The ASU model for university innovation

Guided by eight design aspirations to achieve Access, Excellence and Impact

- Value entrepreneurship
- Be socially embedded
- Conduct use-inspired research
- Engage globally
- Leverage our place
- Enable student success
- Transform society
- Fuse intellectual disciplines

Mission

- Demonstrate leadership in academic excellence and accessibility
- Establish national standing in academic quality and impact of colleges and schools in every field
- Establish ASU as a leading global center for interdisciplinary research, discovery and development
- Enhance local impact and social embeddedness

How do we simultaneously enable access as well as drive research performed at the highest levels?
ASU Charter

ASU is 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.
What does access, excellence and impact look like in an engineering school?
Fulton Schools of Engineering

The largest and most comprehensive engineering college in the United States

Interdisciplinary structure
6 schools
2 campuses + online
Cross-campus partnerships with arts, business, sustainability, sciences

Academic programs
25 undergraduate degree programs
44 graduate programs
23,903 students (7,062 online)
4,823 graduates across all degree levels

Faculty
~355 tenured/tenure-track faculty
~100 lecturers and professors of practice
29 young investigator awards over the past four years

Research and innovation
$115M in FY2019
Lead two NSF ERCs (partner on two others)
Lead DHS Center for Accelerating Operational Efficiency

Entrepreneurial outputs
192 patents
24 startups in the last three years

Global capacity-building programs in Vietnam and Pakistan
### Measures of FSE evolution since 2009

<table>
<thead>
<tr>
<th></th>
<th>Fall 2009</th>
<th>Fall 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total enrollment</strong></td>
<td>6,407</td>
<td>23,903</td>
</tr>
<tr>
<td><strong>Undergraduates</strong></td>
<td>4,253</td>
<td>18,942</td>
</tr>
<tr>
<td><strong>Graduates</strong></td>
<td>2,154</td>
<td>4,961</td>
</tr>
<tr>
<td><strong>Degrees granted</strong></td>
<td>1,391</td>
<td>4,532</td>
</tr>
<tr>
<td><strong>Research expenditures</strong></td>
<td>$73M</td>
<td>$115M</td>
</tr>
<tr>
<td><strong>T/TT faculty</strong></td>
<td>214</td>
<td>355</td>
</tr>
</tbody>
</table>

*21% increase in awards in 2018-2019*
Our Edge: The Fulton Difference

Impacting our community, region and world

Scale: More than 125,000 master learners across five campuses at the nation’s largest public research university.

Quantity and quality: Nearly 24,000 students in the Ira A. Fulton Schools of Engineering including 222 National Merit Scholars, 205 National Hispanic Scholars, one-third of the Honors College

Faculty excellence: Fulton Schools faculty have received 29 National Science Foundation Career Awards over the last four years.

- More than traditional coursework
- Emphasis on experiential learning opportunities across the curriculum
- Mindset as master learners in intrapreneurial and entrepreneurial connections
Broadening participation

4,300 International
5,200 Underrepresented
5,300 Female
More than a degree

Students can develop skills - leadership, mentoring and public speaking - outside the classroom.

customize.engineering.asu.edu
Engaging across the student experience

From E2 Camp through graduation

Building brand awareness throughout the experience

Student projects…events … …guest speakers…
hackathons…research …
faculty engagement …
scholarships … internships …
recruitment … and other events
<table>
<thead>
<tr>
<th>Early stage discovery</th>
<th>Translational research</th>
<th>Mission-focused impact</th>
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</thead>
<tbody>
<tr>
<td>35+ young investigator awards from NSF CAREER, AFOSR YIP, DARPA YFA, ONR YIP, NASA and NIH over past three years.</td>
<td>NSF Engineering Research Centers: Leading QESST &amp; CBBG plus partnering on NEWT &amp; FREEDM</td>
<td>$18 million from USAID to establish the U.S.-Pakistan Centers for Advanced Studies in Energy (USPCASE) to improve power production in Pakistan</td>
</tr>
<tr>
<td>More than $44M awards for 19 DARPA projects in last two years supporting areas such as biological technologies, microsystems, &amp; complex remote systems.</td>
<td>NSF I/UCRCs (Industry/University Cooperative Research Programs): PSERC, Connection One, SenSIP, WET, Center for Embedded Systems, Efficient Vehicles and Sustainable Traffic Systems, BRAIN</td>
<td>Lead DHS Center for Accelerating Operational Efficiency. CAOE develops and applies advanced analytical tools and technologies to enhance planning, information sharing and real-time decision-making in homeland security operations.</td>
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<tr>
<td></td>
<td>Launched new Clinical &amp; Industry collaborations: ASU-Mayo Center for Innovative Imaging</td>
<td>Lead DOT Tier 1 University Transportation Center - Teaching Old Models New Tricks (TOMNET)</td>
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<tr>
<td></td>
<td>Science and Technology Demonstration Centers (Wearable devices, Blockchain)</td>
<td></td>
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<tr>
<td></td>
<td>Continued 20+ years SRP relationship with $2.5M annual funding</td>
<td></td>
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</tbody>
</table>

~350 tenured and tenure-track faculty + 50 research faculty + > 100 post-docs + > 1200 PhD students
Entrepreneurship and innovation

Responsible for 192 patents and 24 startups in the last three years

#3 Licenses and options
Behind only Purdue and Carnegie Mellon

#4 IP disclosures
Behind only Carnegie Mellon, Caltech and Purdue

#4 Startups
Behind only Purdue, Carnegie Mellon and Stanford

Comparative data per $10 million in research expenditures, based on the Association of University Technology Managers annual report of top national engineering schools.
<table>
<thead>
<tr>
<th>School</th>
<th>Director</th>
<th>Students</th>
<th>Undergraduate</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Biological and Health Systems</td>
<td>Marco Santello</td>
<td>864 students</td>
<td>707 undergrad</td>
<td>157 grad</td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Computing, Informatics, and</td>
<td>Sandeep Gupta</td>
<td>7,773 students</td>
<td>5,901 undergrad</td>
<td>1,872 grad</td>
</tr>
<tr>
<td>Decision Systems Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Electrical, Computer and Energy</td>
<td>Steve Phillips</td>
<td>3,353 students</td>
<td>2,369 undergrad</td>
<td>974 grad</td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School for Engineering of Matter, Transport</td>
<td>Lenore Dai</td>
<td>3,860 students</td>
<td>3,153 undergrad</td>
<td>707 grad</td>
</tr>
<tr>
<td>and Energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Sustainable Engineering and the</td>
<td>Ram Pendyala</td>
<td>1,771 students</td>
<td>1,380 undergrad</td>
<td>391 grad</td>
</tr>
<tr>
<td>Built Environment</td>
<td>Interim Director</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Polytechnic School</td>
<td>Leila Ladani</td>
<td>5,858 students</td>
<td>5,422 undergrad</td>
<td>436 grad</td>
</tr>
</tbody>
</table>

- Biomedical engineering
- Biomedical design
- Computer engineering
- Computer science
- Computer systems engineering
- Engineering management
- Industrial engineering
- Informatics
- Robotics and autonomous systems
- Software engineering
- Aerospace engineering
- Chemical engineering
- Materials science and engineering
- Mechanical engineering
- Robotics and autonomous systems
- Solar energy engineering and commercialization
- Civil engineering
- Construction engineering
- Construction management
- Environmental engineering
- Sustainable engineering
- Aeronautical management technology
- Engineering
- Engineering education systems and design
- Environmental and resource management
- Graphic information technology
- Human systems engineering
- Information technology
- Manufacturing engineering
- Robotics and autonomous systems
- Technological entrepreneurship and management
- User experience

25 undergraduate programs • 44 graduate programs • 2 campuses+online
Producing talent

Supply of graduates helps fuel Phoenix being named #3 city for tech jobs (TIME Money June 2017)

#5 for bachelor’s degrees granted in U.S., up two positions.

#8 for bachelor’s degrees granted to Hispanics, up 1 position.

#13 for bachelor’s degrees granted to women, up 5 positions.

Rankings from 2018 American Society for Engineering Education Profiles
65% of children entering primary school today will ultimately end up working in completely new job types that don’t yet exist.
# Learning Pathways for Future Workforce

<table>
<thead>
<tr>
<th><strong>Open Courses</strong></th>
<th><strong>Short Courses</strong></th>
<th><strong>Professional Certification</strong></th>
<th><strong>Undergraduate</strong></th>
<th><strong>Graduate</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Not for university credit</td>
<td>• Not for university credit</td>
<td>• Not for university credit</td>
<td>• Earn university credit</td>
<td>• Earn university credit</td>
</tr>
<tr>
<td>• Online, self-paced learning on demand</td>
<td>• Agile training options delivered in various modalities</td>
<td>• Agile training options delivered in various modalities</td>
<td>• Enhanced courses focus on relevant topics</td>
<td>• Enhanced courses specialized on relevant topics</td>
</tr>
<tr>
<td>• Developed by ASU faculty</td>
<td>• Industry relevant topics</td>
<td>• Industry relevant topics</td>
<td>• Faculty engagement and feedback</td>
<td>• Faculty engagement and feedback</td>
</tr>
<tr>
<td>• Low to no cost</td>
<td>• Developed and taught by ASU faculty and industry experts</td>
<td>• Taught by ASU faculty and industry experts</td>
<td>• Taught by ASU faculty</td>
<td>• Taught by ASU faculty</td>
</tr>
<tr>
<td>• Purpose is to upskill around specific competencies</td>
<td>• Purpose is to upskill around specific competencies with increased rigor &amp; engagement</td>
<td>• Industry-relevant projects</td>
<td>• Accredited programs</td>
<td>• Accredited programs</td>
</tr>
<tr>
<td>• Goal is to introduce technical topics and provides pathways to other credentials</td>
<td>• Goal is to enable learner to rapidly apply content knowledge and build in-demand skills</td>
<td>• FSE-recognized professional certification</td>
<td>• Financial aid</td>
<td>• Financial aid</td>
</tr>
<tr>
<td>• 8-20 hours per course</td>
<td>• 20-40 hours</td>
<td>• Purpose is to upskill around specific competency via completion of a project</td>
<td>• Condensed 7.5 week format possible</td>
<td>• Unique assessments based on graded assignments, exams and applied projects</td>
</tr>
<tr>
<td>• 4-6 open courses can lead to a specialization</td>
<td></td>
<td>• Goal is to provide real-world application to professionals seeking a high impact return</td>
<td>• Transfer pathways</td>
<td>• 10 courses completed over 2-4 years to earn a degree</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3-6 months</td>
<td></td>
<td>• 5 courses completed to earn a graduate certificate</td>
</tr>
</tbody>
</table>

**Value Proposition:** Global Alumni Network, Career Resources, 24/7 Learner Support, Focused on Student Success

**Modes of Delivery:** Online, Classroom, Hybrid, On-Site
Partnership...

**Accelerating** research outcomes whether an undergraduate student, graduate student, or industry partner

**Leveraging** our faculty, our size and our community to advance partner capacity and technical talent

**Building** communities of practice across industry, universities and organizations
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