

Fulton Chair Ira A. Fulton Schools of Engineering











The Ira A. Fulton Schools of Engineering (Fulton Schools or FSE) at Arizona State University seeks to attract a highly select group of the nation's most distinguished faculty and industry leaders to FSE to serve in the position of Fulton Chair.

Motivation for the current opportunity finds inspiration in Arizona's New **Economy Initiative: Enhancing Arizona's Competitiveness** that aims to lead Arizona into the New Economy driven by discovery, knowledge and innovation, and anchored by a philosophy of opportunity for all. This initiative is a key element of ASU's major expansion of FSE to position it as one of the top 15 engineering schools in the U.S. The Fulton

D

Chair in the Fulton Schools will be supported by the initiative and ASU, as well as private philanthropy.

One of the nation's top public universities and ranked #1 in Innovation by U.S. News & World Report, ASU is well underway in its reinvention of higher education as the New American University. ASU has developed numerous new programs and units that defy and bridge disciplinary boundaries to enable the exploration and discovery of new knowledge, while developing practical solutions to serve Arizona and the world at large. ASU has strong and simultaneous commitments to educational access. research and teaching excellence and assumes significant responsibility

for the cultural, social and economic vitality of its surrounding communities in the metropolitan Phoenix region and beyond.

One of the fastest growing research enterprises in the nation. ASU has created a vibrant environment of discovery, interdisciplinary research and innovation focused on addressing society's greatest challenges. Its research expenditures have nearly tripled over the last decade, totaling more than \$670 million last year. ASU is well on its way to expanding the university's research enterprise to over \$800 million in expenditures by 2025. The Fulton Schools will play a pivotal role in this exciting expansion.



Ira A. Fulton Schools of Engineering research and innovation

The Fulton Schools of Engineering is achieving new levels of national and international prominence as it grows its global leadership in engineering education, research and innovation at scale.

The Fulton Schools of Engineering research enterprise is at the cuttingedge of use-inspired research and is leading critical national initiatives.

This includes being the lead institution on two National Science Foundation Engineering Research Centers (ERCs) and partner on one other ERC whose breakthrough discoveries are leading to new paradigms in geotechnical engineering, photovoltaics, clean water technologies and the modern electrical grid.

The Fulton Schools is also home to dozens of research centers that capitalize on faculty expertise and span areas that include additive manufacturing, artificial intelligence, bioelectronics, cybersecurity, communication systems, emerging materials, energy, engineering education, regenerative medicine, robotics, sustainability, transportation, and more.

FSE faculty are actively involved in many of ASU's university initiatives, including collaborative research activities with the Biodesign Institute, and the Julie Ann Wrigley Global Futures Laboratory (including the Global Institute of Sustainability and Innovation). Through these and other initiatives, Fulton Schools researchers connect across their disciplines to team in pursuit of transdisciplinary and convergent research engagements.

The Fulton Schools of Engineering research enterprise is characterized by discoveries of foundational value and advancement of ideas and technologies of translational impact, as evidenced by the fact that FSE is among the top engineering colleges in the country for invention disclosures, issued U.S. patents and startups (per \$10 million of research expenditures, according to Association of University Technology Managers (AUTM)).

The university's research, innovation and entrepreneurship efforts, and technology transfer are facilitated through Skysong Innovations, ASU's technology transfer arm, which helps researchers successfully navigate the path to launching startups and commercialization of their technologies.

New Economy Initiative

The State of Arizona enjoys its current position as a leader in job growth and economic prosperity. To ensure this growth and prosperity, the Arizona Board of Regents has developed a plan to serve the state in the face of significant new forces that will transform our economy. **The New Economy Initiative: Enhancing Arizona's Competitiveness** is based on accelerating the transformation of Arizona's three universities

into adaptive drivers of Arizona's economic success: **Enhance** the universities' capacity to prepare more graduates for critical New Economy areas that will allow Arizona to compete in the new high speed, digital economy of the fourth industrial revolution (where technologies combine hardware, software, and biology, informed by high-speed change from AI, autonomous systems, 3D distributed manufacturing, etc.);

Support the universities to compete more aggressively for major, national research grants

that focus on transformative ideas, innovative technology and emerging economy business startups that drive productivity for Arizona;

Continue the Governor's efforts to expand career and technical training in specialized areas; and

Raise the high school graduation rate and the college-going rate of Arizonans, particularly those least likely to complete high school and attend college.



Science and Technology Center Outcomes



Creation of high-value jobs

Technology startups with AZ founders and innovators

Retention of more than **4,000 skilled** engineering grads per year

Partnerships with established AZ technology companies



Workforce training

Hands-on research experience produces thought leaders

Entrepreneurial training paves way from lab to captured value

,fa

Attraction and retention of leading corporations

People, facilities, intellectual leadership

Partnerships and acquisition opportunities for established companies

Return on Investment for Arizona in the New Economy

FSE Current Goal 16,800 In-person 25,000 In-person 7,100 Online 15,000 Online 4,200 Graduates 6,000 Graduates 6,000 First-generation students >90% Average starting salary 5,300 Female students #1 U.S. producer of technical talent 4,800 Hispanic students * U.S. producer of technical talent

Faculty

Students

- 350 Faculty
- 25 Young investigator awards
- 804 Invention disclosures
- 35 Startups
- #26 Worldwide in patents

Research

\$115M Research output 2 Engineering research centers

\$44M DARPA awards

8 Industry/University research collaborative centers \$215M Research output 250+ New industrial partnerships

#5 Worldwide in patents (2x output)

100 New faculty

Arizona Benefit

\$14B over 20-year increased income impact

>15x return on public investment

5x multiplier on job growth



ASU New Economy Initiative

ASU's New Economy Initiative represents a bold effort to ensure that Arizona is prepared for the fourth industrial revolution — which will fundamentally change the way we live, work and relate to one another — and the accompanying future of high employment, strong economic growth and resilience to economic shocks. The initiative is comprised of three primary components:

Grow the Fulton Schools of Engineering

Invest in the Fulton Schools of Engineering to:

- Grow FSE's world class faculty to accelerate research intensity to the levels of Stanford, MIT and Georgia Tech.
- Broaden student access and graduate more than 5,000 engineers by 2025.
- Complete the launch of a global school alliance for engineering design.
- Emerge as a top 15 U.S. engineering college.
- Make the Phoenix metro one of the largest producers of technology, talent and innovation.

Science and Technology Centers

Invest to establish five Science and Technology Centers (STCs) that will foster the growth of New Economy industries in energy, materials and devices; human performance; extreme environments; advanced manufacturing and future communications technologies. These STCs will produce a significant return on public investment, driving job creation, hundreds of new industrial partnerships and startups, and advance STEM education and workforce training. Test centers are in play through current partnerships and are already yielding promising results. Together with ASU faculty, the STCs will empower engineering linkages around the world and propel ASU forward as a top 5 university patent provider and a top 10 university tech transfer center.

Development and Expansion of Education Programs

Invest in faculty, instructional space, experiential learning programs, and student support services. This investment will shorten the time to earn a degree and increase education options for current students. It will also be used to accelerate the development and deployment of new ways of learning across New Economy fields as well as new hybrid learning and training models for workforce readiness. In addition, this investment will be used to develop content packaged as stackable certificates, micro-degrees, badges and other credentials that provide a flexible and cost-effective way to keep skills up to date in areas that are experiencing unprecedented change. New adaptive learning platforms, Al-infused advising platforms, and portals will be included and faculty numbers increased, to serve an expanded student and lifelong learning population.







Fulton Chair

ASU seeks to attract the most distinguished and exceptional scholars and industry leaders to the Ira A. Fulton Schools of Engineering with the appointment of ten Fulton Chairs.

This cohort is expected to be comprised of the most distinguished engineering faculty and industry leaders in the country as evidenced by their scholarly, research, teaching and service achievements and noted membership in the National Academy of Engineering, National Academy of Sciences, or National Academy of Medicine.

The Fulton Chair will be an endowed professorship or professor of practice who comes from industry with an appointment in one of FSE's schools:

School of Biological and Health Systems Engineering School of Computing and Augmented Intelligence School of Electrical, Computer and Energy Engineering School for Engineering of Matter, Transport and Energy School of Sustainable Engineering and the Built Environment School of Manufacturing Systems and Networks The Polytechnic School

FSE welcomes as Fulton Chairs those who are seeking to move their existing research center to ASU or propose a vision for a new center at ASU. Both of these opportunities would come with resourcing appropriate to transition and/or start a new initiative. This position will have a reduced teaching load (negotiable) for the academic year.

The salary for this position will be commensurate with similar positions at top research universities, as will the relocation package. ASU is supportive of dual-academic career families.





The Ira A. Fulton Schools of Engineering

is the largest and one of the most comprehensive engineering schools in the nation and is excelling in its mission to educate engineers and inspire innovation. In fact, one out of every five students at ASU is a Fulton engineer or technologist. FSE's strategic goals center on advancing research and innovation at scale, revolutionizing engineering education, and expanding global outreach and partner engagement.

FSE's differentiating hallmark is the "Fulton Difference" that is grounded in the following principles:

- A focus on student success in the classroom and beyond.
- Excellence in research from discovery to application and in engineering education.
- An acceleration of use-inspired research and entrepreneurial engagement.
- Engagement with stakeholders in industry and the community.
- Drive to make global impacts.



"Catalyzed in part by the incredible talent pool resulting from **ASU's strong** commitment to engineering education and research, Arizona is becoming a prime location for advanced engineering and technology development," says Kyle Squires, dean of the Ira A. Fulton Schools of Engineering. "The Fulton Chairs will lead the Fulton Schools' efforts to support our growth, leadership, enhance competitiveness and power future industries through research discoveries, technology transfer and partnerships."

Kyle D. Squires serves as the dean for the Ira A. Fulton Schools of Engineering at Arizona State University. With nearly 25,000 enrolled students, the Fulton Schools of Engineering is the largest and one of the most comprehensive engineering schools in the United States, offering 25 undergraduate degrees and over 50 graduate degree programs across seven schools of academic focus.

Professor Squires leads the advancement of the Fulton Schools with a focus on global leadership in engineering education and research and innovation at scale. From discoveries that impact engineers and technologists' fundamental understanding of their fields to translating research into entrepreneurial endeavors, the Fulton Schools is committed to conducting use-inspired research.

A professor of mechanical and aerospace engineering, Squires has held numerous visiting appointments in the United States, Japan and France and was elected a fellow of the American Physical Society in 2008. He holds a Bachelor of Science in mechanical engineering from Washington State University and master's and doctoral degrees in mechanical engineering from Stanford University.

Fulton Schools National Academy of Engineering members



Regents Professor **Ronald Adrian** joined the ASU faculty from the University of Illinois as an NAE Member and continues to make innovative contributions in his field with the Fulton Schools of Engineering.

He is an expert in turbulence fluid motion and developing techniques to explore its space-time structure. Adrian has contributed many new concepts, techniques and measurements to new fields in particle image velocimetry, fluid flow velocity, particle tracking and more.

Adrian was part of a bold proposal to develop the nearly 2,000-mile stretch of borderlands between the United States and Mexico as an innovation zone. Called the Future Energy, Water, Industry and Education Park Initiative, the zone would support the testing, production and deployment of technologies and systems to meet the growing needs for energy, water and food in the United States and Mexico. The plan calls for private business enterprises, public facilities, and research and education centers.

Adrian's expertise in turbulent flow would address challenges of flow resistance from pumping fluids such as desalinated water through pipes spanning nearly 1,000 miles. A section of the pipeline could also be made into an experimental facility to study turbulent flow over surfaces, a facility highly beneficial to Adrian's research community.

Adrian holds eight U.S. patents and patent applications for his work. He has also held many influential positions in professional organizations and committees in his field, and is listed by ISI Web of Science as one of the 250 Most Highly Cited Researchers in Engineering.◆



NAE Member **Dimitri Bertsekas** has a history of pioneering work in optimization and control theory, as well as a focus in the exciting field of reinforcement learning, which applies artificial intelligence and machine learning to large and challenging decision problems in a wide variety of engineering contexts.

Since Bertsekas joined the ASU faculty as the Fulton Chair of Computational Decision Making from the Massachusetts Institute of Technology in 2019, he has established new reinforcement learning research and education initiatives.

He has collaborations with other Fulton Schools faculty members on projects involving multi-robot service systems, RNA folding, structure maintenance scheduling, blood supply replenishment scheduling and economic power generation planning. A recent paper in the IEEE/CAA Journal of Automatica Sinica introduced a new approach to rollout and policy iteration algorithms to improve complex sequential decision-making.

Bertsekas' other research foci include artificial intelligence, optimization, linear and nonlinear programming, data communication networks, parallel and distributed computation.

He also developed a new researchoriented course on reinforcement learning, which allows students to initiate graduate-level research on emerging topics across engineering disciplines. Through this effort, Bertsekas is providing an infrastructure to explore the common boundary between optimal control and artificial intelligence, which is accessible to students and researchers in either field.

Bertsekas is consistently recognized for his research and teaching excellence and he has authored nearly 20 books and numerous research papers and monographs.



Regents Emeritus Professor **Gerald Heydt** is a world-recognized academic whose seminal work in power engineering has impacted industry, higher education teaching and students for more than four decades. He is a pioneer in the field of electric power quality, and his influential contributions span power engineering fields, including electric power transmission and distribution networks.

Heydt joined the ASU faculty after more than 25 years at Purdue University. His contributions to the technology of electric power quality earned him the distinction of NAE Member.

He has worked with colleagues to grow the ASU power engineering program into the largest and most prominent in the country. He has been recognized for his dedication to student success, and his students have gone on to have impactful careers.

With fellow NAE Member Vijay Vittal and their colleagues, Heydt helped develop AzSMART, an analysis system for evaluating the impacts of introducing significant solar power generation in Arizona.

Heydt, who is also a fellow of the IEEE, has written two books on power engineering and served as a program manager of the National Science Foundation program in power systems engineering. He also draws from industrial experience with power companies and the United Nations Development program.

In addition to power engineering, Heydt is an expert on power systems and computer analysis of large systems.

Fulton Schools National Academy of Engineering members



Regents Professor **Edward Kavazanjian, Jr.,** P.E., G.E., is a world-renowned leader of geotechnical engineering. He joined the faculty at ASU after 20 years working in industry, which was preceded by seven years as a faculty member at Stanford University.

The NAE Member is recognized for his research expertise in infrastructure development and the design of waste containment systems, with a focus on seismic design. Kavazankian is one of the leading geotechnical engineering experts on the reduction of soil liquefaction to help prevent damage from earthquakes.

Kavazanjian directs the Center for Biomediated and Bio-inspired Geotechnics, known as CBBG, a National Science Foundation Engineering Research Center dedicated to developing sustainable and resilient solutions involved in the development, maintenance and protection of civil infrastructure. The NSF recently approved \$17 million to support CBBG for the next five years.

He has co-authored U.S. Federal Highway Administration design guidance documents on geotechnical earthquake engineering for highways and U.S. Environmental Protection Agency design guidance for seismic design of municipal solid waste landfill facilities. He routinely serves in leadership roles on boards and committees, which have included advisory positions with the National Research Council of the National Academies of Science and Engineering and the federal Transportation Research Board.

He continues to drive efforts that are putting ASU at the leading edge of geotechnical engineering education and producing a new generation of engineers equipped to confront formidable sustainability challenges around the world.



Regents Professor **Bruce Rittmann** is an international leader in using microbial communities to provide beneficial services to society.

Rittmann, an NAE Member, joined the ASU faculty from Northwestern University and has become one of the most highly cited researchers according to the Institute for Scientific Information.

He is the director of the Biodesign Swette Center for Environmental Biotechnology, which harnesses the metabolic diversity of microorganisms to generate renewable energy, clean water and soil, and improve human health.

He leads ASU teams in renewable bioenergy research, including work to use anaerobic microbes to convert biomass into energy, and photosynthetic bacteria to produce liquid fuels from sunlight and biomass. Rittmann also collaborates with the Mayo Clinic to explore how microbes in the gut contribute to obesity.

Rittmann invented the membrane biofilm reactor, which uses naturally occurring microorganisms to remove contaminants from water. He holds five patents for this technology, which is being commercialized.

Additionally, he holds 17 total patents and has published more than 720 journal articles, books and book chapters. His textbook, titled Environmental Biotechnology: Principles and Applications, is used by universities worldwide.

Rittmann was awarded the first Clarke Prize for Outstanding Achievements in Water Science and Technology from the NWRI and was a co-winner of the 2018 Stockholm Water Prize, among many other influential awards.



Regents Professor **Vijay Vittal** came to ASU from Iowa State University after being named an NAE Member. He has consistently conducted groundbreaking work in implementing renewable energy into the electric grid and on the concept of "islanding" to make the grid more resilient to cascading outages. His current research interests include machine learning applications for power systems and using power system measurements to improve mathematical models.

A pioneer in power system dynamics, Vittal has helped develop ASU's power and energy program into one of the top programs in the world, attracting top graduate students and substantial grants from the Advanced Research Projects Agency-Energy and U.S. Department of Energy. He recently updated ASU's power system simulation laboratory, which has the most sophisticated power system analysis software of any U.S. university laboratory.

In his work with the IEEE Power and Energy Society, in which he has served as Vice President of Technical Activities, Vittal surveyed utilities around the world on the impact of the COVID-19 pandemic on the electric grid. He also prepared a white paper and a popular webinar on how COVID-19 is impacting technical activities.

Vittal has an extensive publishing history, and the recent advanced power system stability textbook he co-authored has now been adopted by several universities.

Until 2020, Vittal served as director of the Power Systems Engineering Research Center, the National Science Foundation-funded Industry-University Cooperative Research Center that has put ASU and the Fulton Schools at the forefront of modernizing the electric grid.◆



Diversity and Inclusion

Arizona State University is deeply committed to positioning itself as one of the great new universities by **seeking to build excellence,** enhance access and have a positive impact on its community, state, nation and the world. To do that requires ASU faculty and staff to reflect the intellectual, ethnic and cultural diversity of our nation and the world at large so that students learn from the broadest perspectives, and we engage in the advancement of knowledge with the most inclusive understanding possible of the issues we are addressing through our scholarly activities. Diversity and inclusion are integral to ASU's commitment to excellence in research, engagement and education.

Candidates who have demonstrated experience in fostering an inclusive environment and incorporating diverse perspectives in research and the classroom are strongly encouraged to apply.

Research centers, institutes and initiatives

Engineering Research Centers (ERCs)

Center for Bio-mediated and Bio-inspired Geotechnics (CBBG) [Lead] Quantum Energy and Sustainable Solar Technologies (QESST) [Lead] Nanotechnology Enabled Water Treatment (NEWT) Systems Center [Partner]

Center of Excellence

DHS Center for Accelerating Operational Efficiency

research.engineering.asu.edu

NSF Industry-University Cooperative Research Centers (IUCRCs)

Building Reliable Advances and Innovation in Neurotechnology (BRAIN) Center Center for Embedded Systems Connection One Efficient Vehicles and Sustainable Traffic Systems Power Systems Engineering Research Center (PSERC) Sensor, Signal and Information Processing Center (SenSIP)

Water and Environmental Technology Center (WET)



Centers

Adaptive, Intelligent, Materials and Systems (AIMS) Arizona Center for Algae Technology and Innovation (AzCATI) ASU — Mayo Imaging Informatics Center (AMIIC) Center for Adaptive Neural Systems Center for Applied Nanoionics Center for Assured and Scalable Data Engineering (CASCADE) Center for Bioelectronics and Biosensors Center for Biosignatures Discovery Automation Center for Cognitive Ubiquitous Computing (CUbiC)

Center for Complex System Safety (CCSS) Center for Computational Nanoscience Center for Solid State Electronics Research Center for Cybersecurity and Digital Forensics Center for Environmental Security Center for Human/Artificial Intelligence/Robot Teaming Center for Negative Carbon Emissions Center for Photonics Innovation **Center for Wireless Information** Systems and Computational Architectures

Decision Theater Flexible Electronics and Display Center **Global Security Initiative** Human Machine Integration Lab Industrial Assessment Center LightWorks Metis Center for Infrastructure and Sustainable Engineering National Center of Excellence on **SMART** Innovations Swette Center for Environmental Biotechnology **Teaching Old Models New Tricks** (TOMNET) The Solar Power Laboratory

Arizona State University

has developed a new model for the American research university, creating an institution committed to excellence, access and impact — the New American University: A comprehensive public research university, measured not by whom it excludes, but by whom it includes and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves.

Eight design aspirations guide the ongoing evolution of ASU. These institutional objectives are integrated in innovative ways throughout the university to achieve excellence, access and impact.

- Leverage Our Place
- Enable Student Success
- Transform Society
- Fuse Intellectual Disciplines
- Value Entrepreneurship
- Be Socially Embedded
- Conduct Use-Inspired Research
- Engage Globally

For the sixth year in a row, Arizona State University was named the most innovative university in the nation, recognizing the university's culture of groundbreaking research and partnerships, as well as its commitment to helping students thrive in college and beyond.

The ASU faculty is at the forefront nationally in advancing research and discovery. The university's more than 3,400 faculty members inspire new ways of thinking, innovating and solving problems socially, culturally and economically in our region and in the international community. ASU has doubled its research funding and been recognized as one of the fastest-growing research universities in the nation over the past 10 years. ASU reported more than \$670 million last year in research expenditures in 2020, up from \$660 million the prior year.

- ➡ 5 MacArthur fellows
- 5 Nobel laureates
- 7 Pulitzer Prize winners
- 9 National Academy of Engineering members
- 36 Guggenheim fellows
- 143 National Endowment for the Humanities fellows

- 251 Fulbright American Scholars
- 25 National Academy of Sciences members
- 3 National Academy of Medicine members
- 7 National Academy of Education members
- 8 National Academy of Public Administration members

Greater Phoenix

Greater Phoenix is known for year-round sun, desert beauty, sophisticated urbanscapes, southwest culture, and so much more.

Climate

Enjoy 300 days of sunshine a year and an average temperature of 76 degrees.

Arts and Culture

Greater Phoenix is a rich arts and culture environment, with diverse museums, theater, concert halls, and cultural centers, such as the renowned Heard Museum, Phoenix Art Museum, Arizona Science Center, Phoenix Symphony, Arizona Opera, Ballet Arizona and the Arizona Theatre Company.

Outdoors

Phoenix has a number of lakes just a short drive away offering opportunities for boating, sailing, windsurfing, water and jet skiing, fishing and more. The area is home to dozens of parks and preserves — both in and around the city — with hundreds of miles of multiuse trails for hiking and biking. The state is home to three national parks, including the Grand Canyon, and other popular destination spots like Sedona.

Sports

All four of Arizona's major professional sports teams — Arizona Cardinals (NFL), Phoenix Suns (NBA), Arizona Diamondbacks (MLB) and Arizona Coyotes (NHL) — call the metro Phoenix area home, as do the Phoenix Mercury (WNBA), Arizona Rattlers (IFL) and Phoenix Rising FC (USL). The area has over 170 golf courses.

Cost of Living

Greater Phoenix offers the diverse amenities of a major metropolitan region without the high cost of living. As the fifth largest state in the U.S. and one of the most dynamic and rapidly growing regions in the nation, living and working here is both exciting and affordable.

Low Tax Position

Low personal income taxes and low effective property tax rates offer affordability and opportunities for everyone to thrive.

Business and Industry

Arizona is home to a surging industrial ecosystem, early stage entrepreneurs, and tech-savvy millennial talent who are breaking new ground across a wide range of industry growth sectors. What's more, Arizona offers a robust portfolio of programs and resources supporting both large and emerging tech companies. The state's rich startup culture continues to thrive and is a preferred choice for technology companies seeking growth. Leading startups have collectively taken advantage of Arizona's high-skills talent base. Arizona's solid reputation and assertive stance on innovation led Fast Company to rank Arizona No. 1 in the country for "entrepreneurial activity."



AGB Search is pleased to assist ASU with this exciting initiative.

Nominations and expressions of interest in the Fulton Chair opportunity are encouraged. Please direct them to the AGB search consultants listed below.

Kimberly Templeton, JD, Principal kimberly.templeton@agbsearch.com *C: 540.761.9494 / O: 202.776.0820*

Rod McDavis, PhD, Managing Principal rod.mcdavis@agbsearch.com 0: 202.776.0854



Arizona State University is a VEVRAA Federal Contractor and an Equal Opportunity/ Affirmative Action Employer. All qualified applicants will be considered without regard to race, color, sex, religion, national origin, age, disability, veteran status, sexual orientation, gender identity or any other basis.

