnik-Brown’s progress demonstrates not only research skills but creative approaches to bioenergy production and water remediation. “She is giving ASU a unique advantage in the most important areas of environmental sustainability,” he says.

Krajmalnik-Brown uses a fermentation process to break down organic waste so it can be used as a food to nourish the kinds of bacteria that aid water and soil remediation and energy production processes. The success or failure of such a process is determined largely by what happens to the hydrogen and organic acids during the fermentation process. Krajmalnik-Brown’s research concentrates on stimulating the “good players” that provide food and other benefits for the energy and remediation systems, while keeping the “bad players” from diverting food to other processes.

The CAREER award will enable Krajmalnik-Brown to provide opportunities for graduate, undergraduate and high school students to participate in the laboratory work.

She’ll bring knowledge gained through the research into both graduate and undergraduate courses she teaches in environmental engineering, including a course she developed on biotransformation that examines uses of microorganisms in environmental engineering, energy generation and health treatments.

Krajmalnik-Brown became an ASU faculty member in 2007. She received a bachelor’s degree in industrial biochemical engineering from the Universidad Autonoma Metropolitana (UAM) in Mexico City, where her academic performance earned her a prestigious Fulbright scholarship, which she used to continue her engineering education. She earned a master’s degree and doctorate in environmental engineering at Georgia Tech and later worked as a post-doctoral researcher at ASU under Professor Rittmann.
defining transhumanism What will it mean to the definition of human if new technologies can enhance the abilities of the human body—and mind—to unprecedented levels? And what if such technological enhancements are available to only a portion of the world’s population? Brad Allenby, professor in the School of Sustainable Engineering and the Built Environment and professor of law and the Lincol Professor of Engineering Ethics for ASU’s Lincoln Center for Applied Ethics, discusses this in an interview with The Triple Helix.

restoring brain function Stephen Helms Tillery, an assistant professor in the School of Biological and Health Systems Engineering, and his team are seeking ways to help people who have lost movement and communication due to severe brain disorders.

acid-reflux relief Bruce Towe, a professor in the School of Biological and Health Systems Engineering, has teamed up with a local physician and entrepreneur to develop a device that promises relief for people who suffer from acid-reflux. The ultrasound-based technology, including a microchip small enough to fit into a syringe, might be effective in reducing pain caused by physical ailments and in treating neurological disorders.

APS Fellow

Nongjian Tao
Professor, School of Electrical, Computer and Energy Engineering
Director, The Center for Bioelectronics and Biosensors
For pioneering and innovative contribution to the science and technology of molecular and nanoelectronics, electrochemical based nanofabrications, and chemical sensors

IEEE Fellows

Tolga Duman
Professor, School of Electrical, Computer and Energy Engineering
For contributions to coding and modulation for wireless, recording and underwater acoustic channels

Guoliang Xue
Professor, School of Computing, Informatics, and Decision Systems Engineering
For contributions to survivability and quality of service in computer networks

research briefs

more faculty awards

Read more online: engineering.asu.edu/news
The nation’s power grid affects virtually every aspect of daily life and it’s also an aging infrastructure. It’s facing increasing demands as populations swell, load growth increases and renewable resources emerge. Engineering research professors at the Power Systems Engineering Research Center (PSERC) are working to bridge that gap between the legacy electric energy system of today and the “smart grid” system of the future.

The smart grid has the potential to reduce the need for transmission lines and will likely be able to operate with smaller generation stations than necessitated by current power systems. ASU researchers are focused on adapting the current power systems to storing and distributing energy produced from wind farms, solar photovoltaic panels, fuel cells and other alternative energy sources through the smart grid. Engineering research professors at the Power Systems Engineering Research Center (PSERC) are working to bridge that gap between the legacy electric energy system of today and the smart grid system of the future that will rely on automated sensory signals and computer technology.

PSERC director Vijay Vittal and PSERC site director Gerald Heydt work directly with industries which pay member fees in support of energy research.

“The collaboration will result in a highly reliable electric grid and a more efficient electricity market with the added benefit of fewer greenhouse gasses in the air.” –Vijay Vittal

“Major electric utilities, manufacturers, independent system operators, consultants—they are the ones who drive the research agenda,” says Vittal.

PSERC partners with 45 such entities nationwide, and ASU is the lead among 13 university collaborators. PSERC is an Industry University Cooperative Research Center, also supported by the National Science Foundation.

Working with its members, PSERC has developed a vision for smart grid implementation, which the U.S. Department of Energy anticipates being developed in the next two to three years. In particular, PSERC is looking at the impact of renewable resources on the grid.

Because of an anticipated high penetration of wind, solar, biomass and hydrogen energy sources entering the grid at different voltage and power levels, the group sees a need for large-scale energy storage and transmission systems. The team is conducting performance and optimization studies, looking at thermal limits, transient stability, voltage stability and the quality of the renewable power being generated. Their research will aid in the design and modification of transmission circuits capable of handling the variable renewable energy loads on the grid.
Three faculty members are leading a project to improve the effectiveness of solar energy technology. Cihan Tepedelenlioglu, George Maracas and Andreas Spanias, each on the faculty of the School of Electrical, Computer and Energy Engineering, are using the research capabilities of the university’s Sensor, Signal and Information Processing (SenSIP) Industry Consortium to monitor and gather some of the most detailed technical data yet available on the factors that determine the performance of photovoltaic arrays. SenSIP focuses on technologies for digital signal processing systems, data mining, wireless communications, information networks and multimedia systems.

Such advanced data will provide groundwork for developing more efficient, reliable and secure solar energy generation facilities, says Spanias, SenSIP’s director. They will devise the sensor and information processing systems to detect and analyze how solar technology performs under a variety of situations, particularly changing atmospheric and weather conditions. “The tools we have can give us the most data-rich and detailed understanding of how photovoltaic arrays are functioning, and to what extent operational and environmental conditions affect performance,” Maracas explains.

Successful research results would enable utilities and solar power generating operations to forecast potentially disruptive situations and implement strategies to cope with difficulties, he says.

“If we can use our tools to devise algorithms that significantly improve the performance of photovoltaic installations, the result could be a major advance that would spur quicker adoption of renewable energy sources.”

Andreas Spanias
**dean’s lecture series**

**Thursday, March 24**
8:30 – 10:30 a.m.

**YOU WANT THE FUTURE? YOU CAN’T HANDLE THE FUTURE**
The implications of emerging military technologies
Lincoln Professor of Engineering and Ethics
Professor, School of Sustainable Engineering and the Built Environment

**braden allenby**

**Thursday, April 21**
5:30 – 7:30 p.m.

**THE AUTOMATION OF A PATHOLOGIST: CAN THAT IMPROVE THE DIAGNOSIS OF CANCER?**
Smart medical technology
Executive Director, Biodesign Institute
Professor, School of Biological and Health Systems Engineering

**alan nelson**

**engineering alumni chapter events**

**Order of the Engineer**
Memorial Union, Arizona State University
Hosted by Chris Kmetty and Dean Paul Johnson. Alumni volunteers are needed for the event. Contact joy.marsalla@asu.edu for information.

**Board Planning Meeting**
3:30–5 p.m., University Club
All alumni are invited to attend in person or forward suggestions for programming for the upcoming year. RSVP to sue.chretien@asu.edu.
METS program creates career opportunities for transfer students

Hundreds of students are benefitting each year from the Motivated Engineering Transfer Students (METS) program that provides opportunities for careers in engineering and computer science for Arizona students starting out in community colleges.

The METS project goal is to develop a supply chain of high-quality engineering students through aiding the community colleges in their outreach to local high school students and by providing classroom materials, tutoring, speakers and tuition scholarships to cover costs of community college engineering courses. Once at ASU, transfer students are supported by the METS Center, where they can study together and get mentoring and training in academic and career planning.

METS is also is expected to have a national impact by developing effective ways for other universities and community colleges to form partnerships to encourage students to pursue engineering careers and help them make the transition into university programs.

Success with upper-division transfer students predominantly from the local Maricopa County Community College District helped earn a grant of $2.5 million over five years from the National Science Foundation (NSF) in 2009 to expand the METS program efforts coordinated at ASU by engineering faculty members Mary Anderson-Rowland, associate professor in the School for Computing, Informatics, and Decision Systems Engineering and Armando Rodriguez, professor in the School of Electrical, Computer and Energy Engineering.

"An engineering career was not even on the radar screen for a lot of these students when they were in high school," Anderson-Rowland says, “and even when they’re in community college they don’t think they’re smart enough to get scholarships or go to a university. So it’s fulfilling to know you’re providing young people with options in their lives.”

mets.engineering.asu.edu

Recruitment and retention results are demonstrating the METS program’s effectiveness

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95 percent of junior-year and senior-year students who earn METS program scholarships are graduating.

50 percent of the METS transfer students who earned scholarships are now full-time graduate students pursuing master’s or doctorate degrees.
With the fall 2010 semester, ASU entered its second year as part of the prestigious group of universities that make up the Engineering Projects in Community Service (EPICS) consortium.

EPICS GOLD at ASU provides students the opportunity to work on a team that addresses a real-world problem, providing many benefits to the students and the community alike. This relatively young program has already attracted a strong following with one hundred students—freshmen through seniors—enrolled in EPICS courses beginning in the fall 2010 semester.

Some of the EPICS GOLD teams include:

**Project Upepo**: working to create low-cost wind turbines to help power rural African villages, along with providing villagers the knowledge, tools and supplies to build their own turbines.

**Bangla–EPICS Water Team and Bangla–EPICS Solar Team**: tackling issues of reliable power, clean drinking water and bathrooms with a septic system for a new girls’ school in a remote village in Bangladesh.

**eBird** (Partnering with Cornell University and the National Audubon Society): developing the eBird Hotspot wiki, which would bring real-time data from bird sightings to the existing eBird program, a significant advancement in the way the birding community reports and accesses information.

**Recycled Rides** (Partnering with NABC): two teams, the Chassis Team and the Engine Team are creating an online database for management of a national program that rebuilds totaled cars with donated labor and parts, then donates the cars to working poor families through 150 not-for-profits across the country.

**Green Girl Gamers Team** (Partnering with Xavier College Prepatory): an all-female team that is conceptualizing and designing a game to get girls and young women outside and active. Using a Nintendo DSi or Google Android phone platform, the game will allow players to interact with nature as they play the game.

**Rio Salado Habitat** (Partnering with the City of Phoenix): tackling a variety of assignments related to environmental issues in the restored Salt River Basin south of downtown Phoenix, including drainage catchment designs, old landfill monitoring and water quality testing.
It takes an engineer to change the world

Susanna Young is a mechanical engineering undergraduate doing research she hopes will lead to better computer simulations of wind energy.

As part of ASU’s Engineering Projects in Community Service (EPICS) program, Young is leading a team of engineering students to design a village for Malawi, Africa, using the retired but durable shipping containers lying idle in ports all over the world. Her team is using engineering technology to create shelter, clean water and healthcare facilities.

“The idea is to create a village out of these containers where the Malawians, particularly disabled people and women, will receive quality healthcare and learn vocational skills such as making wind turbines out of local materials,” says Young.

Young received the award as the most outstanding student in EPICS last year. “Susanna has an enthusiasm for making the world a better place, and the talent to back it up,” says Richard Filley, director of EPICS. “She’s an outstanding student, very refreshing. It’s exciting to watch her team work, to see these kinds of things happen.”

Susanna plans to graduate from ASU with both bachelor’s and master’s degrees in fluid dynamics, and then she may pursue her doctorate at Cornell, MIT or Purdue. She’s still fascinated with wind turbines.

“ASU provides some of the most amazing opportunities. By participating in clubs, study abroad trips, research and excellent curriculum, I have met so many people and formed lasting bonds and connections that I don’t think would be possible otherwise.”

Susanna Young
A team of ASU students showcased their technological skills in a national competition organized by the American Institute of Chemical Engineers, one of the world’s leading professional engineering organizations.

The contest requires teams to design and construct chemically powered shoebox-sized vehicles that produce a chemical reaction to start and stop the vehicles. Teams are told only hours before the start of competition about the distance their cars must travel and the amount of cargo that each vehicle will carry.

Chemical engineering undergraduates Jacob Lenzi, Luis Moya, Tara Smith, Kyle Foster, Alison Davis, Brian Anderson, Andrew Chelsy, Mike Rosauri, and mechanical engineering undergraduate Mark Garrison represented ASU. The team earned its way to the national competition by finishing in third place overall, and placing first for the most creative vehicle design and in the project poster presentation at the Rocky Mountain Region Chem-E-Car Competition.

“The Chem-E-Car’s success is proof of the value of the education I received in engineering at ASU. I’ve learned a lot by building the car,” Smith says.

Using ethanol, sulfuric acid and water as power sources, ASU engineering students designed and built this “Chem-E-Car” that has earned them a place in a national student competition sponsored by the American Institute for Chemical Engineers.
FIRST LEGO League

The theme of this year’s FIRST LEGO League competition, “Body Forward,” challenges students with robotics projects that demonstrate how engineering and biological and medical sciences are combining efforts to find solutions to healthcare problems.

Students program LEGO MINDSTORMS robots to explore medical questions involving bone repair, rapid blood screening, development of bionic eyes, nerve mapping, object control through thought, overcoming genetic predispositions to diseases and maximizing the body’s potential to heal itself.

FIRST LEGO League is an exciting and fun global robotics program, designed to ignite an enthusiasm for discovery of the basic principles of science, technology, engineering, and math in children, ages 9 to 14. FIRST stands for For Inspiration and Recognition of Science and Technology.

Each year, FLL teams of three to 10 children, embark on an adventurous challenge, based on current, real-world issues.

Camp Sparky brings engineering fun to elementary schools

Going to college seems a remote possibility for many fifth graders. But a group of ASU students has set out to change their thinking, by bringing the fun of college learning experiences to them.

Six times a semester, about 80 children from Title I elementary schools in the Phoenix area welcome ASU’s Camp Sparky to their classrooms. ASU students plan an engineering day camp at a different school every other Friday, bringing the children to the Tempe campus at least once during the semester.

The goal is to expose them to college students and to higher education, inspiring them to have confidence in their future success. More than half of the youngsters participate in federally funded lunch programs, and many have no family members who attended college.

“The kids have a lot of fun, and their teachers tell us how much impact we’re having,” Eric Beerman, a sophomore in computer science from Cincinnati and a program coordinator for the camp this semester, says. “I grew up knowing I’d go to college. These kids don’t have that example. We always talk to them about their future. We tell them that you don’t have to be rich to go to college.”

Camp Sparky was founded about 13 years ago, and it continues to be entirely student-run, winning nine awards from the Student Organization Resource Center, more than any other group.
Jeff Begay, a member of the Navajo Nation who has worked for decades to improve business and living conditions in Native American communities, is the 2010 Del E. Webb School of Construction Outstanding Alumni of the Year.

Begay graduated with a degree in construction management in 1974 and now is manager of business development for Kitchell Contractors Native American Division. Through his division’s work, Begay has helped lead efforts to bring quality construction services to Indian lands. The impact he’s had on Native American communities prompted his nomination for the alumni award by colleagues in the industry and the Native American community.

He sees his job as “a mission and a passion. We are helping to build nations, to make them prosperous and healthy. It’s fabulous that Kitchell hires people, like me, who understand this culturally unique segment of America and also strives to provide quality service, with integrity and respect.”

Among his efforts beyond construction business, Begay has been instrumental in organizing Kitchell’s Cultural Sensitivity Seminars, has worked as a general contractor and been a consultant to the Gila River Indian community, assisting in the development of governmental facilities, infrastructure and community housing programs.

Begay was born and raised in Teesto, Ariz., on the Navajo Indian Reservation. He served in the U.S. Army, including a tour of duty in Vietnam in 1967 and 1968. He later went to ASU on the GI Bill and earned a scholarship from Kitchell Corp. which helped him earn his degree at ASU.

He is a former president of American Indian Council of Architects and Engineers and former president of the American Indian Veterans Memorial Organization.

Begay continues an active involvement in the Schools as a founding member of the executive committee of Del E. Webb School’s Construction in Indian Country organization and the founder of the Native American Construction Management Endowment. He gave the first gift that established the Native American Construction Management Grant in 2005. The grant has awarded $42,900 in total grants over the last six years. Eight students have graduated in the program since 2006.
Mastering engineering requires learning to engage in rigorous and precise thinking. Zachary Pirtle’s studies in the field took him even further—beyond a focus on the technological into deeper inquiry in a more fundamental realm.

“Engineering led me to philosophy,” says Pirtle, who earned bachelor’s degrees in mechanical engineering and philosophy at Arizona State University in 2007. He followed that with a master’s degree in civil and environmental engineering from Ira A. Fulton Schools of Engineering in 2009.

While in graduate school he earned a prestigious Fulbright scholarship that enables top students to study and do research abroad. He used it to spend much of the 2008–2009 academic year in Mexico, where he contributed to public discourse on the social and cultural impacts that the rise of nanotechnology could potentially have on that country.

Pirtle later earned a graduate fellowship to work with the National Academy of Engineering in Washington, D.C. There he supported the academy’s Center for Engineering, Ethics and Society. He researched and wrote about the potential societal implications of converting the nation’s power systems to “green” renewable-energy technologies.

He then worked as a consultant in the Washington, D.C. office of ASU’s Consortium for Science, Policy and Outcomes, where he authored a report that detailed the consensus among experts on the direction the country should take in developing innovative energy policies. In July of 2010, he began working as a Presidential Management Fellow at the National Aeronautics and Space Administration (NASA). As part of the Exploration Systems Mission Directorate, he’s applying his engineering and policy training to support new technology development projects NASA is undertaking to expand humanity’s reach into space.

“The only reason I’m able to bounce around among these various fields is because of the interdisciplinary education I got at ASU,” Pirtle says. “Being able to combine engineering and philosophy was very enriching. It’s given me a broader perspective, and people value that diverse set of skills. It’s going to greatly affect what I can contribute to society during my career.”

His interest in engineering has roots in the family lineage. His grandfather, Albert Pirtle, studied math at the Arizona State Teacher’s College—the precursor to ASU—before becoming an architectural detailer. His father, Randall Pirtle, an ASU grad, has been working in engineering at Honeywell Aerospace for more than 25 years. His brother, Trevor Pirtle, earned a bachelor’s degree in mechanical engineering from ASU and now works for Orbital Sciences in Chandler, Ariz.
In the aftermath of the catastrophic earthquake that hit Haiti, engineer Rob Jeter recalls flashing back to lessons he learned at Arizona State University.

Jeter, who earned the class of 1997 Outstanding Senior Award in what was then ASU’s Department of Civil and Environmental Engineering, works for the Office of Design and Engineering in the U.S Department of State’s Bureau of Overseas Building Operations.

Shortly after the earthquake in January he was deployed to Haiti as part of an engineering emergency response team. The magnitude 7.0 quake left more than 200,000 people dead, 300,000 injured and a million people homeless. An estimated 250,000 residences and 30,000 commercial buildings had collapsed or were extensively damaged.

“It was my first time in a crisis situation,” Jeter says. “It was a high-stress environment. We had to work on the fly and react to volatile conditions.”

Working effectively as a part of a team, approaching complicated problems logically, being confident enough in your expertise to take the lead in challenging situations, “those things were always stressed by many of my ASU teachers,” Jeter says.

The team’s assignment was to assess the damage to more than 100 buildings—the residences and offices of U.S. embassy and diplomatic staffers in the country—and help provide for temporary housing needs of U.S. Foreign Service workers.
“My goal was to help make sure we had water and sanitation, and other basic facilities for rescue teams and security forces to do their jobs,” Jeter says. “I was using all the skills I’d learned in hydraulics, hydrology, structural and environmental engineering.”

Jeter’s work in Haiti has been only the most dramatic of the learning experiences he’s had on the job. He’s responsible for civil engineering aspects of capital and maintenance projects for nearly half of the more than 300 U.S. embassies and consulates around the world. In the past year and a half, he has worked in Afghanistan, Pakistan, Yemen, Mauritania, Chile, Finland, Lebanon, England and Germany. He’s worked in at least 20 different countries since joining the State Department in 2008.

“[In] real-life engineering,” he says, “it’s critical to understand the people, and the cultural and social realities in whatever environment you’re working in,” he says.

Jeter is using a range of engineering expertise. He’s on the State Department’s “green team,” as the water conservation coordinator for the Energy and Sustainable Design Unit. In December 2010, he led an engineering team overseas to develop strategies for efficient water use and recycling. He is also the flood mitigation specialist on a team that is designing ways to protect U.S. overseas properties from the impact of natural hazards and disasters.

Jeter worked in the private sector for more than a decade before taking the federal position. Going from the “for-profit model of business to the mission-based model is something that’s in line with my core values,” he says. “I think colleges can do a better job of helping students learn if they will fit better into one of those two models.”

As for his own college education, Jeter says his best teacher was the one who was the hardest on students.

“I always appreciated how tough he was,” he says of Robert Hinks, now an associate professor in the College of Technology and Innovation at ASU’s Polytechnic Campus. “He was very serious. But if you put in the effort, he made himself available to help you succeed.”

“Thank you and ASU,” Jeter wrote in a letter to Hinks, “for giving me what it takes to make a difference in the world.”

“Rob could never have known that someday he would be travelling on behalf of the United States government to some of the most needy, even most dangerous, places in the world. It’s gratifying to see Rob relate his performance in facing the challenges of his work today to his learning experiences at ASU.” —Robert Hinks
Chase Farnsworth has been involved in construction since he was 14. He likes to work with his hands and discovered that a degree in construction management offered a meaningful career path. He says that the Del E. Webb School of Construction at ASU was a natural choice—close proximity to family and one of the top programs in the nation.

“It was one of the top five when I started, and is now ranked even higher,” he says.

Chase is a recent graduate. He has been working for a general contractor in commercial construction, and plans to continue on this path, maybe eventually opening his own company.

During his time at ASU, Chase took full advantage of opportunities to broaden his experience beyond the classroom through internships and membership in several student organizations.

Citing the Associated General Contractors Chapter (AGC) at ASU as an example, Chase says, “AGC provides great opportunities to team up with local contractors to provide service to the community and learn at the same time.” In one project, the team completely gutted and rebuilt a home for a Valley-area family in two weeks.

He was also part of the Associated Schools of Construction Reno competition, where college teams from across the country came together to compete and get a better understanding of how a construction project comes into existence. Each team received a project description. They had less than 24 hours to research and put together a bid then give a presentation to their fictional client. The “client” was actually the contractor who did the work described in the bid. After the presentations were complete, the contractor gave an overview of the actual process and results of the project.

Chase’s other memberships include Sigma Lambda Chi the construction honor society, which he notes as a great source for developing leadership skills, and the Golden Key International Honor Society which represents the top 15 percent of students attending ASU.

It’s no surprise that Chase recommends getting involved. He says the School “provides a lot of opportunities, but not everyone takes advantage of them.” Through his experience, he says he came away with skills, an understanding of the engineering behind construction, systems knowledge and hands-on, practical experience.

Learn more about the Construction Management Program
youtube.com/ASUFultonEngineering
Alumnus now an endowed chair

Arizona State University engineering alumnus Scott J. Mason is now the inaugural holder of the Fluor Endowed Chair in Supply Chain Optimization and Logistics in the Department of Industrial Engineering at Clemson University in South Carolina.

In his doctoral dissertation research, he developed a novel approach to scheduling semiconductor manufacturing operations. His advisers on the work were John W. Fowler, now the Avnet Professor of Supply Networks in the industrial engineering program in the School of Computing, Informatics, and Decision Systems Engineering, and W. Matthew Carlyle, now an associate professor at the Naval Postgraduate School.

Fowler and Mason became co-principal investigators on a research project that stemmed from Mason’s research and attracted joint funding of $850,000 from the Semiconductor Research Corporation and International SEMATECH.

Mason began his studies at ASU after a career in the semiconductor industry. After earning his Ph.D., he joined the Department of Industrial Engineering at the University of Arkansas, where he twice was named Faculty Member of the Year.

Prior to recently accepting the endowed chair position at Clemson, Scott was the Technical Vice President of Networking for the Institute of Industrial Engineers and general co-chair of the Industrial Engineering Research Conference.

Fluor Corporation, which has contributed $2 million to fund the Fluor Endowed Chair in Supply Chain Optimization and Logistics, is a Fortune 500 company that delivers engineering, procurement, construction, maintenance and project management services to governments and clients in diverse industries throughout the world.

Mason’s research primarily focuses on large-scale supply chain systems modeling, optimization, and algorithms, with emphasis in capital project supply chains, all aimed at finding the most efficient and economical ways for business and industry to move goods to market.

Jim Scotti, senior vice president and chief procurement officer for Fluor, said Mason is overseeing a program that will have long-term impact “on elevating the importance of the supply chain profession in the global engineering and construction industry.”
The Engineering Alumni Chapter is here to help you stay connected with the Ira A. Fulton Schools of Engineering and your fellow alumni.

We engage in a wide range of events from football viewing parties, to volunteer activities, mixers and lectures. Please join us, whether you choose to attend one event or all, and please know that you are always welcome and I know that you will enjoy your experience.

Also, please visit our website regularly to find the events that interest you: http://engineering.asu.edu/alumni.

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Mesa-based ATK Integrated Weapon Systems is the world’s leading developer and manufacturer of medium caliber cannons, ammunition and integrated weapon systems solutions.

Our support of the Fulton Schools of Engineering is more than an academic award—it’s an investment in our industry’s future ability to lead technology and the development of innovative, efficiency-driving products, processes and systems. The ATK scholarship gives us an opportunity to recognize and reward students who’ve chosen to play a role in advancing our country’s position as a global technology leader by pursuing a career in engineering. We are honored to be connected to such a well-respected program and to be a part of the educational and experiential development of tomorrow’s engineers.

We want to know—and your fellow alumni do, too!  
E-mail us at full.circle@asu.edu to share news about a new job, new home, new addition to your family or other updates you would like to have included in a future edition of Full Circle magazine. Be sure to include the year you graduated, as well as your degree and major. We look forward to hearing from you! (Submissions may be edited for length or content.)

Investing in engineering  
Thanks to the generous support of our donors, more than 300 scholarships and fellowships totaling $2,300,000 were awarded to Ira A. Fulton Schools of Engineering undergraduate and graduate students in 2010-2011.  
Learn more: engineering.asu.edu/development
Jonathan Topliff, a freshman in materials engineering, jumped into his ASU experience with both feet. During his first semester, he earned the title Lead Designer and Master Builder as part of the engineering student council team who built a 15-foot trebuchet with an 8-foot throwing arm.

Topliff gravitated to engineering citing the versatility and applied skill set. “You can do just about anything as an engineer,” he says.

He had always like building things, from LEGO toys and Tinker Toys to more complex projects as he got older. He actually built his first trebuchet in the 7th grade.

Topliff took the initiative to sketch out specifications and measurements. Plans in hand, he got the club’s VP of finance, Philip Burbank, and president, Jane Lacson, excited about the project and together they worked with student engagement coordinator, Katrina Vance, to secure funding.

Joined by a few other students the group set up shop on the south side of Engineering Center G (ECG). From the initial trip to Home Depot to the launch party, they spent nearly 70 hours building the trebuchet, which would come to be known as Sheila.

A trebuchet is made of three main parts: the base, throwing arm and counterweight basket. The group’s main concern was stress analysis on the different parts.

While Topliff’s original specifications turned out to be quite accurate overall, he did run into design challenges. The basket, made from old jeans, metal grommets and leather, was too heavy. Undaunted, he solved the problem by using basketball nets held together with zip-ties.

For their first test, the group made a projectile out of the tarps used to secure Sheila at night (to protect her from any UA students). The goal was to ensure safety, proper clearance for the arm to move, and to see if it worked. The test launch went 100 feet.

At her official launch party, Sheila drew a crowd of students eager to see pumpkins hurled into the air, and have the opportunity to compete in the how-far-will-it-go contest. The team launched at least a dozen pumpkins, adding more weight to the counterweight basket each time. The final launch, with over 400 pounds of weight in the basket, went 212 feet.

Today, Sheila rests outside the Engineering Student Center.

Why a trebuchet? It comes back to building things, Topliff says. “Some people play tennis, some shop. I like to build large objects that launch things.”

He also says that the group project was a great learning experience. “I learned to always think ahead, the importance of clear communication among team members and to take accountability for my part in making it a successful project,” he says.

Topliff has stayed involved with the student council and is now the interclub communications chair.

Next on the horizon? Topliff says possibly a generation 2 trebuchet with a floating arm to give it more force.

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**How does it work?** More online: [fullcircle.asu.edu](http://fullcircle.asu.edu)
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