Ira A. Fulton Schools of Engineering
Arizona State University

School for
Engineering of Matter, Transport and Energy
2015–2016
Annual Report

Fueling innovation on all levels

Contents

Faculty

Research

Innovation

Students

Staff

On the cover

Associate Professor of chemical engineering César Torres, left, and graduate student Sam Nandakumar peer at a tray of cyanobacteria and algae, photosynthetic organisms capable of producing biofuels. Researchers in Torres' lab study microbiological technologies that generate energy or high-value chemicals. Read more about Torres' work on page 6.

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Published by the School for Engineering of Matter, Transport and Energy, one of the Ira A. Fulton Schools of Engineering

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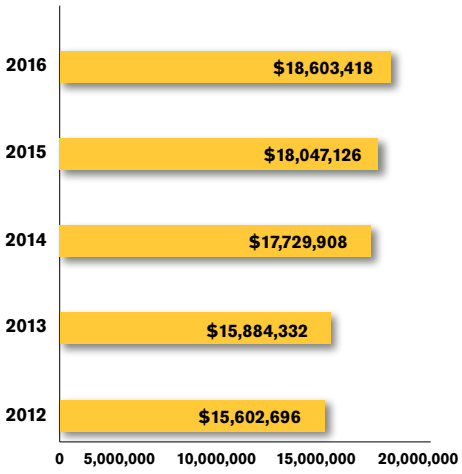
Join us at E2, homecoming and other events throughout the year. Reconnect with alumni, learn about new research initiatives and meet our outstanding students.

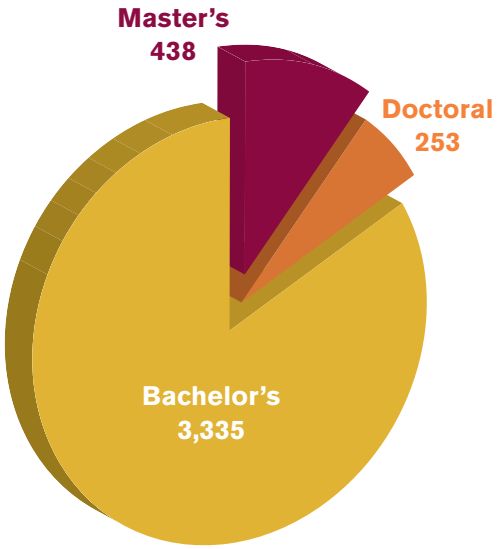
Director's letter

Great accomplishments, discoveries and graduates continue to emerge from the School for Engineering of Matter, Transport and Energy.

Research expenditures



Enrollment



Total 4,026

To the benefit of our students — and community — our faculty members, staff, volunteers and benefactors have led another year of growth and excellence in our nationally recognized programs in aerospace engineering, chemical engineering, materials science and engineering, and mechanical engineering.

Our programs — large and small, undergraduate and graduate — continue to attract top students from across the country. In 2016, six of the 20 Flinn Scholars chose to study in our School. The Flinn Scholarship is a competitive, merit-based scholarship for Arizona high school seniors. It provides more than just tuition support. These high-achieving students also take advantage of leadership training and study abroad programs.

We excitedly welcomed nine new faculty members and three lecturers to the School in the past two years. New faculty members like Assistant Professor Julianne Holloway, who is pursuing advances in tissue engineering and regenerative medicine for remedies to injuries and degenerative diseases, enhance our School's classrooms and research agenda.

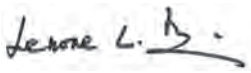
Many of our faculty members continue to enhance our national reputation through significant awards and honors — from honorary doctorates to professional society awards to multiple grants from the Office of Naval Research.

Building on last year's foundation, our junior faculty continue to win highly competitive and prestigious National Science Foundation Faculty Early Career Development Awards. Candace Chan and Sefaattin Tongay are innovative researchers and exceptional teachers committed to inspiring the next generation of engineers in the classroom and through outreach activities.

And our students bring in awards and honors as well. From a national Amelia Earhart Fellowship to two prestigious Barry M. Goldwater Scholarships. It's worth noting that female students earned two of those three awards. Our students continue to stand out.

As we move forward, our School will continue to exemplify excellence inside our classrooms and research labs, and outside of our campus boundaries as we bring innovations and new technologies to a society in need.

That's one thing this year has proved — our influence really has no boundaries as we build next-generation engineers and provide sophisticated, thorough and multidimensional solutions to complex problems facing our world.



Lenore L. Dai
Professor, Chemical Engineering
Director, School for Engineering of Matter, Transport and Energy

Faculty awards

Ron **Adrian**

Honorary Doctorate of Engineering, University of Illinois Urbana-Champaign

Spring **Berman**

2016 Fulton Outstanding Assistant Professor; Office of Naval Research Young Investigator Award

Candace **Chan**

National Science Foundation Faculty Early Career Development Award; Humboldt Fellowship, Alexander von Humboldt Foundation

Nik **Chawla**

2016 Distinguished Alumni Achievement Award, New Mexico Institute of Mining and Technology

Werner **Dahm**

Fulton Schools Top 5% Teaching Award

Lenore **Dai**

Fulton Schools Top 5% Teaching Award

Tirupalavanam **Ganesh**

2016 Tooker Professor

Matthew **Green**

2016 North American Membrane Society Young Membrane Scientist Award

Raghavendra **Murthy**

Fulton Schools Top 5% Teaching Award

Sefaattin **Tongay**

National Science Foundation Faculty Early Career Development Award; Fulton Schools Top 5% Teaching Award

César **Torres**

2016 Fulton Exemplar Faculty

Liping **Wang**

2016 Journal of Quantitative Spectroscopy & Radiative Transfer Elsevier Viskanta Young Scientist Award

Tirupalavanam Ganesh

Tirupalavanam Ganesh is a leader in education research. His expertise spans curriculum development and implementation, as well as teaching and learning methods — particularly in engineering and science instruction at both college and K12 levels.

His research has attracted support from the National Science Foundation, Science Foundation Arizona, and other prominent funding agencies.

The results of his work have been published in leading research journals and reported on in his numerous presentations at national and international science, engineering and education conferences.

Most recently Ganesh was named an **ASU Tooker Professor**, which will provide him resources to design more effective learning environments for engineering students. His goals are to help students cultivate their identity as engineers and to develop educational programs designed for high school students from groups traditionally underrepresented in engineering.

Tooker Professors implement innovations designed to lead to increased student retention and persistence, more rewarding learning experiences, greater student diversity and experiences that aid student competitiveness in the job market.

César Torres

César Torres is on the forefront of investigating simple, natural solutions to complex problems. He's particularly interested putting microbial cells to work — such as bacteria powering wastewater treatment systems or microbial fuel cells providing power to deep-sea probes. Torres' efforts to understand the role of microbes in producing electrical currents have opened up a novel way to interface chemical energy and electrical energy. He has published more than 30 peer-reviewed journal articles related to microbial cell research and his efforts have earned him an appointment as a **Fulton Exemplar Faculty.** The program recognizes tenured and tenure-track faculty distinguished by the unique combination of having high research productivity, instructional load, student evaluations and doctoral student mentoring.

Spring Berman

Spring Berman has big ideas for small robots. She develops techniques for modeling, optimization and control of large collectives of robots, or robot swarms. She's currently focused on creating methods for multiple types of robots to work cooperatively and support one another to accomplish a goal. She hopes these swarms will someday aid in search-and-rescue operations or exploration.

Her work has received funding from the Office of Naval Research as well as the National Science Foundation.

Recently, Berman was named a **Fulton Outstanding Assistant Professor,** an honor granted to assistant professors in the middle of their tenure-track period who also contribute at a high level in teaching, research and service.

Taking the next steps:

Kyle Squires reflects on his journey to dean

In high school, Kyle Squires found he possessed an aptitude and interest in some of the foundational engineering skills: math and science.

"As a young adult I got on the engineering path, and the more I discovered, the more I liked it," says Squires.

His engineering journey didn't start with a grand epiphany, but simply a single step in the right direction. And it continued in a similar way — one step after another.

While an undergraduate student at Washington State University, he became intrigued with the work of a faculty member who was a prominent international researcher in multiphase flows.

"As an undergraduate I didn't understand the significance of what all his research meant, but I understood enough to have my curiosity sparked," he says.

This initial interest in the thermal sciences area of mechanical engineering and computer modeling has carried Squires throughout his career.

He says taking something he was good at, like math and science, and using it to "create something that addresses a need or solves a problem" attracted him to engineering. He's always been interested in the role of an engineer as a "maker," particularly as a creator of new knowledge.

"This was the case for me as an undergraduate and still is today. Making something new and different that leads to a new discovery is compelling," he says.

As a graduate student at Stanford University, Squires really began to "fully realize the possibilities presented by engineering education and research and how powerful that knowledge can be," he says.

One year away from earning his doctorate in mechanical engineering, Squires decided to delay graduation to go to Japan for a research exchange sponsored by the NSF Japan Society for the Promotion of Science program.

"I knew I was delaying my degree, but I had a feeling that the opportunities presented by conducting research abroad could impact my career and life experiences for the better," he says.

Squires ended up meeting his wife, Kayoko, during that year abroad. He also gained valuable experience working at a government research laboratory, and made connections that have led to visiting appointments at various Japanese universities.

Squires has gone on to apply his engineering knowledge to improving the aerodynamics of aircraft, ground vehicles and sports equipment.

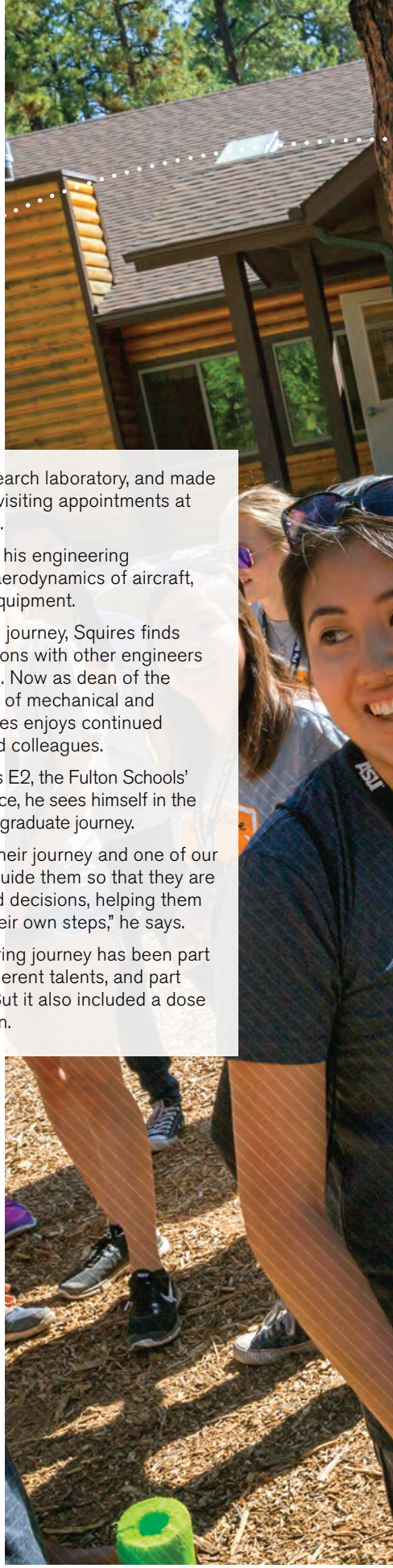
Reflecting on his engineering journey, Squires finds his relationships and interactions with other engineers have proved most meaningful. Now as dean of the Fulton Schools and professor of mechanical and aerospace engineering, Squires enjoys continued interactions with students and colleagues.

Each summer when he attends E2, the Fulton Schools' innovative orientation experience, he sees himself in the students beginning their undergraduate journey.

"They're at the beginning of their journey and one of our jobs as educators is to help guide them so that they are learning and making informed decisions, helping them 'turn over stones' and take their own steps," he says.

All in all, he says his engineering journey has been part following his instincts and inherent talents, and part making informed decisions. But it also included a dose of "go for it" without hesitation.

"Just like there's more than one way to solve a problem, there's more than one way to find your path as an engineer."




adventure
Ira A. Fulton Schools of Engineering

Young faculty

stand out

with early career awards

A key to the success of any institution is new and innovative ideas from new people. The Fulton Schools and SEMTE are no exception, as evidenced by the slew of awards secured by some of the school's young researchers this year.

The National Science Foundation Early Faculty Development (CAREER) Award is one program that recognizes young faculty who have potential to become national and international research and education leaders in their areas of expertise. The award provides funding for research and related educational outreach.

Candace Chan, assistant professor of materials science and engineering, received a five-year, $550,000 award to further her research on lithium-ion batteries. While they are gaining use in applications outside of laptops and cellphones, lithium-ion batteries suffer from safety issues due to their flammable liquid electrolyte component. Chan's research analyzes a potentially safer and better-performing replacement to that electrolyte.

Materials science and engineering Assistant Professor **Sefaattin Tongay** studies the behavior of single-atom-thick 2D materials with defects to see how those imperfections can perform useful functions to maximize their potential in energy conversion and information technologies. His research earned him $501,000 over the next five years to investigate the unusual properties of these 2D materials, which can lead to novel devices in defense, aerospace, medical, energy and industrial applications.

Another initiative acknowledging young researchers is the Office of Naval Research Young Investigator Program, which identifies scientists or engineers in the early part of their careers "who show exceptional promise for doing creative research."

Mechanical and aerospace engineering Assistant Professor **Spring Berman** is working on robots that go where humans cannot and work how humans often will not — cooperatively. She's developing techniques for modeling, optimization and control of very large collectives of robots, or robot swarms. Berman is receiving support from the ONR – $170,000 per year for three years – for her work, which could someday aid in search-and-rescue operations as well as exploration and inspection tasks.

Contributions in fluid dynamics nets Ron Adrian honorary doctorate

Photo courtesy L. Brian Stauffer/University of Illinois Board of Trustees

For accomplishments that have made him "arguably the most important living experimental fluid mechanician of the past fifty years," Fulton Professor of Mechanical and Aerospace Engineering Ron Adrian was awarded an honorary doctorate from the University of Illinois at Urbana-Champaign.

Adrian spent more than 30 years teaching and conducting research at Illinois before joining ASU's Ira A. Fulton Schools of Engineering.

For decades he has been among the leading experts in fluid dynamics. His work has included development of devices and techniques that have enabled advances in research, earned patents and fostered new industry ventures.

Adrian says he is "honored and appreciative" to be receiving an honorary doctorate from Illinois "because it's where I grew up academically."

Prestigious international fellowship will boost Candace Chan's catalysis research

Assistant Professor of materials science and engineering Candace Chan has been awarded an Alexander von Humboldt Foundation fellowship enabling her to conduct research at the Max Planck-Institute in Düsseldorf, Germany, for 15 months over a three-year period.

Humboldt Foundation fellowships are awarded through a highly competitive process to researchers whose efforts hold promise for contributing to important advances in engineering, science and scholarship.

During her 2016 fellowship, Chan seeks to expand her efforts to develop new photocatalytic materials that could be used to improve the performance of technologies employed in energy production and conversion, and in water-treatment techniques, among other areas.

Nik Chawla recognized with achievement award

Fulton Professor of Materials Science and Engineering Nik Chawla is being recognized as a distinguished and well-respected member of his field by his alma mater, the New Mexico Institute of Mining and Technology. "It's very humbling to be selected for this award," Chawla says. "I have great memories of being an undergraduate there. It's a small, but very rigorous engineering school where the professors really cared about teaching and we were all a big family."

The New Mexico Tech Alumni Association selected Chawla for the 2016 Distinguished Alumni Achievement Award for his notable academic and research career.

Chawla's achievements in his field include two textbooks, more than 200 refereed journal papers, nearly 400 presentations, and myriad other awards, honors, and advisory and editorial board positions.

Matthew Green wins 2016 NAMS Young Membrane Scientist Award

Chemical engineering Assistant Professor Matthew Green was presented with the North American Membrane Society Young Membrane Scientist Award at the 2016 NAMS conference.

"The NAMS community is very friendly, but they are very critical and demanding scientifically," Green says. "I was pleased that the community valued my contributions and selected me as the award winner."

The NAMS Young Membrane Scientist Award is given annually to up to three postdocs and faculty at the beginning of their professional careers in membrane science and technology

Green presented his work on the design of ionomer block polymers as battery electrolytes and electromechanical transducers.

Liping Wang receives award for work on radiative transfer

Mechanical and aerospace engineering Assistant Professor Liping Wang won the 2016 Elsevier/Journal of Quantitative Spectroscopy & Radiative Transfer Raymond Viskanta Award at the Eighth International Symposium on Radiative Transfer (RAD-16) in Cappadocia, Turkey. The award recognizes students and faculty early in their careers who work on the theory and application of radiative transfer.

Wang's research focuses on selective control of thermal radiation for energy-related applications, including solar thermal energy harvesting and conversion, coherent infrared light sources and radiative cooling. In particular, his team in the Nano-Engineered Thermal Radiation Lab studies nano-engineered materials and their physical mechanisms in nanoscale radiative transport.

Faculty expertise

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Ph.D., University of Wisconsin-Madison
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Ronald **Adrian**
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● indicates new faculty

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Sze Zheng **Yong** ●
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● indicates new faculty

Advancing OLED technology to more effectively light our world

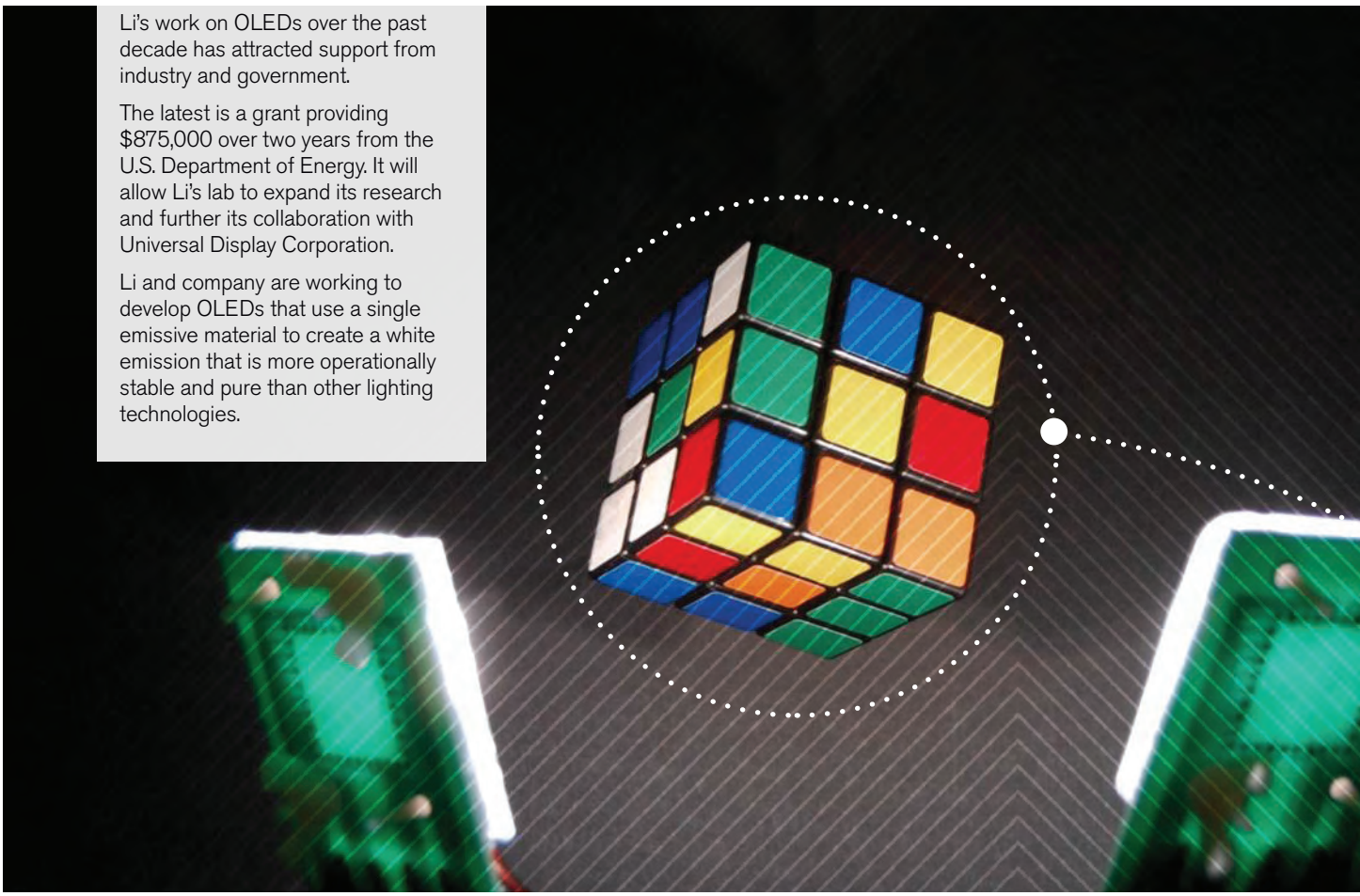
Despite great technological leaps, the quality of lighting in modern electronics leaves much to be desired. Advanced organic light-emitting diodes, or OLEDs, may be the answer.

Advances in OLED technology would be “a very big milestone” in the ability to effectively light our world, said Jian Li, an associate professor of materials science and engineering.

Li’s work on OLEDs over the past decade has attracted support from industry and government.

The latest is a grant providing $875,000 over two years from the U.S. Department of Energy. It will allow Li’s lab to expand its research and further its collaboration with Universal Display Corporation.

Li and company are working to develop OLEDs that use a single emissive material to create a white emission that is more operationally stable and pure than other lighting technologies.



Team chemistry is key ingredient in formula for research success

Even when researchers are in the same or closely related fields, good communication and strong working relationships are crucial to fully achieving project goals, according to Marc Mignolet, a professor and the graduate program chair of mechanical and aerospace engineering.

Mignolet has decades of experience in collaborative research and is now involved into two separate multi-year Air Force-funded projects in his primary area of expertise — the structural dynamics of aircraft.

“Even when people share a common goal, the result will not be as good as it could be if they do not have the desire and ability to work closely together,” he says.

Exploring the issues and challenges of multidisciplinary research is the aim of the Science of Team Science Conference held May 2016 in Phoenix.

Keeping the Navy's fleet shipshape

As the Navy primarily operates in harsh saline environments, corrosion has a significant influence on the materials that make up naval aircraft. Corrosion is not only a big word in regards to structural integrity, it is also an expensive word for the Navy.

For instance, according to a Logistics Management Institute study for the Department of Defense, the cost of corrosion for Navy and Marine Corps ships and aviation between 2010 and 2012 was a combined $5.7 billion. Corrosion accounted for 29 percent of the Navy and Marine Corps aviation maintenance cost during those years.

However, Associate Professor of mechanical and aerospace engineering Kiran Solanki and his collaborators champion an approach that doesn't look at corrosion in isolation.

Supported by a $635,000 grant from the Office of Naval Research, Solanki's team is developing a more complete method to study joint degradation behavior by combining electrochemical and materials/mechanical concepts.

He points out a problem encountered in the field — the scientists and engineers who build long-lasting naval structures do not collaborate enough. Electrochemists study the effects of corrosion. Materials scientists study the microstructural influence of fatigue and fracture. The problem is they do not look at how these areas impact each other.

"When you have materials deformation, such as during fatigue, and corrosion happening simultaneously in structural materials you have the worst case scenario," says Solanki, the grant's principal investigator. "Our goal is to combine the knowledge of these two areas and to look at how they influence each other."

Nik Chawla, Fulton Professor of Materials Science and Engineering, is the co-principal investigator of the grant, and offers expertise in material microstructural influence on the fatigue behavior.

In particular, Solanki and Chawla aim to uncover the precise crack growth-driving mechanisms that occur when naval-relevant materials experience mechanical load in a saline environment.

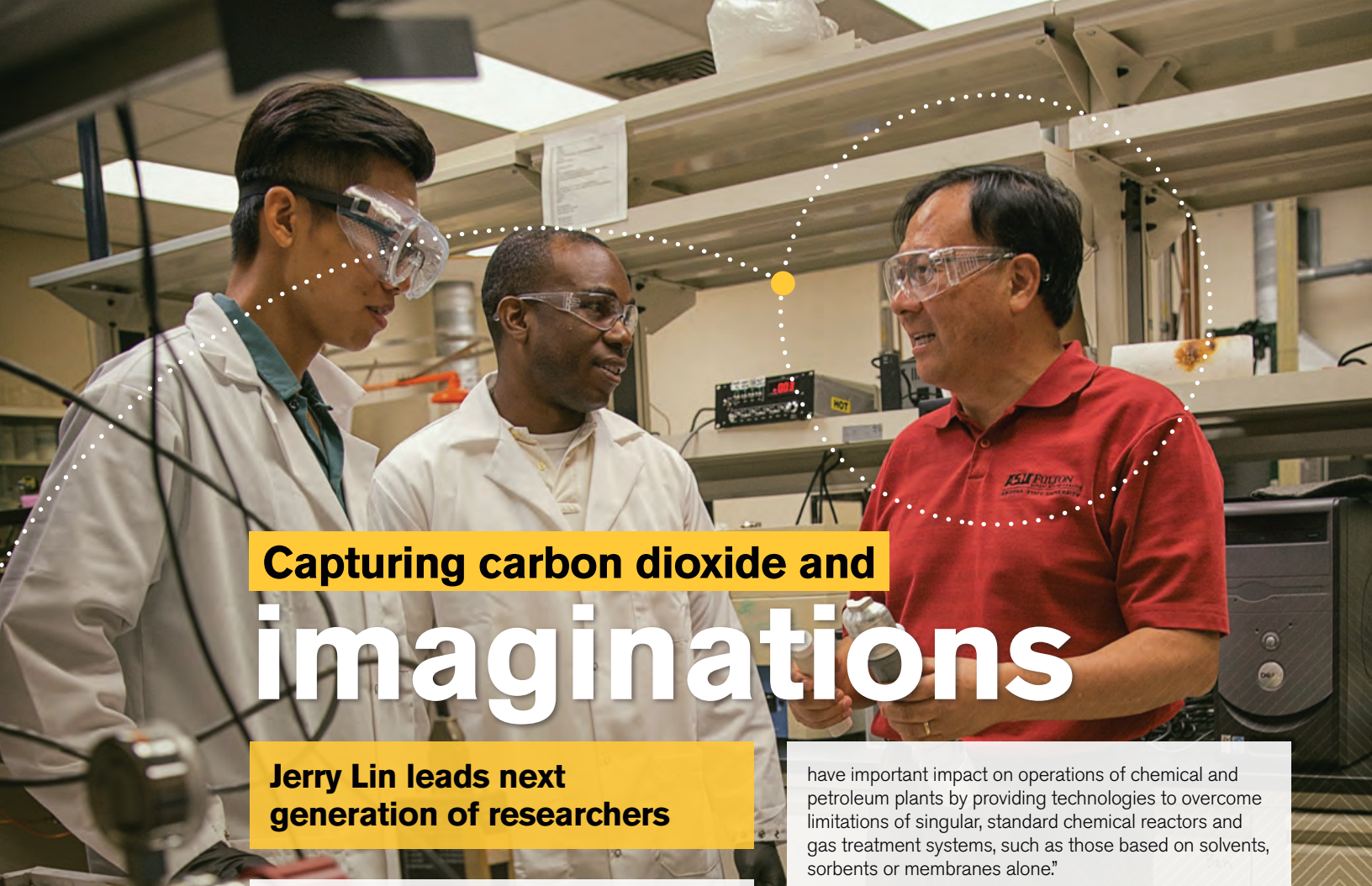
Loading can take on many forms, but Solanki looks specifically at environmental and mechanical load — and most importantly how they operate together. Environmental load refers to corrosion that occurs in the maritime environment. Mechanical load refers to structural loads.

"Understanding the combined effects environmental and mechanical loads have on the primary materials used in military aircraft and sea craft, in addition to improving upon predictive capability, will undoubtedly improve mission readiness," says Solanki.

Solanki and Chawla are also advancing this effort with another ONR grant totaling more than $506,000. Chawla is the principal investigator of this Defense University Research Instrumentation Program (DURIP) grant, and Solanki the co-principal investigator.

Solanki describes their approach as seeking a bottom-up understanding, meaning they are studying electrochemical and structural problems at a very small scale to better understand problems that happen at a larger, more visible layer. A lot is happening at the nanoscale level before a crack visually appears in the materials that make up marine aircraft, for example.

"We are looking at features that are very, very small, but provide a critical understanding of structural integrity," says Solanki.



Capturing carbon dioxide and imaginations

Jerry Lin leads next generation of researchers

An Arizona State University research team will work with the U.S. Department of Energy's National Energy Technology Laboratory to find ways to capture carbon dioxide from fossil fuel burning electricity power plants more efficiently. Carbon dioxide capture is the most critical technology to mitigate global warming due to the emission of greenhouse gases into the atmosphere. The main drawbacks of the current technology is that it is too costly and it is too energy intensive.

The team, led by Jerry Y.S. Lin, a chemical engineering Regents' Professor, has been awarded $2.5 million through the national laboratory's Carbon Capture Program to support development and testing of transformational carbon dioxide capture systems for new and existing coal-based power plants.

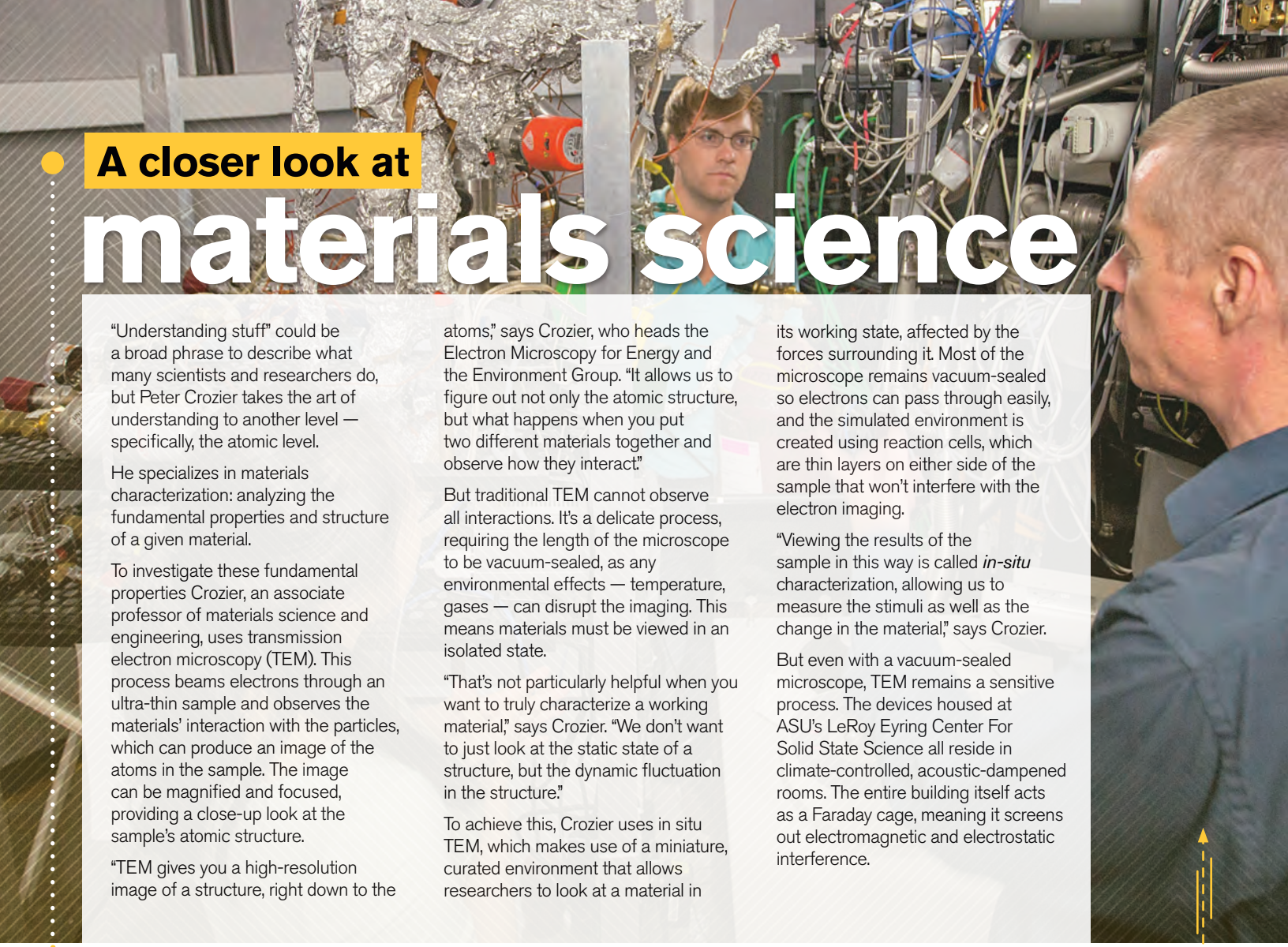
Lin and researchers from Media and Process Technology, Inc., the University of Cincinnati and Nexant Inc., will use the federal funding to develop a membrane reactor with a hydrogen semi-permeable MFI-type zeolite for water-gas shift to produce hydrogen with carbon dioxide capture. The project will include first high temperature membrane reactor bench-scale field testing at the National Carbon Capture Center with real syngas, which is a fuel gas mixture made primarily of hydrogen and carbon monoxide.

"The goal is to have a major impact on the development of efficient technology for pre-combustion carbon dioxide capture from fossil fuel burning power plants," Lin says. "The membrane reactor technology will also have important impact on operations of chemical and petroleum plants by providing technologies to overcome limitations of singular, standard chemical reactors and gas treatment systems, such as those based on solvents, sorbents or membranes alone."

The project will also work to encourage a broader audience to study chemical engineering. Lin is working with underrepresented students and postdoctoral scholars that will be trained to become leaders in membrane science and separation technologies. The results of research obtained in this project will be incorporated in courses for graduate students to keep them updated about the latest development in membrane science and advanced materials. The project will help introduce a membrane separation project for ASU's "Science for Fun" outreach program to inspire high school students to pursue an engineering degree.

"They are working on mathematical modeling, synthesis of membrane and catalyst, testing of membrane reactor operation, bench-scale testing and process design and technoeconomic analysis," says Lin. "These are who will become future leaders in membrane science and technology."

The funding is part of NETL's Carbon Capture Program. This year NETL selected 16 projects to receive funding through the program. Support from the program allows for the development and testing of transformational carbon dioxide capture systems for new and existing coal-based power plants. Research funded by this program is expected to help overcome limitations of singular, standard gas treatment systems, such as those based on solvents, sorbents or membranes alone. It is also hoped it will lead to breakthrough technologies for efficient capture of carbon dioxide from fossil fuel burning power plants.



A closer look at materials science

"Understanding stuff" could be a broad phrase to describe what many scientists and researchers do, but Peter Crozier takes the art of understanding to another level — specifically, the atomic level.

He specializes in materials characterization: analyzing the fundamental properties and structure of a given material.

To investigate these fundamental properties Crozier, an associate professor of materials science and engineering, uses transmission electron microscopy (TEM). This process beams electrons through an ultra-thin sample and observes the materials' interaction with the particles, which can produce an image of the atoms in the sample. The image can be magnified and focused, providing a close-up look at the sample's atomic structure.

"TEM gives you a high-resolution image of a structure, right down to the atoms," says Crozier, who heads the Electron Microscopy for Energy and the Environment Group. "It allows us to figure out not only the atomic structure, but what happens when you put two different materials together and observe how they interact."

But traditional TEM cannot observe all interactions. It's a delicate process, requiring the length of the microscope to be vacuum-sealed, as any environmental effects — temperature, gases — can disrupt the imaging. This means materials must be viewed in an isolated state.

"That's not particularly helpful when you want to truly characterize a working material," says Crozier. "We don't want to just look at the static state of a structure, but the dynamic fluctuation in the structure."

To achieve this, Crozier uses in situ TEM, which makes use of a miniature, curated environment that allows researchers to look at a material in its working state, affected by the forces surrounding it. Most of the microscope remains vacuum-sealed so electrons can pass through easily, and the simulated environment is created using reaction cells, which are thin layers on either side of the sample that won't interfere with the electron imaging.

"Viewing the results of the sample in this way is called *in-situ* characterization, allowing us to measure the stimuli as well as the change in the material," says Crozier.

But even with a vacuum-sealed microscope, TEM remains a sensitive process. The devices housed at ASU's LeRoy Eyring Center For Solid State Science all reside in climate-controlled, acoustic-dampened rooms. The entire building itself acts as a Faraday cage, meaning it screens out electromagnetic and electrostatic interference.

Transferring understanding into engineering

Crozier's work is not simply in pursuit of understanding the materials that constitute the world around us. Much of the work coming out of Crozier's research group is in the service of improving energy conversion technology.

One area of focus is the chemical energy conversion of solid oxide fuel cells. Though a potentially promising method for converting energy stored in chemical fuels into electricity, these devices are costly and lack sustained stability due to their high-temperature operation.

With the aid of a four-year, $520,000 grant from the National Science Foundation, Crozier is investigating the fundamental properties and interactions of oxide fuel cells at an atomic level. The goal is to use the knowledge gained from these studies to create novel materials capable of sustainably operating oxide fuel cells at lower temperatures.

In addition to energy conversion, materials characterization benefits many other engineering disciplines overall.

"Once you understand the fundamental structures and dynamics of a given material, you can then engineer new materials to meet a specific engineering function," says Crozier.

For instance, a mechanical engineer building an engine is going to use materials that must be understood and tested with other materials, just as an electrical engineer developing silicon solar panels must understand how that material responds to different environmental stimuli, according to Crozier.

In support of these pursuits, Crozier has received numerous grants to expand the understanding of materials and their inherent properties.

In September 2015, Crozier and physics Professor Peter Rez were awarded a $450,000 grant for an estimated three years to develop a tool to probe the nanoscale chemistry of materials surfaces. The award, also from the NSF, funds efforts to understand the fundamental interactions of nanoparticles and their influence on their environment.

Crozier also uses materials characterization techniques to address environmental challenges. In the past, he's investigated the optical properties of carbonaceous aerosols and how they contribute to climate change. Formed in combustion processes, carbonaceous aerosols can absorb light, consequently heating the atmosphere and contributing to global warming. However, their properties are not well enough defined to be effectively incorporated into climate change models.

"It's well established and understood that greenhouse gases affect global warming, but there is a lot of uncertainty about carbonaceous aerosols," says Crozier.

Laser technology, nanomaterials combine to offer promising body tissue repair technique

In the age of nanotechnology, medical advances are increasingly a matter of finding the right combinations of materials to help perform specific therapeutic or restorative functions.

Kaushal Rege, a professor of chemical engineering, has been using gold nanorods as a key ingredient in a new kind of body tissue sealant.

Using near-infrared laser light to heat a nanocomposite of gold nanorods embedded in a matrix of polypeptides, Rege's laboratory team can process the mixture of materials into a "nanosolder" for sealing tissues separated by rupture or surgical incisions.

Recently, Rege received an R01 grant to provide $1.6 million over three-and-a-half years to expand his research and development in this area.

MCTB Symposium unites researchers, community partners

The Molecular, Cellular and Tissue Bioengineering Symposium held at ASU in April 2016 was the first in what will be a series of annual events designed to bring the university's biomedical engineering faculty together with research centers from across the valley and the country.

"The symposium was an excellent platform to showcase outstanding bioengineering research carried out at ASU to our local and national peers," said co-chair Kaushal Rege, a chemical engineer and SEMTE professor. "This also was a wonderful medium for our students and trainees at ASU to learn about cutting-edge bioengineering research and technologies that can transform human health in the future."

Kaushal Rege

Just-in-time teaching

Building teaching and learning communities is key to effective education

American Founding Father Benjamin Franklin expressed in characteristically concise and pithy fashion his view on effective education: "Tell me and I forget. Teach me and I remember. Involve me and I learn."

The statement could serve as an abbreviated description of Professor Stephen Krause's goal in his work to develop and implement teaching and learning practices that engage and motivate teachers and students alike.

"It is a no-brainer," Krause says, that engaged and motivated students and teachers are essential to successful education. The big challenge is to come up with ways to effectively instill new attitudes and approaches necessary to ensure engagement and motivation can be achieved and sustained.

Krause teaches materials science and engineering and for the past eight years has also been designing and refining an approach to education called Just-in-Time-Teaching with Interactive Frequent Formative Feedback.

That has meant providing a variety of meticulously detailed strategies and techniques aimed at realizing Ben Franklin's educational ideal. It has also involved establishing evidence that results of using this method can be rigorously analyzed and objectively evaluated to gauge its success or expose any need to alter the blueprints.

The project has shown enough promise that the National Science Foundation recently awarded Krause a $1.5 million grant to expand the endeavor. In the next three years, he will work with more than 80 ASU engineering faculty members to put the Just-in-Time Teaching approach into action.

They will learn how to establish productive "communication channels" between themselves and students, something that requires teachers to transition "from being the sage on the stage to being the guide on the side," Krause explained. "It is about teaching faculty not just how to teach certain subject matter but how to teach students how to learn it."

This requires knowing how to foster collaborative learning in the classroom, creating an environment in which students teach each other with guidance from the faculty member.

"The class becomes more than a transfer of technical knowledge from professor to students. It becomes a social activity that evolves into a learning community, and it's this kind of cooperative environment that is motivating to students and teachers," Krause says.

The social connectedness and collaborative spirit also extends to the relationships among teachers who will work to institute the change in approach.

For the project to be successful, "faculty support for each other is a big thing," Krause says. "They have to talk to each other about issues and problems that come up, and work together on solutions."

The overriding objective is not only to develop camaraderie that enhances teaching and learning. The foremost focus is on communicating to students the relevance of their classes.

"In all the equations, calculations, formulas, data, graphs, charts and the stuff in the textbooks, students must be made to see the possibilities of things they can get excited about doing," Krause says. "They need to understand the social impact engineering and science can have and be able to envision their future being a part of it."

The new style of teaching and learning emphasizes enabling students to frequently put to use the technical knowledge they're being given in the classroom. Instructors would encourage students to explore how they might be able to contribute valuable things to the world by using what they're learning in class.

"Engaging in hands-on activities generates the kind of thinking you use in engineering design, and that is where motivation sets in and real learning happens," Krause says.

The project will include regular and stringent evaluations to determine if the new method is producing intended results. How well faculty members adapt to the new approach will be assessed through classroom observations by graduate student researchers and through faculty surveys about changes in their motivation, attitude and social connectedness to other faculty members involved in the project. In addition, an automated web-based system will give students the opportunity to provide feedback on their classes and how effectively they think teachers are boosting student learning.

Scholarly works (2015)

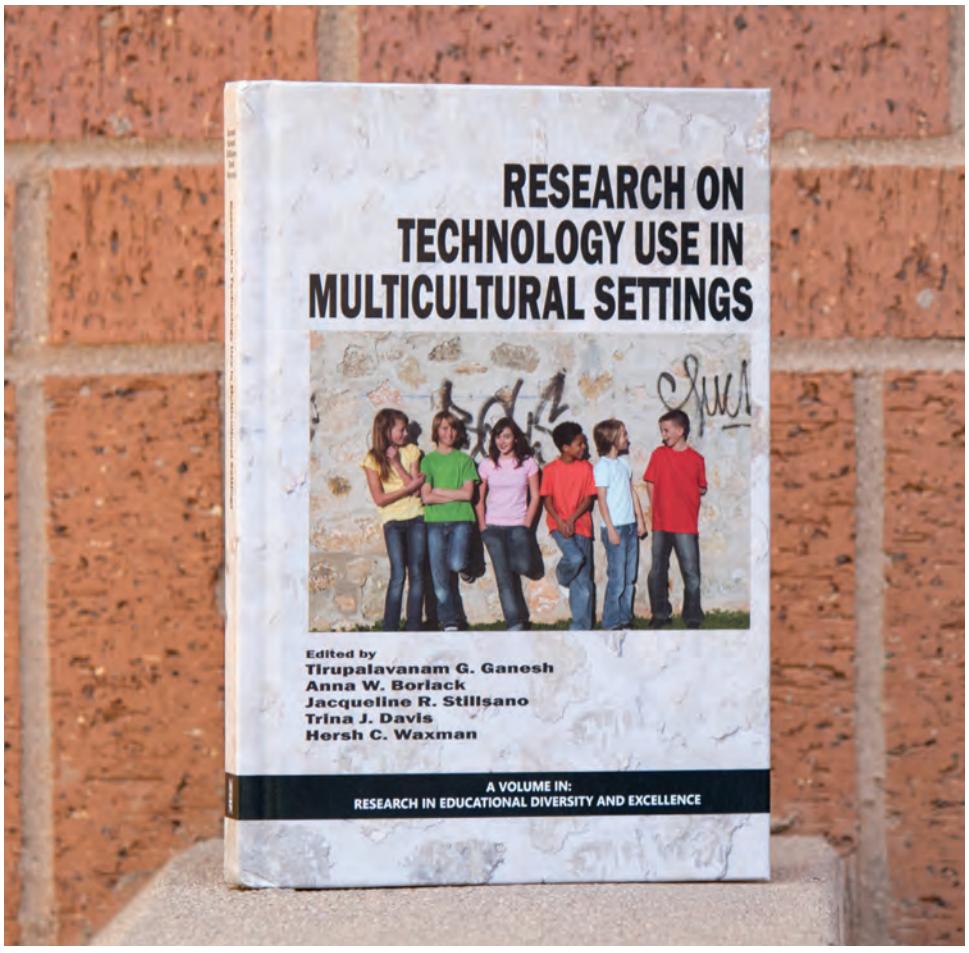
113 journals
15 areas

152
Publications
2015

Top 10 Journals Published In	Articles
Scientific Reports	7
ACS Nano	4
Journal of Physical Chemistry C	4
Langmuir	4
ACS Applied Materials & Interfaces	3
Journal of Membrane Science	3
Metallurgical & Materials Transactions A: Physical Metallurgy & Materials Science	3
Microporous & Mesoporous Materials	3
Nature Communications	3

Top 10 Research Areas Published In	Articles
Materials Science and Engineering	68
Chemistry and Biochemistry	65
Physics	53
Nanoscience and Technology	29
Chemical Engineering	24
Mechanical and Aerospace	18
Multidisciplinary	13
Health and Life Sciences	11
Environmental Science and Engineering	10
Other	9

Exploring tech-based solutions to elevate education



High-tech tools are critical to meaningful education. Awareness of these devices and the vast knowledge they make accessible now seems all but indispensable to most career and life pursuits.

But questions abound as to how to most effectively employ advanced technologies in all levels of schooling. Researchers such as Tirupalavanam Ganesh at ASU are searching for the answers.

Ganesh is a Tooker Professor in the School for Engineering of Matter, Transport and Energy, and an assistant dean of engineering education for the Ira A. Fulton Schools of Engineering.

His findings and those of his colleagues are detailed in, “Research On Technology Use in Multicultural Settings,” a book he edited with four other education researchers.

Authors include instructional designer and learning theorist Brian Nelson and cognitive scientist and education technology researcher Robert Atkinson, both associate professors on the faculties of the Fulton Schools and ASU’s Mary Lou Fulton Teachers College.

Changing lives

Inspiration springs from engineering education outreach effort

Teacher Valerie Garcia-Denogean never imagined she would see young students excited to get up early on six straight Saturday mornings for an extra day of schooling. "They were there waiting for the bus every time," she recalls.

Those mornings began with a sunrise trip an hour away from their small rural mining community of Superior, Arizona, to ASU's urban Tempe campus.

Once there, the group of about 20 students gathered with engineering students and professional engineers for four hours of lessons and hands-on activities designed to demystify mathematics, technology and research.

Superior school district leaders "saw the value of giving our students support for this experience," says Garcia-Denogean, who teaches both junior high and high school classes and is the district's career and technical education director. Along with the district's curriculum director and transportation supervisor, she volunteered to get the students to and from the instruction sessions.

The results made the Saturday trips more than worthwhile. "The impact has been absolutely priceless. Just being in a university environment and meeting college students and business people, and seeing research labs, has been eye-opening for our students," Garcia-Denogean says. "I think this will have lasting effect on them. They are learning the terminology of technology and the love of problem-solving, and they are now talking about their future and what they want to do in their lives," she says.

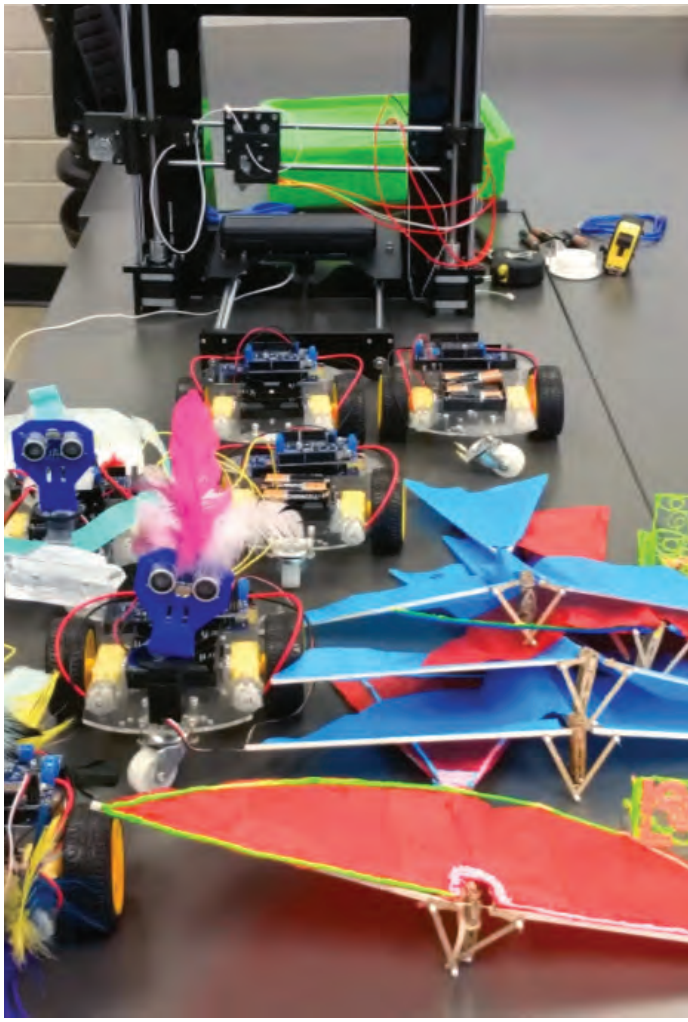
All of this is heartening to Michael Thompson, a mechanical engineering doctoral student in the Ira A. Fulton Schools of Engineering, who almost single-handedly launched the program and has led it over eight semesters.

Offered space and transportation for students in 2012, he used his own monies to purchase teaching materials for the program for the first two years.

In 2014, he received two annual grants from the National Aeronautics and Space Administration through its Space Grant program.

In 2014, he received two annual grants from the National Aeronautics and Space Administration through its Space Grant program. These helped to fund the purchase of classroom tools for instructing students. Thompson's work is supervised by faculty advisors Associate Professor Marcus Herrmann of SEMTE and Professor Armando Rodriguez of the School of Electrical, Computer and Energy Engineering.

Thompson's progress caught the attention of the director of the Fulton Schools Career Center, Robin Hammond, who awarded him a student Professional and Career Development grant. Thompson also got an Engineering Projects in Community Service grant from the Institute of Electrical and Electronics Engineers (IEEE) Foundation. It has helped provide students with lunch during the Saturday sessions.



"Flapping Bird" toys (right) made of paper and balsa wood teach young students about the principles of flight and aerodynamics. The outreach program includes robotic toy cars (at left, decorated and accessorized) to provide lessons on how math is used to create, test and improve technology. Photo courtesy Michael Thompson.

Ford fuels student success

Left to right: Kyle Ness, John Nolan, Fabian Gadau, Rae Rutkowski, Troy Buhr, Stephen Stewart, Samuel Mokdad, Nicolas Corrales

ASU's Ira A. Fulton Schools of Engineering is now numbered among Ford Motor Company's 22 top-ranked schools and designated Premier Schools for recruiting initiatives. Ford actively recruits from 52 schools and six professional organizations in an effort to attract a diverse range of candidates for its summer internship and Ford College Graduate programs.

ASU's W. P. Carey School of Business also ranks in the top tier, along with MIT, Notre Dame, Purdue and University of California-Berkeley. These top schools do well on Ford's school decision matrix, which includes criteria, such as school quality, top external ranking, competitiveness and high completion rates.

Acquiring Premier School status brings with it additional funding for Career Services, increased Ford-sponsored campus activities and a designated recruiting team, which for ASU includes Armando A. Chacon, Ford Motor Company Electrical Integration Manager. Chacon received his Master of Science in Electrical and Electronics Engineering from ASU.

"One of the things that makes Fulton Schools such an attractive recruitment source is that students are so active in automotive engineering organizations," explained Chacon. "Involvement with programs like Formula SAE give students opportunities to work in teams and develop problem-solving and leadership skills. ASU's programs are among the best in terms of recruitment." Formula SAE is a student design competition organized by SAE International (formerly known as the Society of Automotive Engineers).

The Ford Summer Internship Program provides students with hands-on, career-specific experience during summer break. Students are engaged in networking and educational activities throughout their internship to gain exposure to senior level management.

Michael Thompson, mechanical engineering doctoral student, worked as a computational fluid dynamics external flow intern working with a team on the Ford F150 truck in the summer of 2015. Thompson says he thrived in the program. "I've learned so much on the job. If there's something I can't do myself, I can ping someone across the building and they are there with answers."

Mechanical engineering senior **Troy Buhr** knew he wanted an internship when Ford announced that it was moving beyond the hybrid market toward battery-operated vehicles. Working in the Electrified Powertrain Engineers Division he has enjoyed the immersion in his assignment, as well as one-on-one interviews with engineers from other divisions. "They were very generous in detailing what's been successful and what has not," says Buhr.

For mechanical engineering student **Samuel Mokdad,** being part of the team that works on the Ford Mustang engine was a dream — a dream that came true while working with a powertrain research team as a Ford intern. Mokdad's team investigated ways to mitigate the hydrocarbons and nitrogen oxide emissions to meet upcoming SULEV30 EPA regulations in 2021.

Solar energy graduate program inspires

Jobs in the solar energy field are on an upward trajectory, and there is a lot of room for the industry to grow with solar power currently accounting for only about one percent of total power generation in the United States.

It's an especially appealing industry in a sunny location like Arizona, and ASU has taken advantage of that benefit by developing the largest solar energy portfolio among all universities in the country.

The Ira A. Fulton Schools of Engineering also has a unique graduate studies program to give engineering and non-engineering students a comprehensive education on the solar industry. The Professional Science Master's in Solar Energy Engineering and Commercialization enables students to get an understanding of solar energy technology and engineering as well as business, policy and nontechnical aspects of the field, preparing them to be successful in solar development and commercialization. It's a relatively new type of graduate program designed to be completed in 12 months for students interested in graduate studies, but not necessarily interested in a doctoral degree or an MBA.

Nicholas Fortenberry, now a PSM SEEC alum, became interested in solar energy during high school when he took part in international humanitarian projects in several countries around the world. During trips for those projects he noticed the lack of electricity was a common problem among impoverished communities.

"My passion for solar stemmed from these experiences because of its potential to solve people's problems," Fortenberry says. "As an engineer, seeing a need and then the potential of a particular technology to meet that need gives me motivation to be a part of the effort to make that technology more obtainable for the masses."

Work on energy-conversion system earns engineering students best research paper award

The best student research paper award at this year's American Society of Mechanical Engineers Power & Energy Conference went to ASU mechanical engineering doctoral students Andrey Gunawan and Nicholas Fette.

In addition to receiving $2,500 and travel reimbursement for the cost of attending the conference, the paper ("Thermogalvanic Waste Heat Recovery System in Automobiles") will be published online in Energy-Tech magazine.

Their research was conducted under the supervision of SEMTE Professor Patrick Phelan. Phelan is also a co-author on the award-winning research paper.

QESST Scholar Pablo Guimerá Coll wins NSF Perfect Pitch Competition

Congratulations to Pablo Guimerá Coll, a doctoral student in materials science and engineering, for bringing home a first-place win in the National Science Foundation Engineering Research Centers' Perfect Pitch Competition!

Coll, a scholar in the Quantum Energy and Sustainable Solar Technologies (QESST) NSF-DOE Engineering Research Center, won a $5,000 cash prize.

Doctoral student lands NASA Fellowship

Aerospace engineering doctoral student Sydney Taylor secured a competitive NASA Space Technology Research Fellowship to explore methods to create an adaptive coating to regulate the temperatures of spacecraft.

To shield a spacecraft's sensitive equipment such as batteries or transmitters from the rigors of thermal cycling, Taylor plans to create a coating that will adopt different properties to regulate the spacecraft's temperature.

Taylor will conduct the bulk of her research here at Arizona State University under the direction of Assistant Professor of mechanical and aerospace engineering Liping Wang, but spend 10 weeks out of the year working at a NASA or NASA-affiliated facility.

The fellowship, which will last the duration of the academic year, comes with an award that takes the form of a training grant to ASU. The grant will support Taylor's work, covering the costs associated with traveling to conferences as well as lab necessities, such as fabrication.

The program also partners fellows with a professional research collaborator. Taylor has been paired with Rubik Sheth, who currently heads a team developing a thermal control system for the International Space Station at Johnson Space Center in Houston, Texas.

"Obviously, it's a great career opportunity. The one requirement I've always had for my career is to work with space technology," Taylor says about the fellowship. "Be that in a national lab, working in [research and development] for a company or at a university, it doesn't matter. I just want to work with space technology."

ASU engineers take on rivals, earn first place Materials Bowl award

The Ira A. Fulton Schools of Engineering had seven teams compete against 13 teams from University of Arizona's Department of Materials Science and Engineering in the 13th Annual Materials Bowl on April 25, 2016.

ASU's team, mentored by Nate Newman, took home the top prize of $1,000 with their project was titled "Ultra-Low-Noise Cryogenic Dipping Probe with Dynamic Range for JMRAM Applications." Congratulations to Cougar Garcia, Brooke Hudson, Adam Pocock and Nolan Walker for bringing the Materials Territorial Trophy to ASU.

eSeed Challenge student entrepreneurs visit Silicon Valley

Entrepreneurs from five ASU student-led startups traveled to the promised land of startups, Silicon Valley, from March 31 to April 2, 2016. There they met with top-level professionals, toured startup companies and had the opportunity to pitch to successful entrepreneurs.

The top-performing startup was Tech Dispatcher, led by aerospace engineering student Brandon Garrett and ASU alumnus Dallas Grantham.

Run by the Startup Center within the Ira A. Fulton Schools of Engineering, the eSeed Challenge develops promising early stage student ventures, preparing them to secure funding and win competitions to support their startups.

'Domesday' prizewinner fashioned from cans and tripods

An ASU team earned third place in a recent national student competition at the Materials Science & Technology industry conference in Columbus, Ohio.

The Sun Devil Dome team — materials science and engineering seniors Ryan Treadwell and Michael Moorehead, and freshman Yegor Zenkov — won the prize in the ASM Geodesic Dome Design Competition, also known as the Domesday competition.

Gaining elevation: Aeronautics team on the rise

ASU's Air Devils rose to new heights during the spring semester, most notably making a significant jump in the rankings in a major international student aviation competition.

The club's team of aerospace and mechanical engineering students in the Ira A. Fulton Schools of Engineering finished among the top performers in the 2016 American Institute of Aeronautics and Astronautics Design/Build/Fly competition.

From 145 teams that initially entered the competition, 80 were selected to move to the second and final phase. In the end, the Air Devils finished in 14th place among those teams, up from 23rd place last year.

Their ranking was earned with an especially strong showing in the competition's flight challenges event at the Cessna Aviation company's campus in Wichita, Kansas.

ASU/NASA Space Grant fellowship enables exploration in additive manufacturing

Brittany Nez is exploring the intersection between 3D printing and aircraft manufacturing with a fellowship from the ASU/NASA Space Grant program.

Nez, a junior studying aerospace engineering, received an undergraduate fellowship for 2015, which provides her with a bimonthly stipend and the opportunity to advance research with a faculty mentor.


Brittany Nez

Amelia Earhart Fellowship propels research

Amelia Earhart found her passion for aviation while working as a nurse's aid at Toronto's Spadina Military Hospital. Nearly a century later, her influence and fame as a female pioneer in the aviation industry spans continents.

As a youngster in Trivandrum, India, Nithya Subramanian admired the record-setting aviator.

Subramanian, an aerospace engineering doctoral student at ASU, developed her own love for aviation at eight years old when she was invited to sit in an airplane's cockpit during a flight on SriLankan Airlines.

The Amelia Earhart Fellowship, presented by Zonta International, a global organization for women professionals, aims to support and grow the number of women in the aerospace industry and other aerospace-related science and engineering fields.

Subramanian was one of 35 doctoral students named an Amelia Earhart Fellow for 2016–2017.

The recipients, chosen from a pool of 121 applicants, represent 19 countries and include students from universities such as Purdue University, Stanford University, MIT, Brown University and the University of Cambridge in the United Kingdom. The fellowship comes with a $10,000 award.


Nithya Subramanian

Subramanian received the fellowship for her research contributions in lightweight multifunctional nanocomposites. She studies nanoparticles that could improve performance when infused into the lightweight composite materials that make up aircraft, spacecraft and other aerospace technologies.

Although Subramanian's efforts are still at a basic level, she foresees her research "enabling more rapid introduction and certification of smart materials with quantified reliability, reduced maintenance costs and increased mission safety."

Pilots and astronauts are frequently recognized for their contributions to the field of aviation and aerospace, but Subramanian says it's important to also recognize the "scientists and researchers, often in the background, who make the space explorations and the giant strides in the field of aviation possible."

She says Aditi Chattopadhyay, her doctoral advisor, a Regents' Professor and Ira A. Fulton Professor of Mechanical and Aerospace Engineering, as well as a leading expert on composite materials and structural health monitoring in the aerospace industry, is "a great source of inspiration."


Morgan Kelley

Nothing gold can stay: Kelley named Outstanding Engineering Undergraduate

Morgan Kelley, a student in ASU's Barrett, the Honors College, has been selected not only as the 2016 Outstanding Graduate in Chemical Engineering but the overall 2016 Outstanding Engineering Graduate from the Ira A. Fulton Schools of Engineering.

Such honors are not new to the chemical engineering graduate, who earned a Barry Goldwater Scholarship in 2015, one of the most prestigious awards supporting undergraduate students in engineering, science or mathematics who aspire to earn a doctorate.

Kelley plans to pursue a career in the energy industry, seeking to "help create a more sustainable world by optimizing either energy harvesting or storage" and "hoping to use sustainable energy technologies to reduce our carbon footprint."

Entry into that industry will come after her pursuit of a doctoral degree in chemical engineering — supported by a fellowship from the Department of Energy — at the University of Texas at Austin.

Gold Standard

Chemical engineering students nab Goldwater Scholarships

In 2016, a mere 252 students were selected from a field of 1,150 nominees to be awarded a prestigious Barry M. Goldwater Scholarship — considered the premier undergraduate scholarship for mathematics, science and engineering majors. Out of those 252 exceptional recipients, four students hail from Arizona. Out of the four Arizonans, three are students in the Ira A. Fulton Schools of Engineering and two of them are from SEMTE.

Over the last 10 years, ASU has become one of the nation's leading producers of Goldwater Scholars, with 27, outperforming lauded institutions such as Stanford, Princeton, Harvard and Yale. This year's SEMTE honorees — chemical engineering students Kaleigh Johnson and Christopher Balzer — both credit the extensive research opportunities for undergraduates in the Fulton Schools as a key to their success.

Both are students in Barrett, the Honors College and participate in the Fulton Undergraduate Research Initiative, expanding their education with hands-on lab experience and independent and thesis-based research.

Johnson's FURI experience has furthered her chemical engineering knowledge and contributed to the progress of sustainable industrial engineering practices through research in synthetic biology — using microorganisms to produce compounds and materials for industry — in Assistant Professor David Nielsen's lab.

"As a first-generation college student, gaining national recognition for my accomplishments at ASU is an honor beyond what my family and I thought possible," Johnson says.

The choice of pursuing chemical engineering came easy to Johnson as it combined her favorite subjects of chemistry, math and physics in a versatile field that could take her anywhere.

She plans to pursue a doctorate in chemical engineering before working in industry.

"I want to implement synthetic biology into the production of chemicals and fuels," Johnson says. "I hope to make a significant impact in improving the sustainability of industrial manufacturing."

Balzer has participated in FURI for three consecutive semesters, and plans on leveraging his award to continue focusing on research. Balzer studies nanoporous materials in chemical engineering Assistant Professor Bin Mu's lab.

"The projects I have worked on focus on applying metal-organic frameworks into composite devices for gas separation and sensors," says Balzer. "I'm grateful ASU has a program like FURI to expose students to research early on."

Balzer hopes to continue his research in the future working on groundbreaking projects and is planning on attending graduate school. Regardless of where he ends up, Balzer is determined to make a difference in the world.

"My dream for my life is to contribute greatly to society," says Balzer. "That could mean making a large discovery in engineering or changing people's lives through volunteering. There's more than one way to make a difference."

The Goldwater Scholarship Program, honoring the late U.S. Sen. Barry Goldwater of Arizona, is intended to encourage outstanding students to pursue graduate studies and careers in engineering, science and mathematics fields. It provides up to $7,500 per year to support completion of undergraduate studies.

2015–2016 scholarship recipients

Alfredo **Dimas**
Aerospace Engr (Aeronautics)
CIRC Scholars Program

Ivan **Milosavljevic**
Aerospace Engr (Aeronautics)
Fulton Schools Faculty-Directed Study Abroad Scholarship

Erika **Mueller**
Aerospace Engr (Aeronautics)
Peter Stein Measurement Engineering Scholarship, SMECA Scholarship

Gage **Swarm**
Aerospace Engr (Aeronautics)
Fulton Schools Faculty-Directed Study Abroad Scholarship

Bryan **Vo**
Aerospace Engr (Aeronautics)
Boeing Scholarship

Dylan **Ottney**
Aerospace Engr (Astronautics)
Dr. James W. Turnbow Memorial Scholarship

Athena **Roberts**
Aerospace Engr (Astronautics)
CIRC Scholars Program

Benjamin **Winsryg**
Aerospace Engr (Astronautics)
Fulton Schools Faculty-Directed Study Abroad Scholarship

Christopher **Balzer**
Chemical Engineering
Michael J. Konen Engineering Scholarship, Blowers Engineering Scholarship

Stephanie **Brown**
Chemical Engineering
Stephanie A. Lahti Memorial Scholarship in Chemical Engineering

Joelle **Cayer**
Chemical Engineering
NCWIT Scholarship

Ana **Cervantes**
Chemical Engineering
Samuel E. Craig Memorial Scholarship

Samuel **Engelbert**
Chemical Engineering
IM Flash Technologies Industrial Scholarship

Tanner **Flake**
Chemical Engineering
W.L. Gore 4+1 Applied Project Scholarship

Nancy **Fujikado**
Chemical Engineering
W.L. Gore 4+1 Applied Project Scholarship

Haley **Gjertsen**
Chemical Engineering
W.L. Gore 4+1 Applied Project Scholarship

Saumya **Gupta**
Chemical Engineering
W.L. Gore Undergraduate Scholarship.

Sue **Han**
Chemical Engineering
Nellie 'Jean' Randle Scholarship, Tom and JoAnn Prescott New American University Scholarship

Hope **Jehng**
Chemical Engineering
Elyse and Paul Johnson Maroon & Gold Leaders Scholarship (NAMU)

Kaleigh **Johnson**
Chemical Engineering
Han Hartjens Scholarship

John **Lyle**
Chemical Engineering
SMECA Scholarship

Anthony **Ortega**
Chemical Engineering
Materials Science Engineering Scholarships

Richard **Phan**
Chemical Engineering
IM Flash Technologies Industrial Scholarship, CIRC Scholars Program

Cindy **Rivera**
Chemical Engineering
Materials Science Engineering Scholarships, CIRC Scholars Program

Yusef **Sabri**
Chemical Engineering
Materials Science Engineering Scholarships

Andres **Valenzuela**
Chemical Engineering
CIRC Scholars Program

Ivan **Ruiz**
Chemical Engineering MS
CIRC Scholars Program

Mark **Blei**
Materials Sci & Engineering
Craig and Barbara Barrett Scholarship

Justin **Edberg**
Materials Sci & Engineering
ASQ Ted Thal American Society for Quality Scholarship

Tayler **Fulton**
Materials Sci & Engineering
Boeing Scholarship

Hailey **Boshell**
Mech Engr
(Computational Mech)
Boeing Scholarship

Austin **Goodrich**
Mech Engr
(Computational Mech)
Richard R. Simari Memorial Scholarship

Jazmin **Kianpour**
Mech Engr (Energy/Environmt)
SMECA Scholarship, Boeing Scholarship, Orbital Sciences Corporation - Women in STEM Scholarship

Daniel **Orr**
Mech Engr (Energy/Environmt)
METSTEP Scholars Program

Jonathan **Reyes**
Mech Engr (Energy/Environmt)
Blowers Engineering Scholarship

Austin **Sorvala**
Mech Engr (Energy/Environmt)
Scholarship for Merit in Mechanical and Aerospace

Kendalyn **Toomey**
Mech Engr (Energy/Environmt)
Dr. James W. Turnbow Memorial Scholarship

Alexander **Aguinaga**
Mechanical Engineering
W.L. Gore 4+1 Applied Project Scholarship

Michael **Armstrong**
Mechanical Engineering
Fulton Schools Faculty-Directed Study Abroad Scholarship

Zayne **Bamond**
Mechanical Engineering
Fulton Schools Faculty-Directed Study Abroad Scholarship

Stephanie **Booth**
Mechanical Engineering
CIRC Scholars Program

Kimberly **Bui**
Mechanical Engineering
M. T. Postacchini Memorial Scholarship

Adalberto **Campos**
Mechanical Engineering
CIRC Scholars Program

Michael **DeKonty**
Mechanical Engineering
Theodore Allen Memorial Scholarship

Jeremiah **Dwight**
Mechanical Engineering
W.L. Gore 4+1 Applied Project Scholarship

Preston **Gender**
Mechanical Engineering
Materials Science Engineering Scholarships

Kenneth **Greason**
Mechanical Engineering
Dr. Lee P. Thompson Memorial Scholarship

Caprial **Grow**
Mechanical Engineering
NCWIT Scholarship

Sean **Holloway**
Mechanical Engineering
CIRC Scholars Program

Anna **Hu**
Mechanical Engineering
Boeing Scholarship

David **Ingraham**
Mechanical Engineering
SMECA Scholarship

Aidan **Jacobs**
Mechanical Engineering
SMECA Scholarship.

Marissa **Jimenez**
Mechanical Engineering
Special Scholars Program

Ryan **Kiracofe**
Mechanical Engineering
ASQ Ted Thal American Society for Quality Scholarship, M. M. Lowry Memorial Scholarship

Michael **Kuntz**
Mechanical Engineering
Edward E. Francisco Jr. Scholarship

Tak **Hung Kwan**
Mechanical Engineering
CIRC Scholars Program

Luis **Lopez Saavedra**
Mechanical Engineering
CIRC Scholars Program

Anna **Martin**
Mechanical Engineering
W.L. Gore Undergraduate Scholarship

Tyler **McDaniel**
Mechanical Engineering CIRC Scholars Program, W.L. Gore Undergraduate Scholarship

Alyssa **Nazareno**
Mechanical Engineering
NCWIT Scholarship

Alexander **Neuperger**
Mechanical Engineering
SMECA Scholarship

Huong **Ngo**
Mechanical Engineering
Argyro Lalos Tribute Scholarship, W.L. Gore Undergraduate Scholarship

Andrew **Perez**
Mechanical Engineering W.L. Gore Undergraduate Scholarship, CIRC Scholars Program. Materials Science Engineering Scholarships,

Preston **Pierce**
Mechanical Engineering
Srinivasan Iyer Family New American University Scholarship

Anthony **Pratt**
Mechanical Engineering
METSTEP Scholars Program

Travis **Skinner**
Mechanical Engineering
METSTEP Scholars Program

Doni **Tapederi**
Mechanical Engineering
Dr. Lee P. Thompson Memorial Scholarship

Emanuel **Toth**
Mechanical Engineering
Stanley D. Duke Applied Science Award.

Kane **Wiley**
Mechanical Engineering
METSTEP Scholars Program

Alexander **Wilson**
Mechanical Engineering
CIRC Scholars Program

Nathanael **Zuniga**
Mechanical Engineering
Special Scholars Program

Jordan **Ames**
Mechanical Engineering
MS
CIRC Scholars Program

Kevin **Espinoza**
Mechanical Engineering
MS
CIRC Scholars Program

Adrian **Maranon**
Mechanical Engineering
MS
CIRC Scholars Program

Outstanding and distinguished grads

Fall 2015

Outstanding Graduates

Kenneth **Lozes**
Aerospace Engineering

Emilio **Torres**
Mechanical Engineering

Fall 2015

Distinguished Graduates

Evan **Hammac**
Aerospace Engineering

Joseph **Hanson**
Mechanical Engineering

Peter **Harper**
Mechanical Engineering

Christian **Wiles**
Mechanical Engineering

Spring 2016

Outstanding Undergraduates

Morgan **Kelley**
Chemical Engineering
School for Engineering of Matter, Transport and Energy
Ira A. Fulton Schools of Engineering

Rick **Ahlf**
Aerospace Engineering

Andrew **Hickey**
Mechanical Engineering

Anna **Weiss**
Materials Science and Engineering

Spring 2016

Distinguished Service Awards

Kristen **Brown**
Chemical Engineering

Sanya **Mehta**
Chemical Engineering

From answering the phones to advising students and making sure all our research reports get done on time, our staff members are the invisible strength behind our endeavors.

Thank you.

Scott **Ageno**
Research Specialist

George **Ahlers**
Information Technology Manager

Robert **Alford**
Academic Success Specialist

Antoinette **Anderson**
Research Advancement Administrator

Shahriar **Anwar** ●
Research Specialist Sr.

Ebony **Baker**
Academic Success Specialist

Susan **Baldi**
Business Ops Specialist Sr.

John **Billings**
Academic Success Specialist

Andrea **Brown**
Academic Success Specialist

Leonard **Bucholz**
Shop Manager

Marilyn **Burckardt** ●
Research Advancement Administrator

Jessica **Caruthers**
Academic Success Coordinator

Gabriella **Clitso**
Academic Success Specialist

Karen **Dada**
Program Manager

Devon **Dale**
Program Coordinator

Danielle **Daley** ●
Research Advancement Administrator

Thomas **Dobrick** ●
Department HR Specialist Sr.

Jennifer **Gonzalez Thompson**
Academic Success Specialist

Kelley **Hall** ●
Research Advancement Admin. Sr.

Richard **Hanley**
Engineer Assoc.

Lindsay **Harkins**
Academic Success Specialist

Donley **Hurd**
Support Systems Analyst Principal

Jarrett **Johnson**
Business Operations Specialist

Dallas **Kingsbury**
Laboratory Manager

Mia **Kroeger**
Assistant Dir Academic Services

Tiffany **Le**
Student Services Coordinator Assoc

Leonardo **Leon**
Management Intern

Gayla **Livengood**
Department HR Specialist

April **MacCleary** ●
Research Advancement Manager

Andre **Magdelano**
Machinist Sr.

Lindy **Mayled**
Project Coordinator

Elisa **Mojica Garcia**
Research Technician

Durella **O'Donnell**
Administrative Assistant

Mariah **Pacey** ● ●
Business Operations Manager Sr.

Fred **Pena**
Laboratory Manager

Shannon **Pete**
Business Operations Specialist

Elena **Pollard**
Program Coordinator PRN

Christine **Quintero**
Academic Success Specialist

Shabnam **Rezai**
Academic Success Specialist

Cara **Rickard** ●
Assistant to Director

Philip **Schulz**
Research Technician

Wesley **Scruggs**
Business Operations Specialist

Lexi **Shulla**
Academic Success Specialist

Bruce **Steele**
Laboratory Manager

Molly **Swindler**
Research Advancement Specialist

Susan **Terkelsen** ● ●
Student Services Coordinator Assoc.

Albert **Thompson III**
Tech Support Analyst Senior

Dave **Vega**
Academic Success Specialist

Tiffany **Wingerson**
Academic Success Specialist

● indicates IMPACT Award recipient
● indicates IMPACT Award nominee
● indicates SEMTE Award recipient
● indicates Fulton Difference Award nominee

SEMTE Staff Excellence Award

This year, SEMTE introduced a new award for staff to be recognized by faculty and their peers for excellence in contributions to the school. Marilyn Burckardt, Mariah Pacey and Susan Terkelsen were honored and thankful to be chosen for the award by the leadership committee. “It’s nice to know my colleagues appreciate me and that we’re on the right track,” Pacey said. “I appreciate the School taking the initiative to create the award and recognize staff.”

Tom Dobrick honored for his impact

Tom Dobrick, a human resources specialist senior, received an IMPACT Award for his commitment to completing his long-unfinished Master of Arts in Human Resources/Industrial Relations from the University of Minnesota. Dobrick was slated to graduate in 1996, but life got in the way. SEMTE business operations manager Mariah Pacey, nominated Dobrick for his perseverance in achieving a personal and professional goal where many others would have quit while maintaining a high standard of work.. Pacey added the degree expanded the expertise and capabilities of the unit. Dobrick, who’s been working in SEMTE since 2013, said juggling coursework and professional responsibilities wasn’t fun, but relished the opportunity to return to school.

Ira A. Fulton Schools of Engineering
Arizona State University

School for **Engineering** of
Matter, Transport and Energy

P.O. Box 876106, Tempe, AZ 85287-6106

semte.engineering.asu.edu

SEMTE provides opportunities for students at all levels to engage in hands-on, experiential learning, from literally

walking on water as freshman in FSE 100,

gaining lab experience through the Fulton Undergraduate Research Initiative to

reaching new heights in student organizations, and

solving real-world problems in graduate studies.