Ira A. Fulton Schools of Engineering
Arizona State University

FURI

Fulton Undergraduate Research Initiative

Spring 2020 Symposium

furi.engineering.asu.edu

The Fulton Difference: Discover. Create. Innovate.

April 24, 2020

Our students have been working on research into innovative solutions to real-world challenges in data, education, energy, health, security and sustainability.

Access to research activities from students' first semester is a core value of the Ira A. Fulton Schools of Engineering. Together with highly regarded faculty, first-year students through doctoral candidates collaborate on use-inspired research.

Students conducting research in FURI and the Master's Opportunity for Research in Engineering (MORE) programs have spent the past semester conceptualizing an idea, developing a plan and investigating their research question.

You'll also see research and creative projects that explore the National Academy of Engineering Grand Challenges through the Grand Challenges Scholars Program (GCSP) and apply an entrepreneurial mindset with projects funded by the ASU Kern Project's KEEN Student Mini-Grants.

These programs advance students' skills in innovation, independent thinking and problem-solving that will support their future pursuits and careers. High-level research also opens doors to opportunities for scholarships, internships, graduate research and travel to prestigious conferences.

We are proud of what our students have accomplished and we're excited to share their work with you.

Sincerely,

Kyle D. Squires
Dean, Ira A. Fulton Schools of Engineering
Professor, mechanical and aerospace engineering

Jay Oswald
FURI faculty director
Associate professor, mechanical and aerospace engineering

Tami Coronella
Director
Student Success and Engagement

Patrick Phelan
MORE faculty director
Professor, mechanical and aerospace engineering
Assistant Dean of Graduate Programs

Find out more about our students and their projects at
furi.engineering.asu.edu/symposium

On the cover

Tannis Breure

FURI student researcher | **Graduation:** Spring 2021 | **Hometown:** Camrose, Alberta, Canada

Environmental engineering

Biochar's Ability to Remove Escherichia Coli

Mentor: Rebecca Muenich

The research question addressed was how effective biochar is as a soil amendment for the removal of Escherichia Coli (E. coli). Biochar is created through pyrolysis–heating biomass in the absence of oxygen to create a porous medium. The research question was answered through a series of soil column experiments, in which E. coli contaminated water was fed in variable flow rates through columns of biochar and sand. The results indicate that biochar is can effectively remove E. coli. In the future, the experiment should be repeated under different soil types and temperatures.

Snapshot Spring 2020

FURI Students	123	FURI Mentors	72
MORE Students	37	MORE Mentors	26
GCSP Students	2	GCSP Mentors	2
KEEN Students	9	KEEN Mentors	8

Research opportunities

Fulton Undergraduate Research Initiative

The Fulton Undergraduate Research Initiative enhances an undergraduate student's engineering experience and technical education by providing hands-on lab experience, independent and thesis-based research, and travel to national conferences.

Master's Opportunity for Research in Engineering

The Master's Opportunity for Research in Engineering is designed to enrich a graduate student's engineering and technical graduate curriculum with hands-on lab experience, independent and thesis-based research.

KEEN Student Mini Grants

Students who apply curiosity and connections to create extraordinary value for stakeholders are supported by KEEN Student Mini Grants, funded by the ASU Kern Project. Their projects can be part of student organization activities, group research or individual work that exemplifies an entrepreneurial-minded approach. These students are invited to present their entrepreneurial projects at the FURI Symposium.

Grand Challenges Scholars Program

The Fulton Schools Grand Challenges Scholars Program combines innovative curriculum and cutting-edge research experiences into an intellectual fusion that spans academic disciplines and includes entrepreneurial, global and service learning opportunities. Students in GCSP conduct research in a grand challenges theme and are invited to present their research at the FURI Symposium.

How do you get started?

"FURI was my first chance to design and execute my own research project."

— Chris Balzer
FURI Spring '15–Spring '16
Chemical engineering '17
Chemical engineering graduate student, Caltech

Step 1: Explore your research interests.

Step 2: Identify possible research mentors.

Step 3: Prepare to talk with faculty.

Step 4: Contact faculty members.

Step 5: Make a decision.

Step 6: Earn a FURI badge with the ASU Library:
badges.lib.asu.edu/badge/furi-badge

What you'll learn from FURI Badge:

- Plagiarism awareness
- How to develop a research or guiding question
- Source citations
- Research data management

Students who earn a badge will get a **#FURIous t-shirt!**

For more information, visit furi.engineering.asu.edu/get-started

Contact the Fulton Student Success and Engagement office at **furi@asu.edu** with questions or if you need advice on next steps.

Grad students: Curious about MORE? Contact **more@asu.edu** if you have questions about getting started.

Find research opportunities at

furi.engineering.asu.edu/opportunities

Find out more about the research presented at this semester's FURI Symposium

furi.engineering.asu.edu

Data

In an increasingly digital world, data collection is growing at a rapid pace. Fulton Schools faculty and student researchers are devising innovative approaches and tools that will help us better process, analyze, use, manage and access data. New computational tools, algorithms and data analysis techniques, including hardware and software approaches, machine learning, data analytics, data-driven decision-making and more will help advance scientific discoveries and collaborations across multiple fields where data use and capture is ubiquitous.

F FURI student researchers

Vineet **Butala '22**
Mechanical engineering
Studying the mark-making process and designing a robot to recreate the same marks will help create a language robots can understand.
Mentor: Anthony Kuhn

Paul **Butler '20**
Computer science
Efficiently modeling high-traffic areas will maintain the level of safety in autonomous vehicles and other drivers while reducing the computational cost.
Mentor: Yi Ren

Nitish **Chennoju '23**
Computer systems engineering
Optimizing electric aircraft propulsion through data will help maximize range and other aircraft performance features.
Mentor: Timothy Takahashi

Olivia **Christie '21**
Electrical engineering
Developing energy-efficient localization and mapping methods will help low-power devices navigate.
Mentor: Suren Jayasuriya

John **Daly '21**
Mechanical engineering
Using machine learning for material property simulations will accelerate the process and decrease computational expense.
Mentor: Yi Ren

Vincent **Davis '20**
Chemical engineering
Using molecular dynamic simulations to model ionic liquids for low-temperature sensors will improve understanding of their use for space applications.
Mentor: Lenore Dai

Shashank **Ginjpalli '21**
Computer science
Using natural language processing and machine learning to automatically create and recommend visualizations will help show related data for news stories.
Mentor: Chris Bryan

Edward **Goldenberg '21**
Engineering (robotics)
Designing a virtual environment that changes upon each usage will help develop artificial intelligence that learns with less time and data.
Mentor: Wenlong Zhang

Jason **Green '21**
Chemical engineering
Analyzing the properties and performance of natural materials will create more efficient methods of handling and storing them.
Mentor: Heather Emady

Zachary **Hoffmann '21**
Computer science
Creating a more accurate human prediction model in self-driving cars will account for the uncertainty in human actions.
Mentor: Wenlong Zhang

Andrew **Hredzak '21**
Electrical engineering
Tracking wireless users by training a neural network to associate 5G signals with their position captured by cameras will overcome limitations of 5G technology.
Mentor: Ahmed Alkhateeb

Dillon **Jayanthan '21**
Computer science
Writing a graphical user interface with text mining code will help our chemical engineering lab get information from articles more efficiently.
Mentor: Bin Mu

Ryan **Kemmer '20**
Computer science
Investigating better ways to collect opinions from people will improve data quality and motivate less-biased crowdsourcing results.
Mentor: Adolfo Escobedo

Anshul **Krishnan '21**
Biomedical engineering
Using ankle strength data as a criteria for prescribing the right type of orthotic device to stroke patients will help prevent falls.
Mentor: Claire Honeycutt

Sreeharsha **Lakamsani '23**
Computer science
Developing a neural network model for predictive modeling of many-body interactions will help simulate collective dynamics of cancer cells.
Mentor: Houlong Zhuang

Guangchi **Lee '22**
Computer science
Designing an algorithm for a rover to navigate itself in an unmapped region using GPS will help with rescue or discovery missions.
Mentor: Anoop Singh

Rebecca **Martin '21**
Computer systems engineering
Studying distributed algorithms for micro-scale swarms of synthetic cells will help target wounds or infections in the body.
Mentor: Andrea Richa

Natalie **Mason '22**
Computer science
Improving the software used in Raman spectrometry to determine the presence of compounds can illustrate the importance of intuitive software.
Mentor: Anoop Singh

Cody **McMahon '20**
Mechanical engineering
Studying the ability for an autonomous vehicle to determine another vehicle's intent or loss of function will promote safer executions of traffic scenarios.
Mentor: Yi Ren

Tanner **Merry '21**
Mechanical engineering
Creating a time-variant neural network that can model particle dynamics will demonstrate machine learning can learn unknown physics concepts.
Mentor: Yi Ren

Ritvik **Ramdas '23**
Computer science
Developing vector maps allows industries to model and scale cities and regions on a multi-dimensional and global scale for their clients.
Mentor: Mohamed Sarwat

Youssef **Serag '20**
Electrical engineering
Using machine learning algorithms for faster channel gain estimation will help improve wireless communications.
Mentor: Ahmed Ewaisha

Tejas **Singh '23**
Computer science
Studying network anomalies helps improve network data, user organization safety and threat accuracy within businesses and organizations.
Mentor: Nong Ye

M MORE student researchers

Sahil **Badyal '21**
Computer science
Using reinforcement learning to enable a team of robots to plan search and rescue missions will enable them to become effective tools.
Mentor: Stephanie Gil

Jonathan **Bush '20**
Engineering (robotics)
Designing a system to collect and analyze data about how people ride bicycles will help make this activity more accessible through balance and steering assistance.
Mentor: Wenlong Zhang

Dhaivat **Dholakiya '20**
Engineering (robotics)
Developing a deep learning architecture to control a custom-built hip exoskeleton will help it adapt across different walking behaviors among users.
Mentor: Heni Ben Amor

Elikplim **Gah '20**
Mechanical engineering
Designing a "temporary leader"-based swarm controller could allow for whole new ways of achieving tasks in limited information environments.
Mentor: Spring Berman

Gautam **Sharma '21**
Robotics and autonomous systems
Using deep reinforcement learning to control a platoon of drones will assist first responders in search and rescue operations.
Mentor: Stephanie Gil

Pallavi **Shrinivas Shintre '20**
Electrical engineering
Studying human behavior in collaborative tasks will help develop robots that effectively and intelligently work with humans.
Mentor: Wenlong Zhang

Education

We are engaged in advancing the ways we educate engineering students. The Fulton Schools' research focuses on learning methods, cognitive theory and best teaching practices, as well as the integration of engineering concepts in K-12 educational programs to engage students early and educate our community about the impact engineering has on everyday life.

F FURI student researchers

Daniel **Anderson**
Mechanical engineering
Developing a method to design and test certain structures for additive manufacturing will help better understand their potential applications.
Mentor: Dhruv Bhate

Darwin **Mick '22**
Mechanical engineering
Designing and constructing a prototype for a lunar rover will help facilitate human exploration on the moon.
Mentor: Hamid Marvi

Kevin **O'Brien '20**
Aerospace engineering
Studying how the sizing of an aircraft's control surfaces impacts its stability will help teach people how to design more efficiently.
Mentor: Timothy Takahashi

Connor **Sonnier '20**
Computer science
Developing a method to quantify students' understanding of the engineering design process will allow for instructors to improve their courses.
Mentors: Haolin Zhu, Tirupalavanam Ganesh

K KEEN supported students

Michael **Amato**
Engineering management
Leveraging high-quality instruction and novel engineering will aid STEM instructors in delivering a powerful learning experience for K-12 students.
Mentor: Dean Bacalzo

Ryan **Bodhipaksha '20**
Engineering (robotics)
Engaging students in a global robotics competition applies the knowledge and skills they have learned to a game-based challenge.
Mentor: Jerry Gintz

Hayden **Brandt '22**
Engineering (electrical systems)
Building an underwater autonomous robot helps improve students' design skills and create industry connections through competitions.
Mentor: Ryan Meuth

Camila **Ibarra '20**
Civil engineering
Learning the foundation and technical aspects of civil engineering through hands-on applications will improve students' skills.
Mentor: Kristen Ward

M MORE student researcher

Cole **Brauer '20**
Engineering
Studying the performance impact of computer-generated material transitions will allow for the design of stronger educational robot components.
Mentor: Daniel Aukes

Guest presenters

Priya **Borah '21**
Biomedical engineering
The SolarSPELL library provides access to existing resources for biomedical equipment technicians and empowers resource-constrained hospitals.
Mentor: Laura Hosman

Karla **Cosio '22**
Electrical engineering
The SolarSPELL library for biomedical equipment technicians is empowering resource-constrained hospitals by providing them access to existing resources.
Mentor: Laura Hosman

Claudia **Fragoso '20**
Biomedical engineering
The SolarSPELL library for biomedical equipment technicians strives to empower individuals in resource-constrained areas by providing access to existing resources.
Mentor: Laura Hosman

"Research is about gaining new scientific knowledge, and how exciting it is that you can be the one to discover it. Don't be afraid to think big, and attention to detail always pays off."

— Anne Silverman (Ranes)
FURI Fall '04–Spring '05
Mechanical engineering '05
Associate professor of mechanical engineering, Colorado School of Mines

Nandini **Sharma '20**
Biomedical engineering
The SolarSPELL library for biomedical equipment technicians is creating a curated set of information that can be accessed anywhere with a Wi-Fi hotspot.
Mentor: Laura Hosman

Ashley **Tse '23**
Biomedical engineering
The SolarSPELL library for biomedical equipment technicians provides offline, digital user manuals, repair guides and more for resource-constrained hospitals.
Mentor: Laura Hosman

Brittine **Young**
Mechanical engineering
From Tattoos to Microchipping: Perceptions and Attitudes Around Body Modification
Mentor: Katina Michael

"FURI taught me diligence, perseverance and rigorous questioning of assumptions."

— Joy Marsalla
FURI Fall '08
Environmental engineering '11
Sustainable chemicals management manager, Nike

Energy

The urgency to discover and deploy new forms of carbon-reducing energy technologies has become an indispensable part of our economic and environmental landscape. The Fulton Schools' research in renewable and alternative energy sources is multifaceted with efforts in solar and photovoltaic energy, biotechnology, low- and high-power energy storage, power electronics, electric power systems, batteries and hydrogen fuel cells.

FURI student researchers

Kareem **Ayoub**
Aerospace engineering
Preparing a method to measure radiative heat transfer between two surfaces and extracting measurements will help quantify heat transfer energy.
Mentor: Liping Wang

Mariana **Bray '22**
Engineering management
Studying the flow and heat transfer properties of 3D-printed, millimeter-scale polymer tubes will aid in designing better heat exchangers.
Mentor: Beomjin Kwon

Austin **Cameron '21**
Engineering (mechanical systems)
Creating methods to rapidly plan microgrid development will lead to the sustainment and resilience of off-grid power projects.
Mentor: Nathan Johnson

Nikolas **Deffigos '21**
Mechanical engineering
Developing a high-temperature heater for a thermophotovoltaic system will help create a more efficient energy conversion method for further study.
Mentor: Liping Wang

Bradley **Fox '20**
Chemical engineering
Studying the modes of heat transfer in a rotary drum will guide industry users to better determine process parameters such as rotation rate.
Mentor: Heather Emady

Mukhtar **Hamzat '21**
Electrical engineering
Developing a process for helping microgrid designers select generation assets and their positions will help minimize cost and losses.
Mentor: Nathan Johnson

Bethany **Kalscheur '21**
Chemical engineering
Genetically engineering bacillus subtilis will increase the efficiency of biofuel production.
Mentor: Arul Varman

Robert **Lattus '22**
Electrical engineering
Testing solar cell materials at different wavelengths and temperatures will help achieve greater efficiency.
Mentor: Michael Goryll

Kristina **Luong '21**
Chemical engineering
Discovering the effectiveness of a cold trap condenser can lead to its use to collect clean water from a pervaporation system.
Mentor: Mary Laura Lind

Anna **Mangus '21**
Chemical engineering
Optimizing cyanobacteria cell health will allow for an efficient photosynthetic-based biofuel production system.
Mentor: César Torres

Nicole **Martin '21**
Chemical engineering
Exploring properties that affect the granulation of pharmaceutical materials can help reduce energy consumption by preventing wastage.
Mentor: Heather Emady

"FURI provided the opportunity to apply classroom knowledge to hands-on projects."

— Alison Gibson
FURI Fall '12–Fall '14
Aerospace engineering '15
Guidance, navigation and control engineer, SpaceX

"FURI improved my confidence in my ability to both independently and collaboratively produce and prototype a novel product."

— Alexandra Aguilar (Hoffman)
FURI Fall '15–Spring '16
Biomedical engineering '16
Patent engineer, Karsten Manufacturing Corporation (Ping Golf)

Christian **Messner '21**
Mechanical engineering
Measuring the radiative heat transfer between two flat plates that are nanometers apart will help build better solar cells.
Mentor: Liping Wang

William **Mulkern '21**
Aerospace engineering
Studying the optical force produced by materials will further advancements and implementation of electronics and space exploration technology.
Mentor: Liping Wang

Christian **Polo '22**
Electrical engineering
Designing an electrolyzer application for a load-managing system will lead to a new, more efficient power transfer system for solar panels.
Mentor: Meng Tao

Anand **Pratap Singh Sengar '21**
Electrical engineering
Designing next-generation antennas to dynamically interact with the wireless environment gives users flexibility to stay connected, everywhere.
Mentor: Georgios Trichopoulos

Mohammad **Salah '20**
Mechanical engineering
Designing a more aerodynamically optimized rocket will help improve the efficiency of space rocket launches and reduce overall costs.
Mentor: Jeonglae Kim

Shane **Skinner '22**
Mechanical engineering
Studying the strength of composites will enable cheaper, safer methods of space travel and more effective warfighting capabilities.
Mentor: Jay Patel

Nicole **Sluder '21**
Mechanical engineering
Studying near-field radiation with phase-shift materials will create more efficient thermal rectifiers for energy transfer.
Mentor: Liping Wang

Maxwell **Stauffer '21**
Aerospace engineering
Designing instruments for aircraft performance measurement will increase aircraft energy efficiency.
Mentor: Timothy Takahashi

Cooper **Tezak '21**
Chemical engineering
The development of a process for recycling solar panels is profitable and makes the technology a truly renewable energy source.
Mentor: Meng Tao

Energy

> **"Break big problems down into smaller, easier to solve ones."**
>
> **— Nathan Kirkpatrick**
> FURI Fall '15–Spring '16
> **Biomedical engineering and English literature '16**
> *Biomedical engineering graduate student, Georgia Institute of Technology and Emory University*

KEEN supported students

Mennatallah **Hussein '21**
Aerospace engineering
Understanding how liquid fuels can augment hydrogen production will help improve fuel cells, autonomous vehicles and other portable power generation.
Mentor: Ryan Milcarek

Matilda **Koa '20**
Mechanical engineering
Developing a polymer composite from silica aerogel to be used as heat insulators will reduce the cost of heating and cooling of homes.
Mentor: Qiong Nian

MORE student researchers

Christopher **Amarquaye '20**
Mechanical engineering
Studying the effect of nanofiller to elastomer ratio in a conductive polymer composite will help determine its electrical conductivity.
Mentor: Qiong Nian

Bhaumik **Bheda '20**
Chemical engineering
Studying the effects of particle size, fill level and rotational speed on heat transfer in rotary drums will enable reduced energy usage.
Mentor: Heather Emady

Yan **Dou '21**
Materials science and engineering
Designing a high-energy-density, holey graphene-based electrode can create opportunities for mobile power supply in varied applications.
Mentor: Qiong Nian

Raj Kumar **Hariharan '21**
Chemical engineering
Designing a novel strategy to reduce carbon dioxide emissions will help minimize the environmental impact of biofuel production.
Mentor: David Nielsen

Nurulhaq **Hasan '20**
Mechanical engineering
Utilizing hydrophobic patterns on the surfaces of heat exchangers will help optimize heat transfer.
Mentor: Beomjin Kwon

Kadiatou **Keita '20**
Mechanical engineering
Enhancing heat transfer in liquid cooling channels will contribute to the advances in heat exchanges and thermodynamic systems.
Mentor: Beomjin Kwon

Zhikai **Liu '20**
Materials science and engineering
Enhancing the process of fabricating flexible perovskite solar cells can be used as a power source for flexible devices.
Mentors: Shahriar Anwar, Terry Alford

David **Manford '20**
Mechanical engineering
Investigating the thermodynamic cycle and efficiency of thermal hydraulic engines will provide a more reliable and efficient use of waste heat.
Mentors: Patrick Phelan, Ronald Calhoun

Molly **Rhodes '20**
Mechanical engineering
Investigating the temperature field evolution during resistance spot welding can improve the durability of electric car batteries.
Mentor: Jay Oswald

David **Tome '20**
Mechanical engineering
Investigating a method to regenerate desiccants for energy-efficient use in vacuum desiccant personal cooling devices will make the devices more useful.
Mentor: Konrad Rykaczewski

Sanjay Kumar **Vijaya Kumar '21**
Engineering (electrical)
Designing advanced antenna surfaces for efficiently redirecting radio waves will enable more efficient wireless communications.
Mentor: Georgios Trichopoulos

> **"When conducting research, always seek to explain every facet of your results. You never know what you might find."**
>
> **— Matthew Jackson**
> FURI Fall '15–Spring '16
> **Electrical engineering '16**
> *Research engineer, Georgia Institute of Technology*

Health

The Fulton Schools' efforts in health innovation range from understanding the causes behind Alzheimer's disease and improving methods for predicting epileptic seizures to developing advanced biosensors, bioassays and lab-on-a-chip devices for clinical diagnostics. Additional areas of research exist in novel biological materials, neural engineering, biomedical informatics, drug-delivery systems, health care systems analysis and modeling, health monitoring devices and human rehabilitation technologies.

FURI student researchers

Brian **Aguilar '24**
Biomedical engineering
Designing an oral drug vehicle to modulate the immune response to rheumatoid arthritis will slow progression and increase patient comfort.
Mentor: Abhinav Acharya

Diego **Barra Avila '20**
Biomedical engineering
Analyzing the effect of host-circuit interactions in cells will improve how people robustly design synthetic gene circuits.
Mentor: Xiaojun Tian

Clayton **Bliss '20**
Mechanical engineering
Modeling the human ankle during walking in variable environments will help design better controllers for lower-extremity wearable robotics.
Mentor: Hyunglae Lee

Sarah **Brady '21**
Biomedical engineering
Designing complex geometries for PEG hydrogels to encapsulate islet cells will help treat type 1 diabetes.
Mentor: Jessica Weaver

Tannis **Breure '21**
Environmental engineering
Determining the effectiveness of biochar as a soil amendment to remove E. coli will prevent future outbreaks.
Mentor: Rebecca Muenich

Stanton **Burnton '20**
Mechanical engineering
Optimizing a motorized ankle-foot orthosis will assist in the rehabilitation process for people suffering from neuromuscular conditions.
Mentor: Hyunglae Lee

Avery **Cartwright '20**
Biomedical engineering
Determining a fibrous tissue model for the testing of a novel surgical device will help standardize the decortication procedure for trapped lung.
Mentor: Olivia Burnsed

Myung **Chung '20**
Biomedical engineering
Studying the effects of applied potential on plasticity will help develop bioelectronics and neurotechnological devices for rehabilitation.
Mentor: James Abbas

Alexandra **Dent '20**
Computer science
Creating new algorithms using EEG, biological and environmental data can help predict epileptic seizures before they occur.
Mentor: Armando Rodriguez

Shae **Diaz '20**
Biomedical engineering
Developing a surgical instrument to assist surgeons with the complicated decortication procedure will help increase the effectiveness of trapped lung treatments.
Mentor: Olivia Burnsed

Devika **Dileep '21**
Biomedical engineering
Designing a therapeutic hand device that utilizes electrical stimulation will help improve hand dexterity in people with spinal cord injuries.
Mentor: James Abbas

Michael **Finocchiaro '21**
Biomedical engineering
Studying oxygenation within tissues via fluorescent nanoprobes will help develop an alternate treatment to insulin injections.
Mentor: Jessica Weaver

Wesley **Groves '20**
Biomedical engineering
Developing a mechanism to actively assist the knee joint during high-risk movements will reduce the risk of joint re-injury.
Mentor: Sydney Schaefer

Teleah **Hancer '21**
Biomedical engineering
Verifying the functionality of octopus arm muscles will advance soft robotics and motor control systems.
Mentor: Hamid Marvi

Sonia **Hernandez '20**
Engineering (robotics)
Designing and 3D-printing an optical lens via micro-continuous liquid interface printing will help create portable microscopes.
Mentor: Xiangfan Chen

Tiffany **Hertzell '20**
Mechanical engineering
Designing a soft robotic exosuit with inflatable fabric-based actuators will provide better lateral support for the ankle in walking rehabilitation.
Mentor: Hyunglae Lee

Nathan **Hui '20**
Biomedical engineering
Designing safe drug delivery solutions for managing pain will help people find better alternatives to opioids.
Mentor: Brent Vernon

Tori **Johnson '20**
Biomedical engineering
Using reusable silicon netting to assist with organ isolation and protection will help decrease surgery time and increase patient outcomes.
Mentor: Brent Vernon

Salma **Leyasi '20**
Biomedical engineering
Characterizing the effect of a ratiometric fluorescent pH sensing nanoprobe in different tissue culture models will help scientists better assess cellular microenvironments.
Mentor: David Brafman

Michelle **Loui '20**
Biomedical engineering
Designing a thermo-responsive liquid embolic agent will create better methods of endovascular therapy for treating ruptured brain aneurysms.
Mentor: Brent Vernon

Alec **McCall '21**
Biomedical engineering
A clinically translatable cell encapsulation strategy would enable the widespread application of islet transplantation to treat diabetes.
Mentor: Jessica Weaver

Margaret **Miller**
Biomedical engineering
Designing a new device for treating tangles of blood vessels in the brain will allow for safe delivery of embolic agents for treatment.
Mentor: Vincent Pizziconi

Fernando **Rangel '20**
Biomedical engineering
Researching ways to model anterior cruciate ligament tear risks and designing a smart knee brace device will help prevent ACL tears.
Mentor: Sydney Schaefer

Anna **Rothweil '20**
Biomedical engineering
A new knee brace electronic platform will provide insights into an athlete's performance and risk of re-injury after knee ligament surgery.
Mentor: Sydney Schaefer

Jinpyo **Seo '21**
Biomedical engineering
Analyzing the effect of size range on microparticles' ability to release drugs and naturally degrade will improve patient safety and satisfaction.
Mentor: Brent Vernon

Bhavya **Sharma '21**
Biomedical engineering
Using stem cells and hyaluronic acid hydrogels that allow cell adhesion, differentiation and survival could lead to better traumatic brain injury treatment.
Mentor: Jeffrey Kleim

Zachery **Shropshire '22**
Biomedical engineering
Studying the comfort and pressure inside the sockets of amputees to give them comfort and stability could change the world of prosthetics.
Mentors: Claire Honeycutt, Marco Santello

Ryan **Szalanski '21**
Electrical engineering
Designing a retractor tool that can be enlarged at the working end will allow neurosurgeons greater freedom of movement during neurosurgery.
Mentor: Junseok Chae

Amanda **Tran '21**
Chemical engineering
Studying ground-based, microgravity protein crystallization unit operation will lead to regenerative medicine applications on Earth and in space.
Mentor: Vincent Pizziconi

Health

Shaun **Victor '23**
Biomedical engineering
Creating a system to track a person's energy expenditure under free-living conditions will lead to more effective weight management.
Mentor: Erica Forzani

Gabrielle **Wipper '20**
Biomedical engineering
Discovering factors driving immune cell migration to mesothelioma tumors using computational biology can benefit patient immunotherapy studies.
Mentor: Christopher Plaisier

Angelea **Wirstrom '22**
Biomedical engineering
Developing a medical imaging software package will improve the planning and outcome of great artery heart defect surgeries.
Mentor: Scott Beeman

Jennifer **Wong '22**
Biomedical engineering
Collecting data to form a baseline for designing and targeting stem cell replacement therapies will mitigate the long-term effects of traumatic brain injury.
Mentor: Sarah Stabenfeldt

Jason **Zhang '20**
Biomedical engineering
Studying the effects of combining visual and tactile modulation of gait will help increase efficacy and retention in stroke patient rehabilitation.
Mentor: Hyunglae Lee

G GCSP student researcher

Nathanael **Borgogni '22**
Chemical engineering
Discovering specific biomarkers for traumatic brain injury will aid in the diagnosis of the condition and pave the way for novel treatments.
Mentor: Sarah Stabenfeldt

K KEEN supported students

Earl **Brown '20**
Biomedical engineering
Developing a novel cancer treatment for resistant types of melanoma will help improve therapeutic strategies.
Mentor: Kaushal Rege

Tanya **Nanda '20**
Biomedical engineering
Tumor cells cultured in the form of spheroids and encapsulated in polymers can provide insight into studying their in-vitro dormancy.
Mentor: Kaushal Rege

Connor **Phillips '22**
Mechanical engineering
Testing the ability of a robotic controller to reduce human muscle activation will increase the efficiency of human-robot interfaces.
Mentor: Hyunglae Lee

M MORE student researchers

Emmanuella **Adjei-Sowah '20**
Biomedical engineering
Investigating the role of certain brain cells in cancer recurrence will identify efficient therapeutic treatments for glioblastoma.
Mentor: Mehdi Nikkhah

James **Arnold '21**
Mechanical engineering
Designing and testing a controller for wearable robots that is safe and stable will help improve their performance in stability, agility and effort.
Mentor: Hyunglae Lee

Earl **Brown '20**
Biomedical engineering
Developing a novel cancer treatment for resistant types of melanoma will help improve therapeutic strategies.
Mentor: Kaushal Rege

Matthew **Chrest '20**
Biomedical engineering
Creating a near infrared multi-modal photoacoustic fluorescence microscopy system will enable in vivo cellular imaging at a larger imaging depth.
Mentor: Barbara Smith

Dakota **Edwards '20**
Mechanical engineering
Needle tracking will help improve targeted drug delivery by providing more accurate delivery and less recovery time for the patient.
Mentor: Hamid Marvi

Glenna Bea **Embrador '20**
Biomedical engineering
Finding the most efficacious and potent HDAC inhibitor drug will help modulate neuroinflammation to improve traumatic brain injury pathology.
Mentor: Sarah Stabenfeldt

Jamie **Handlos '20**
Chemical engineering
Studying chimeric antigen receptor macrophages will help determine if they are a better treatment for B cell lymphoma tumors.
Mentor: Abhinav Acharya

Tanya **Nanda '20**
Biomedical engineering
Tumor cells cultured in the form of spheroids and encapsulated in polymers can provide insight into studying their in-vitro dormancy.
Mentor: Kaushal Rege

Toan **Nguyen '20**
Biomedical engineering
Enriching for edited stem cells using gene editing tools can generate disease-relevant stem cell lines for disease modeling.
Mentor: David Brafman

Alex **Petras '20**
Mechanical engineering
Studying magnetic needle steering for use in minimally invasive surgery will increase precision and control.
Mentor: Hamid Marvi

Souvik **Poddar '20**
Mechanical engineering
Using gait sensing and force haptic feedback in shoe insoles will help provide better rehabilitation.
Mentor: Wenlong Zhang

Omik **Save '20**
Mechanical engineering
Investigating the effect of user-determined variable resistance control of active orthosis will reduce muscle fatigue and improve gait correction.
Mentor: Hyunglae Lee

Sarah **Soaf**
Biomedical engineering
Developing a system for deep-brain stimulation that uses cerebral blood flow rates will help optimize the efficacy of the treatment.
Mentor: Jitendran Muthuswamy

Jordan **Todd '20**
Biomedical engineering
Evaluating nanoparticle use for therapeutic drug delivery will help better treat traumatic brain injury.
Mentor: Sarah Stabenfeldt

"FURI gave me an insight into research and experience that helped me land a spot at Harvard Medical School where I did further research before my PhD."

— Cameron Gardner
FURI Spring '13–Spring '15
Biomedical engineering and finance '15
Graduate student and National Institutes of Health Oxford-Cambridge Scholar

Security

As technology develops at a faster rate, there is a growing need to develop engineering systems to keep people and infrastructure secure, including securing cyberspace, developing secure communications, developing self-healing systems resilient to attack and identifying, monitoring and reducing threats. Fulton Schools researchers — faculty and students — are addressing issues of national defense, homeland security, border security, cyberwarfare and more, devising technology solutions as well as legal, policy and social implications.

FURI student researchers

Lily **Baye-Wallace '20**
Mechanical engineering
Understanding the mechanisms for damage growth is key to the development of predictable defense and armor systems.
Mentor: Pedro Peralta

Shanika **Davis '21**
Electrical engineering
Creating a repeatable, open-source radiation hardening method allows more companies to create radiation robust electronics.
Mentor: Jennifer Kitchen

Joseph **de la Vara '22**
Mechanical engineering
Studying the fracture speed in a glassy polymer as a function of electric resistance and temperature can improve a variety of products.
Mentor: Jay Oswald

Natalya **Gage '20**
Mechanical engineering
Designing a Mars soil sample collection system that prevents contamination will improve the ability to study the planet.
Mentor: Anoop Singh

Marcus **Gambatese '20**
Mechanical engineering
Studying the forces that a basilisk lizard exerts on the surface of the water will improve robots designed to traverse complex terrain.
Mentor: Hamid Marvi

Sebastian **Garcia Peralta '21**
Mechanical engineering
Studying the particle velocity at different locations of a rippled shock front provides a potential new technique to evaluate dynamic strength.
Mentor: Pedro Peralta

Shaurya **Jaisinghani '21**
Industrial engineering
Conducting an economic analysis of fund allocation processes will improve disaster preparedness and mitigation operations.
Mentor: Pitu Mirchandani

Chase **Lee '22**
Aerospace engineering
Developing damage-sensing composites will provide a better understanding of the composite structure and minimize catastrophic failure.
Mentors: Aditi Chattopadhyay, Lenore Dai

Madison **Macias '21**
Mechanical engineering
Assessing non-lethal weapons and technologies around the globe will help develop less-lethal solutions for peace and security applications.
Mentor: Darshan Karwat

Jack **Mester '20**
Mechanical engineering
Comparing the most common mechanical property testing methods of carbon composites will improve future analysis of their structure.
Mentor: Masoud Yekani Fard

Liam **Nguyen '20**
Electrical engineering
Studying the voltage threshold shifts of MOS circuits will improve design practices for radiation-hardened circuits for space applications.
Mentor: Jennifer Kitchen

Alexandra **Schwindt '22**
Chemical engineering
Characterizing mechanical properties of nanocomposites allows military technology to create safer and more effective armor for soldiers.
Mentor: Matthew Green

Yiting **Shi '21**
Electrical engineering
Improving the robustness of signal detectors in the presence of channel distortions has potential impacts in Earth and space exploration.
Mentor: Douglas Cochran

Daniel **Sinclair '20**
Materials science and engineering
Using non-destructive 3D microscopy to measure the corrosion of a key aeronautical alloy over time will improve alloy design and reliability.
Mentor: Nikhilesh Chawla

"The most important thing to remember as a researcher is that it's OK if an experiment fails or if you make a mistake. As long as you learn something from those failures, it was worthwhile. Sometimes failures can tell you much more about your experiment than successes."

— Catherine Millar-Haskell
FURI Fall '14–Spring '15
Biomedical engineering '15
Graduate student, University of Delaware

Tyler **Souders '20**
Aerospace engineering
Allowing designers to simulate shock structures inside of a high-speed engine helps pave the way to higher speed jet engines.
Mentor: Jeonglae Kim

Cole **Truitt '22**
Mechanical engineering
Understanding a material's ability to deform plastically is fundamental in creating secure structures.
Mentor: Jay Oswald

MORE student researcher

Amberly **Ricks '21**
Electrical engineering
Extracting the activation energy of the electrodeposit growth rate will help better understand the temperature dependence of nanoionic devices.
Mentors: Michael Kozicki, Yago Gonzalez Velo

Sustainability

The central thrust behind sustainability is the capacity of metropolitan areas to grow and prosper without destroying or depleting natural resources. The Fulton Schools' research focuses on restoring and improving urban infrastructure, access to clean water and air, advanced construction techniques and management, environmental fluid dynamics, transportation planning, as well as geotechnical and geoenvironmental engineering.

FURI student researchers

Eugene **Agravante '20**
Mechanical engineering
Computational modeling of a specific atomic structure that is efficient at capturing CO_2 from the air can help fight climate change.
Mentor: Houlong Zhuang

Alexandria **Ardente '21**
Mechanical engineering
Self-burrowing robots can help with sensing individuals during search and rescue after a disaster and detecting nutrients in agriculture.
Mentor: Junliang Tao

Dylan **Beck '20**
Chemical engineering
A cost-effective, sustainable ammonia detection sensor can be designed using metal organic frameworks by relying on measurable conductivity changes from gas adsorption.
Mentor: Bin Mu

Ben **Bethke '22**
Mechanical engineering
Optimizing self-boring robot design parameters decreases environmental impact and improves subterranean mobility for underground testing.
Mentor: Hamid Marvi

Daniel **Bruce '21**
Engineering (mechanical systems)
Studying surface irregularities in metal 3D printing will help manufacturers build more resilient parts for end-users.
Mentor: Dhruv Bhate

Yaritza **Cahue '22**
Chemical engineering
Studying the possible effects of carbon-based materials on microorganisms will help create safe production of these substances.
Mentor: Francois Perreault

Bryan **Cocanour '20**
Mechanical engineering
Optimizing 3D-printed inlays through the use of a non-uniform structure will allow for parts with a better strength-to-weight ratio.
Mentor: Qiong Nian

Elmer **Correa '21**
Chemical engineering
Studying the filtration properties of ultra-porous membranes will help create more environmentally friendly ways to treat industrial waste.
Mentor: Bin Mu

William **Ederer '22**
Chemical engineering
Studying the transport of microplastics through soil will inform the agriculture industry to make decisions about sustainable farming.
Mentor: Yuqiang Bi

Dylan **Ellis '21**
Chemical engineering
Altering the metabolic pathways of bacteria will aid in the sustainable production of medicines and other value-added compounds.
Mentor: Arul Varman

Hezekiah **Grayer '20**
Aerospace engineering
The study of entrainment with the detail of computation in convection scenarios is necessary to understand the formation of dust storms.
Mentor: Yulia Peet

"Work toward a concrete goal, like publishing your work."

— Jake Packer
FURI Summer '16–Fall '16
Biomedical engineering '18
Medical student, Tulane University

"FURI ignited my interest in renewable energy research, which led me to pursue a PhD in chemical engineering, and pursue a research career in catalytic conversion of waste materials to produce fuels and specialty chemicals."

— Julie Rorrer
FURI Fall '11–Spring '14
Chemical engineering '14
Postdoctoral research associate, Massachusetts Institute of Technology

Amy **Holladay '20**
Industrial engineering
Studying the benefit and cost structure of paper recycling methods will assist large corporations in improving their sustainability efforts.
Mentor: Adolfo Escobedo

Sean **Innes '21**
Chemical engineering
Designing an improved auto-sampling system for cyanobacteria CO_2 fixation experiments will improve research efficiency.
Mentor: David Nielsen

Marissa **Jimenez '20**
Materials science and engineering
Mixing UV-treated micro-plastics into cement will mitigate plastic waste and enhance the mechanical properties of cement.
Mentor: Christian Hoover

Salma **Ly**
Chemical engineering
Studying the creation of reverse osmosis pretreatment membranes with eletrospinning will help understand its role in removing biological and inorganic contaminants in water.
Mentor: Matthew Green

Lily **McCalmont '20**
Materials science and engineering
Developing a new window film will allow for active reduction of unwanted noise.
Mentor: Matthew Green

Kaci **McMillin '20**
Engineering (mechanical systems)
Studying how engineers and their firms consider the impact of border barriers on wildlife will show the sustainability of such projects.
Mentor: Darshan Karwat

Mark **Nguyen '20**
Chemical engineering
Synthesizing ethyl lactate through E. coli will increase its sustainability and offer an alternative to petrochemical derivatives.
Mentor: Arul Varman

Keiko **Ochoa '21**
Industrial engineering
Conducting an analysis of alternatives for evaporation prevention for the Central Arizona Project will help sustain Arizona's water supply.
Mentor: Joshua Loughman

Abigail **Pezelj '22**
Chemical engineering
Studying electric vehicle upstream emissions will enable engineers to further optimize battery design for efficiency and sustainability.
Mentor: Joshua Loughman

Anirudh **Ranganathan '21**
Aerospace engineering
Mapping the behavior of glassy material fractures allows us to build materials and mechanisms over time that are sustainable, safe and efficient.
Mentor: Jay Oswald

Sustainability

"FURI greatly improved my initiative as an engineer and gave me an opportunity to learn how to learn new and difficult material."

— Max Ruiz
FURI Spring '13–Summer '13
Electrical engineering '16
Software engineer, Ophir Corporation

Cameron **Schwabe '20**
Chemical engineering
Developing porous membranes that can separate mixtures will help with progress in issues such as climate change and renewable energy.
Mentor: Bin Mu

Marcela **Strane '21**
Civil, environmental and sustainable engineering
Studying silver reactions on stainless steel 316 will help improve potable water systems on spacecraft.
Mentor: Francois Perreault

Joseph **Tamakloe '20**
Materials science and engineering
Developing a simple-to-use spectrometer can help reduce post-harvest losses of farm produce.
Mentor: Nathan Newman

Kira **Winsor '20**
Chemical engineering
Engineering cyanobacteria will improve the production of sustainable biochemicals by optimizing growth rate and efficiency.
Mentor: Arul Varman

Kaley **Yazzie '20**
Environmental engineering
Studying atmospheric water capture and the effects location has on water quality parameters will create a source of drinking water when it is otherwise unavailable.
Mentor: Paul Westerhoff

G GCSP student researcher

Omar **Abed '21**
Chemical engineering
Metabolically engineering cyanobacteria will lead to the efficient production of renewable chemicals using sustainable resources.
Mentor: David Nielsen

M MORE student researchers

Husain **Mithaiwala '20**
Chemical engineering
Employing hydrophilic character on the surface of membranes will prevent the effect of fouling and scaling in the water filtration process.
Mentor: Matthew Green

Emily **Nugent '20**
Materials science and engineering
By studying the critical size range of particles, the amount of energy used to produce products in a variety of industries can be minimized.
Mentor: Heather Emady

Heidi **Pankretz '20**
Mechanical engineering
Understanding how nanoscale damage at the interphase impacts the overall properties of a polymer matrix composite will show how it affects the sustainability of the material.
Mentor: Masoud Yekani Fard

Kiarash **Ranjbari '21**
Environmental engineering
Controlling the rate of silver release will help to increase efficiency in water treatment systems on the International Space Station.
Mentor: Francois Perreault

"Don't be afraid — to ask questions, to talk to your student mentor, to talk to your faculty mentor, to get bad research results to get a failed experiment — that's how you grow."

— Julia King
FURI Fall '14–Spring '15
Chemical engineering '16
Chemical engineering doctoral student, University of Washington

Mentors

What is a faculty mentor?

Fulton Schools faculty members guide students through the research process in their role as FURI and MORE research program mentors. Throughout the semester-long program, mentors meet with their student researchers one-on-one and in lab settings for training, professional etiquette coaching and to serve as their students' guide for writing abstracts and designing research posters. Faculty mentors provide advice and professional development opportunities, including submitting research to conferences, applying for travel grant funding, submitting papers for publication and discussing career goals.

How to get involved

Do you have students conducting research in your lab? Encourage them to apply for FURI or MORE research funding. Faculty members can mentor up to five students in each program per semester.

Students will submit their research proposal, five research references, timeline, budget, personal statement, résumé and unofficial transcript in their FURI or MORE application. Then faculty mentors are prompted to submit a Faculty Mentor Proposal Support Letter. If the application is accepted by the faculty committee, the student and faculty member will receive FURI or MORE funding for the semester.

If you don't currently have undergraduate or graduate student researchers and would like to find qualified researchers, you can post your research opportunity for students to connect with you.

Find out more at furi.engineering.asu.edu

James **Abbas**
Associate professor

Abhinav **Acharya**
Assistant professor

Terry **Alford**
Professor

Ahmed **Alkhateeb**
Assistant professor

Shahriar **Anwar**
Research specialist senior

Daniel **Aukes**
Assistant professor

Dean **Bacalzo**
Assistant professor, ASU Herberger Institute for Design and the Arts

Scott **Beeman**
Assistant professor

Heni **Ben Amor**
Assistant professor

Spring **Berman**
Associate professor

Dhruv **Bhate**
Associate professor

Yuqiang **Bi**
Assistant research professor

David **Brafman**
Assistant professor

Chris **Bryan**
Assistant professor

Olivia **Burnsed**
Lecturer

Ronald **Calhoun**
Associate professor

Junseok **Chae**
Professor

Aditi **Chattopadhyay**
Professor

Nikhilesh **Chawla**
Professor

Xiangfan **Chen**
Assistant professor

Douglas **Cochran**
Emeritus professor

Lenore **Dai**
Professor

Deanna **Delp**
Lecturer

Heather **Emady**
Assistant professor

Adolfo **Escobedo**
Assistant professor

Ahmed **Ewaisha**
Lecturer

Erica **Forzani**
Associate professor

Tirupalavanam **Ganesh**
Associate research professor

Stephanie **Gil**
Assistant professor

Jerry **Gintz**
Lecturer senior

Yago **Gonzalez Velo**
Assistant research professor

Michael **Goryll**
Associate professor

Matthew **Green**
Assistant professor

Claire **Honeycutt**
Assistant professor

Christian **Hoover**
Assistant professor

Laura **Hosman**
Associate professor

Suren **Jayasuriya**
Assistant professor

Nathan **Johnson**
Assistant professor

Darshan **Karwat**
Assistant professor

Jeonglae **Kim**
Assistant professor

Jennifer **Kitchen**
Assistant professor

Jeffrey **Kleim**
Associate professor

Michael **Kozicki**
Professor

Anthony **Kuhn**
Lecturer

Beomjin **Kwon**
Assistant professor

Hyunglae **Lee**
Assistant professor

Mary Laura **Lind**
Associate professor

Joshua **Loughman**
Lecturer

Hamid **Marvi**
Assistant professor

Ryan **Meuth**
Lecturer senior

Katina **Michael**
Professor

Ryan **Milcarek**
Assistant professor

Pitu **Mirchandani**
Professor

Bin **Mu**
Assistant professor

Rebecca **Muenich**
Assistant professor

Nathan **Newman**
Professor

Qiong **Nian**
Assistant professor

David **Nielsen**
Associate professor

Mehdi **Nikkhah**
Assistant professor

Jay **Oswald**
Associate professor

Jay **Patel**
Lecturer

Yulia **Peet**
Assistant professor

Pedro **Peralta**
Professor

Francois **Perreault**
Assistant professor

Patrick **Phelan**
Professor

Vincent **Pizziconi**
Associate professor

Christopher **Plaisier**
Assistant professor

Kaushal **Rege**
Professor

Yi **Ren**
Assistant professor

Andrea **Richa**
Professor

Armando **Rodriguez**
Professor

Konrad **Rykaczewski**
Associate professor

Marco **Santello**
Professor

Mohamed **Sarwat**
Assistant professor

Sydney **Schaefer**
Assistant professor

Anoop **Singh**
Lecturer

Barbara **Smith**
Assistant professor

Sarah **Stabenfeldt**
Associate professor

Timothy **Takahashi**
Professor of practice

Junliang **Tao**
Associate professor

Meng **Tao**
Professor

Xiaojun **Tian**
Assistant professor

César **Torres**
Associate professor

Georgios **Trichopoulos**
Assistant professor

Arul **Varman**
Assistant professor

Brent **Vernon**
Associate professor

Liping **Wang**
Associate professor

Kristen **Ward**
Lecturer

Jessica **Weaver**
Assistant professor

Paul **Westerhoff**
Professor

Nong **Ye**
Professor

Masoud **Yekani Fard**
Assistant research professor

Wenlong **Zhang**
Assistant professor

Haolin **Zhu**
Lecturer senior

Houlong **Zhuang**
Assistant professor

Where are they now?

Each semester we invite FURI alumni to share where they are now as they embark on their careers or the pursuit of advanced degrees. They also look back on how FURI helped them build valuable skills, learn about themselves and succeed in their current endeavors. Over the past four semesters, 151 FURI alumni responded to our surveys.

- Industry - 54%
- Obtaining an advanced degree - 26%
- Medical school/medicine - 8%
- Academia - 5%
- Government - 4%
- Startup ventures - 1%
- Other - 1%

34%
of FURI alumni in Arizona

64%
of FURI alumni in the U.S.

2%
of FURI alumni around the world

Top companies employing our alumni

American Express
Apple
Blue Origin
Boeing
Centers for Disease Control and Prevention
Cisco Systems
U.S. Department of Defense
General Dynamics
Google
Honeywell Aerospace
Intel Corporation
Lockheed Martin
Medtronic
Microsoft
NASA
Nike
Northrop Grumman
NVIDIA
Phoenix Children's Hospital
Raytheon Missile Systems
SpaceX
W. L. Gore & Associates

FURI alumni are...

...working exciting careers

Alexandra Aguilar (Hoffman) is a patent engineer at Karsten Manufacturing Corporation (Ping Golf).

Priya Ball (Challa) is a propulsion engineer at Blue Origin.

Celia Barker is a product manager at the National Cancer institute.

Alison Gibson is a guidance, navigation and control engineer at SpaceX.

Omar Habib is a senior software development engineer at Apple, Inc.

Matthew Jackson is performing underwater acoustics research at Georgia Tech and applying the signal processing skillset he learned at ASU.

Elisabeth Perea (McLaughlin) is a chemical engineer conducting research for commercial and government clients at nonprofit scientific research institute and organization SRI International.

Alex Weir is the global director of supply chain for Olin Chlor Alkali Products.

Shaun Wootten creates innovative, personalized dermatology products and medical devices as director of R&D at Aesthetics Biomedical, Inc.

...pursuing advanced degrees and working in academia

Nicholas Berk is a law student at Harvard Law School.

Michael Machas is a lecturer at ASU.

Gabe Oland is in his general surgery residency at UCLA and designing medical devices.

Andrew Payne is pursuing a doctorate in addiction neuroscience at Brigham Young University.

Anne Silverman (Ranes) is an associate professor of mechanical engineering at the Colorado School of Mines.

Joana Sipe is pursuing her doctorate in environmental engineering at Duke University.

...starting their own companies

Rick Ahlf is the co-founder and chief technology officer of 6-4-3 Charts, which provides weekly advanced scouting reports and analytics for baseball.

Taylor Graber is running a company revolving around a patent for a biomedical device that facilitates airway management for anesthesiologists, and a company called ASAP IVs, which provides on-demand IV therapies for hydration, wellness, immunity boosting and athletic performance recovery.

"The project-based research fundamentals and skills that I learned through FURI allowed me to pursue and succeed in a research-based career without the need for a doctoral degree."

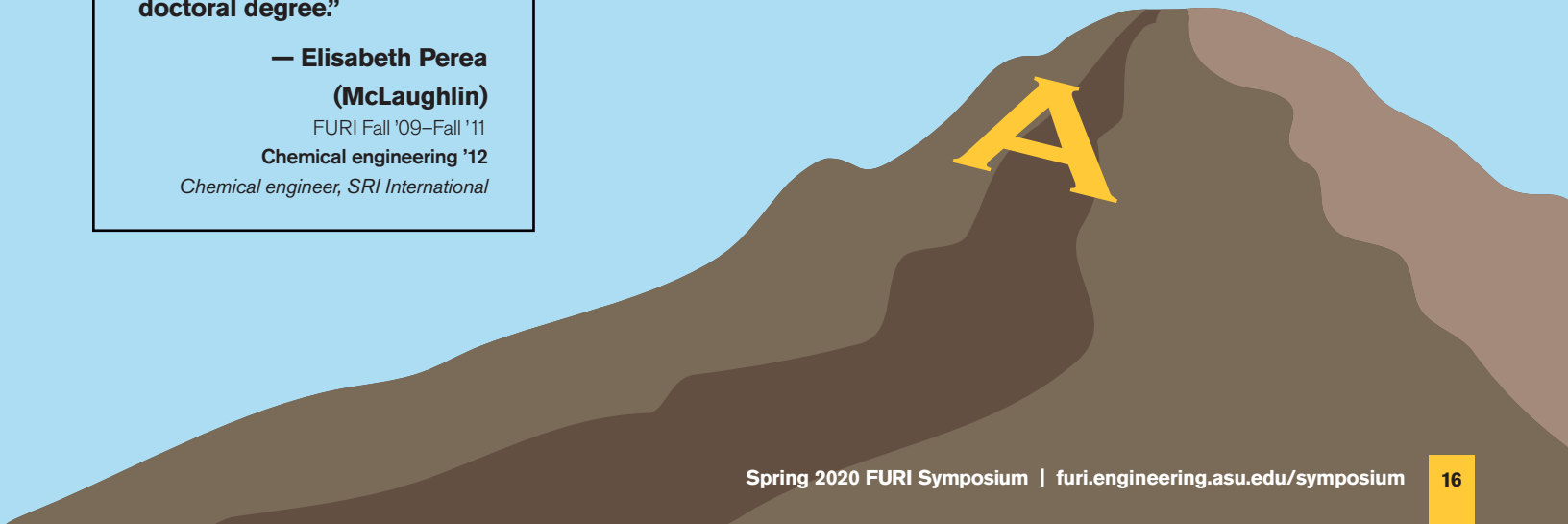
— Elisabeth Perea (McLaughlin)
FURI Fall '09–Fall '11
Chemical engineering '12
Chemical engineer, SRI International

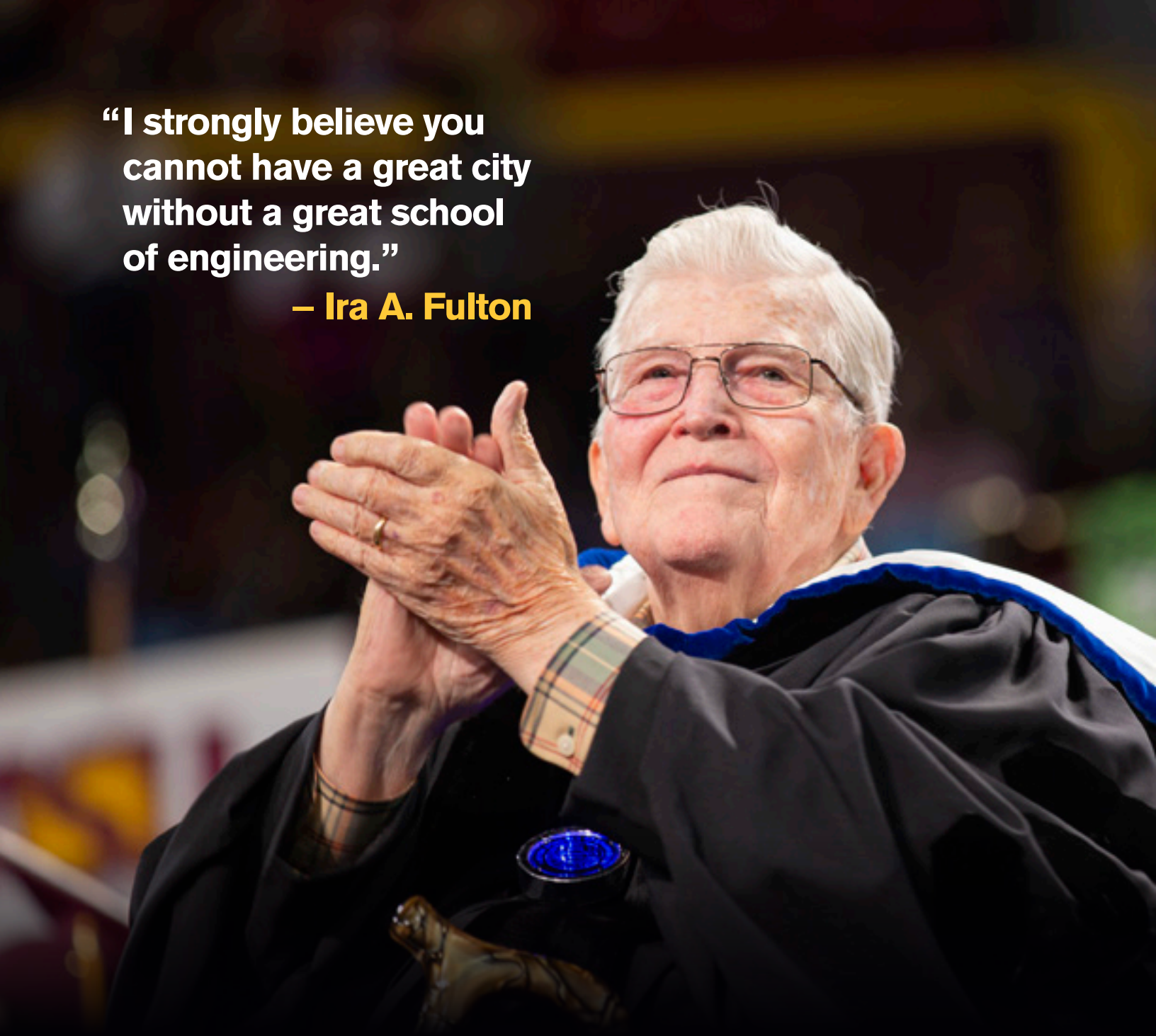
"Spend as much time as you can in the lab and keep industry skills in mind. It is probably the most transferable experience in respect to skills when going into industry."

— Shaun Wootten
FURI Fall '14–Spring '16
Biomedical engineering and biochemistry '17
Director of R&D, Aesthetics Biomedical, Inc.

"FURI gave me the foundation that I now use every day in graduate school."

— Nathan Kirkpatrick
FURI Fall '15–Spring '16
Biomedical engineering and English literature '16
Biomedical engineering graduate student, Georgia Institute of Technology and Emory University





“I strongly believe you cannot have a great city without a great school of engineering.”

– Ira A. Fulton

Fueling innovation, building engineers

At Arizona State University, we’ve been educating engineers for Arizona and the world for nearly 60 years. With more than 20,000 students, we are building the engineers of the future and pursuing the discoveries and solutions to challenges facing society.

In 2003, Ira A. Fulton, founder and CEO of Arizona-based Fulton Homes, established an endowment of $50 million in support of ASU’s College of Engineering and Applied Sciences.

His investment served as a catalyst, enabling the development of a dynamic portfolio of strategic initiatives that benefit our students and faculty and the communities where they live and work.

Throughout the years, Ira A. Fulton has remained an active supporter of the school that bears his name. He is a familiar face to students and a regular presence at events such as this semiannual FURI Symposium.