



**Thriving people. Thriving Planet.
Thriving Society.**

*How ASU's Knowledge Enterprise is Changing the
World for the Better*

Sally C. Morton, PhD

**Executive Vice President, Knowledge Enterprise
Arizona State University**

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 is Knowledge Enterprise?

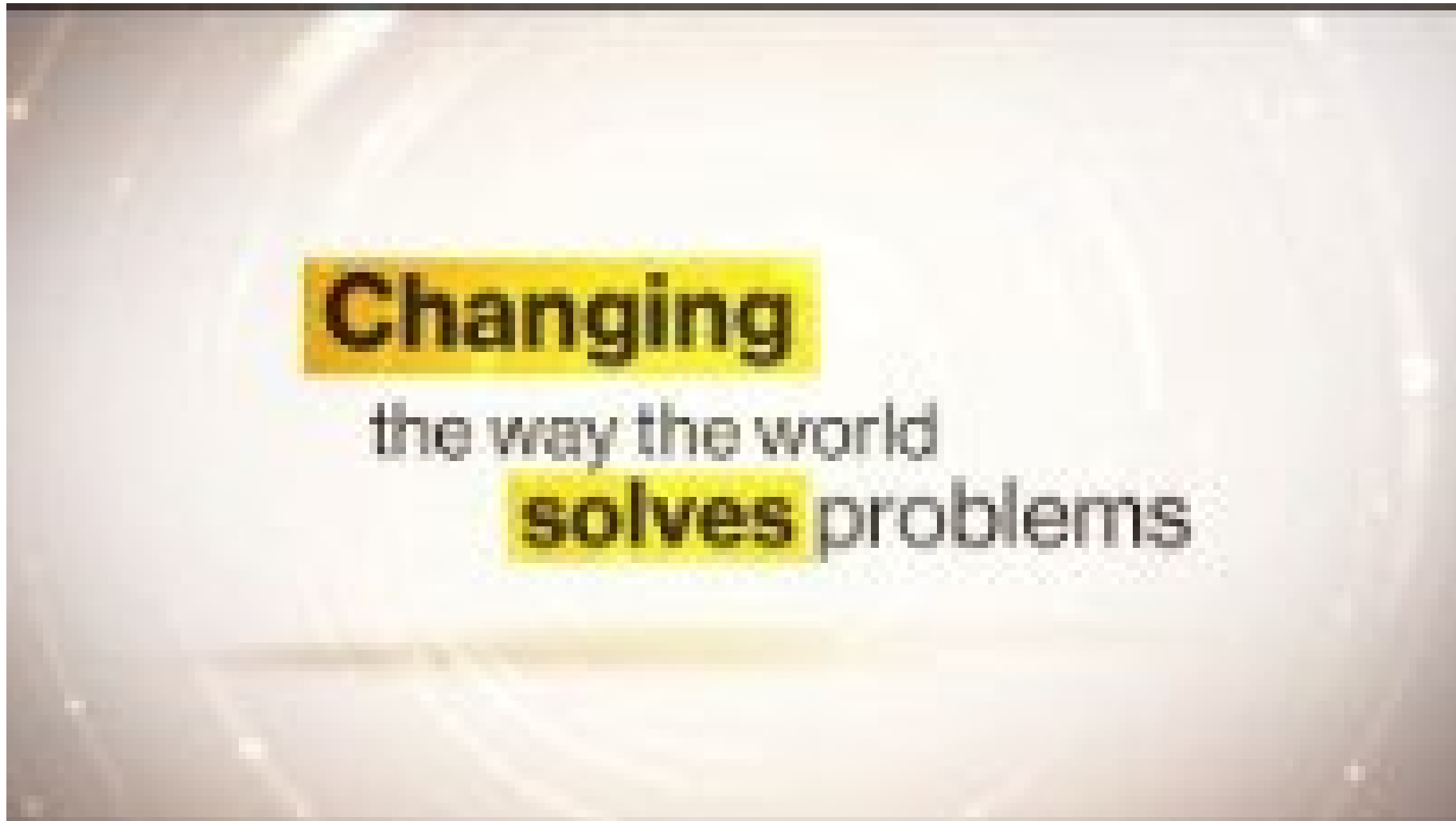
Knowledge Enterprise is a **bold** ambitious **university-wide mindset** that seeks to **solve humanity's greatest challenges**.

A component is providing **dedicated service** to the entire university to enable faculty, students and community researchers to be **successful**.

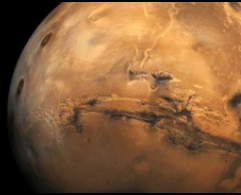
Knowledge Enterprise is the **engine** that drives ASU research. We are responsible for the **research ecosystem** of the University.



What is Knowledge Enterprise?

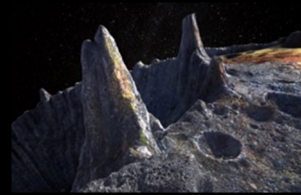


Institutes & Initiatives in Knowledge Enterprise



NewSpace Initiative

Jim Bell, Director



Interplanetary Initiative

*Lindy Elkins-Tanton,
Vice President*



Julie Ann Wrigley Global Futures Laboratory

*Peter Schlosser, Vice President &
Vice Provost*



Institute for Social Science Research

H. Russell Bernard, Director



Institute for Humanities Research

Ron Broglio, Director



Biodesign Institute

*Joshua LaBaer,
Executive Director*



Global Security Initiative

*Nadya Bliss,
Executive Director*



The McCain Institute

*Evelyn Farkas,
Executive Director*



Decision Theater

Jon Miller, Director



J. Orin Edson Entrepreneurship + Innovation Institute

*Linda Ricchiuti,
Executive Director*

ASU research engagement spans the globe



ASU research engagement spans the Valley



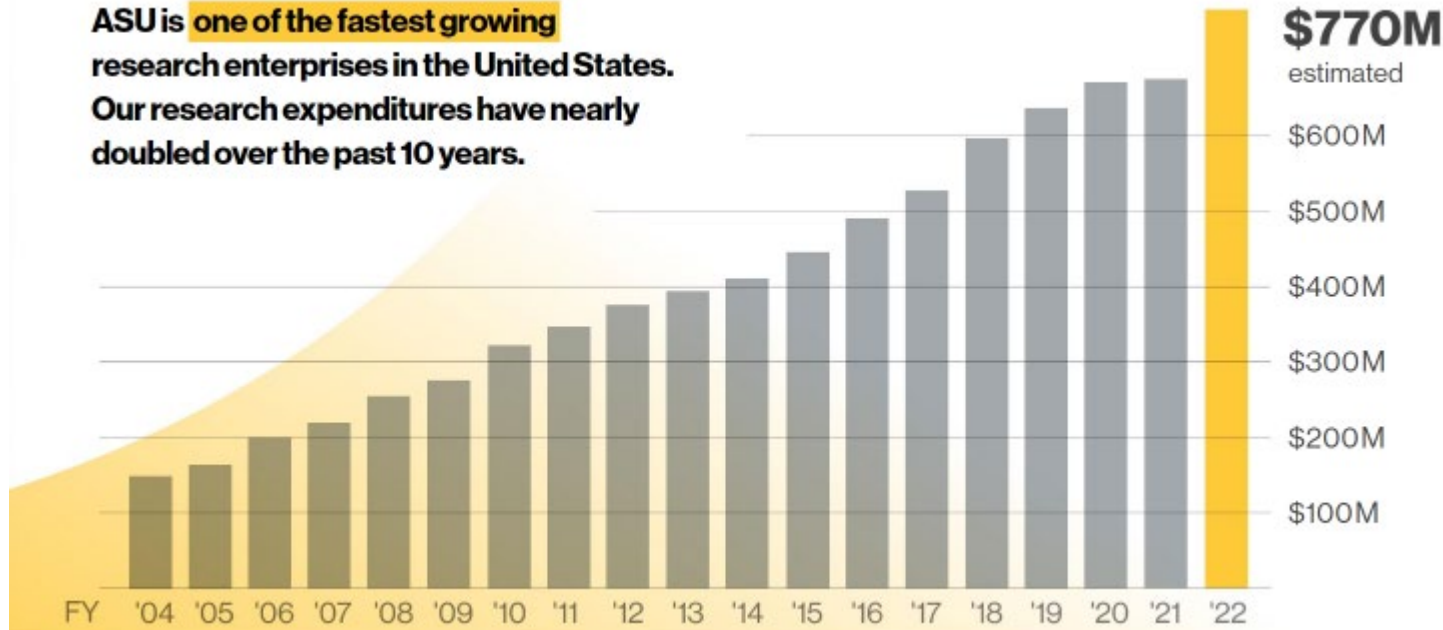
Knowledge Enterprise Research Ecosystem Support

- Research Compliance and Integrity, Finance, and Strategy
- Core facilities and animal care
- High-performance research computing including the Quantum Collaborative
- Corporate Engagement and Strategic Partnerships
- Economic Development
- International Development
- Chief Science and Technology Officer



Leading the Nation in Research and Innovation

ASU is **one of the fastest growing** research enterprises in the United States. Our research expenditures have nearly doubled over the past 10 years.



#6 Total research expenditures among institutions without a medical school

Rankings by research expenditures

Source: National Science Foundation HERD Survey 2021

#1 **Transdisciplinary research**, ahead of Johns Hopkins, Northwestern and the University of Pittsburgh

#1 **Anthropology**, ahead of Harvard, Stanford and the University of Michigan

#5 **Business management and business administration**, ahead of Georgetown, Duke and Columbia

#9 **Education**, ahead of UCLA, Michigan State University and University of Oregon

#1 **Geological and earth sciences**, ahead of MIT, Penn State and the University of Arizona

#4 **Social sciences**, ahead of Cornell, UCLA and University of North Carolina at Chapel Hill

#9 **HHS-funded expenditures (including NIH)**, among institutions without a medical school

#9 **Civil engineering**, ahead of Duke, University of Illinois at Urbana-Champaign and Clemson

Geared for Impact

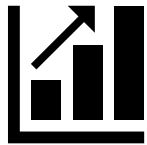
Key Performance Indicators FY22

305 Innovations captured

166 Patents secured

57 Licensing deals closed

21 Startups launched



Economic Impact Arizona FY16–FY21

8,125 Job-years

\$851M Gross state product

\$565M Cumulative labor income

\$76M State and local taxes

Worldwide Rankings

Top 10 in industry-wide rankings
for all institutions without a medical school

#1 most innovative university

for eight consecutive years as recognized by U.S. News & World Report, ahead of MIT and Stanford

#6 for best tech transfer

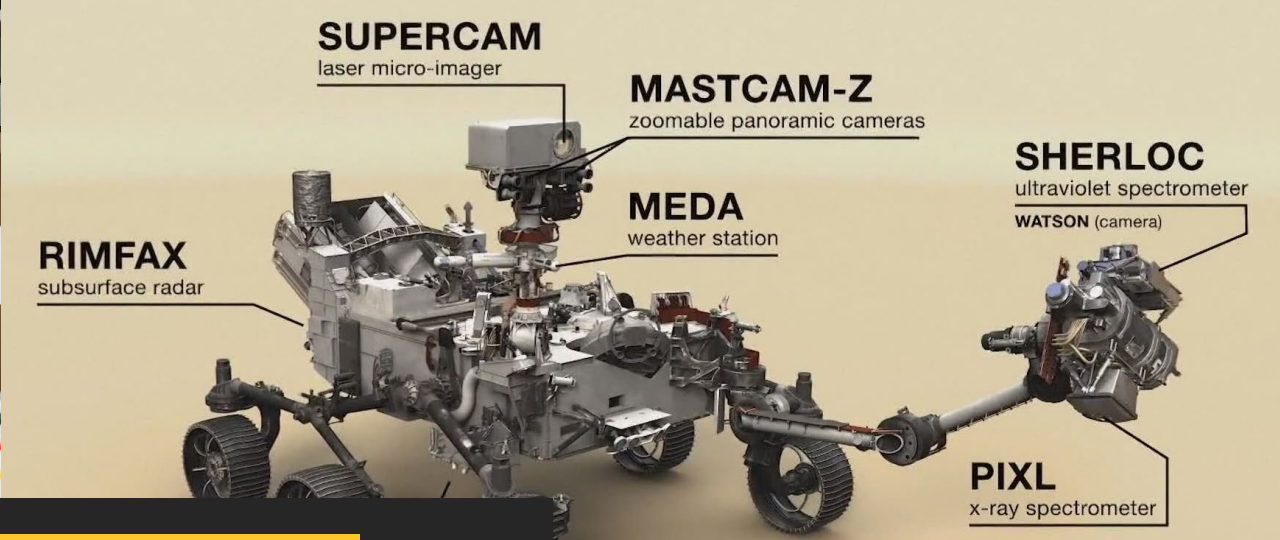
for universities without a medical school, ahead of Northwestern, Harvard, and Duke

#8 for U.S. patents

issued to universities worldwide in 2021, ahead of Caltech, Penn, Johns Hopkins, Columbia, Cornell, and Yale

#11 for innovation impact productivity

among large comprehensive research universities, ahead of Stanford, Penn, Washington, Harvard, and MIT



The Next 5 Years:

- Game changing discovery
- Social and economic impact
- Enhanced AZ workforce



ASU: Improving Health

A photograph of two scientists in a laboratory setting. They are wearing white lab coats, black face masks, and safety glasses. The scientist on the left is older with grey hair, and the one on the right is younger with brown hair. They appear to be looking at something off-camera. In the background, there are shelves with green boxes and various lab equipment.

- Create joint Institute for Future Health, develop tools to prepare for future pandemics (with UA)
- Improve the lives of people with neurodegenerative diseases (with Banner Health)
- Advance cutting-edge health care through Health Futures Center (with Mayo Clinic)
- Expand Phoenix biomedical corridor through new Phoenix Biomedical Campus (with downtown clinical partners)

ASU: Water, Environmental and Energy Solutions

- Build resilient food, energy and water systems, empowered by Decision Theater
- Advance Mechanical Trees and deploy in Arizona for CO₂ capture
- Bring jobs and greater water access to urban and rural communities
- Accelerate sustainable plastics and polymers with new center



ASU: National Security Systems

- Lead the nation in human-robot interfacing in the coming age of AI
- Advance Arizona as a leader in defense and security, attracting new defense industries
- Deter and withstand cyberattacks on critical infrastructure and networks
- Combat disinformation and implement digital literacy throughout Arizona
- Support real-time decision making through advanced analytical tools

ASU: Space Exploration and Optical Sciences

- Expand corporate partnerships and joint missions
- Provide immersive problem-solving experiences to students
- Institutionalize relationships with NASA and Space Force



MARS 2020
PERSEVERANCE



ASU: Access and Workforce Development

- Expand to over 6,000 engineering graduates per year
- Make mentored research experiences accessible to learners at a distance
- Run student-driven, industry and community-focused innovation sprints
- Prepare K-12 students for computationally intensive careers
- Create tailored programs for in situ workforce skill enhancement



Why do external companies engage with ASU?

Cultivate institutions, not just individuals

Durable, cooperative models create long-term connections for relationships and allow for proactive engagement in specific projects as they emerge.

Locate R&D near the source

“Be at the center of an ecosystem that shares our aspirations”

– Jeffrey Immelt, former CEO of General Electric

Bridge the cultural divide

- Companies recognize they must create purpose-driven organizations to attract talent.
- University role expands beyond traditional core competencies of teaching and research, dedicating resources to solving social challenges and contributing to economic growth.

How do companies engage with ASU?



Hire students



Research & licensing



Philanthropy



Join advisory boards



Connect with students



Solutions for business challenges



Executive education and professional development



Real estate & economic development



New Economy Initiative

Catalyzing a Future of Sustained Prosperity for Arizona



Think of how many

children

entering primary school today will end up working in completely new job types that don't yet exist.

New Economy Initiative



What is the New Economy?

Industries of the the future go by many names:

- The Knowledge Economy
- The Sharing Economy
- The Gig Economy
- The Data Economy
- The 4th Industrial Revolution

The future is technology-driven: digital, autonomous, virtual, data-intensive



What are New Economy industries?

- Advanced manufacturing + materials
- Augmented intelligence
- Automation/robotics
- Big data
- Biosciences + personalized medicine
- Cybersecurity
- Digital media
- Virtual/augmented reality





ASU is driving the New Economy with:



Science and Technology Centers

Catalyze industry-relevant research, development and manufacturing



Workforce development

New graduates, re-training and upskilling for existing workforce



Support New Economy enterprises

Partner with industry, enhance entrepreneurship, and attract new businesses to AZ





Building the New Economy workforce

Enhancing job readiness

through hands-on
research
experiences

Accelerated learning

through hybrid
online/in-person
models

Upskilling the current workforce

through stackable
certificates,
micro-degrees,
badges and
other credentials

Increasing graduation rates

and decreasing
time-to-degree
through AI-
infused advising
platforms

Increasing capacity to serve students

by attracting
world-class faculty

Return on investment

Arizona's New Economy in 2032



48,000

new jobs



\$6.9 billion

in increased
economic output



**\$300
million**

increase in
engineering research



10,000

new engineering
graduates per year

ASU Science and Technology Centers are the Organizing Hubs



Future communications technologies

Focus on driving Arizona to the forefront of physical information systems for sensing and communications.



Extreme environments

Focus on engineering resiliency into transportation, energy, water and materials systems of future cities.



Human performance

Focus on enhancing physical and cognitive performance, as well as medical prevention and intervention.



Energy and materials

Focus on advancing new energy materials and device technologies to market, growing industry engagement.



Advanced manufacturing

Focus on new technologies that strengthen links to private industry support in aerospace and defense.

**Kicked off
in 2022**

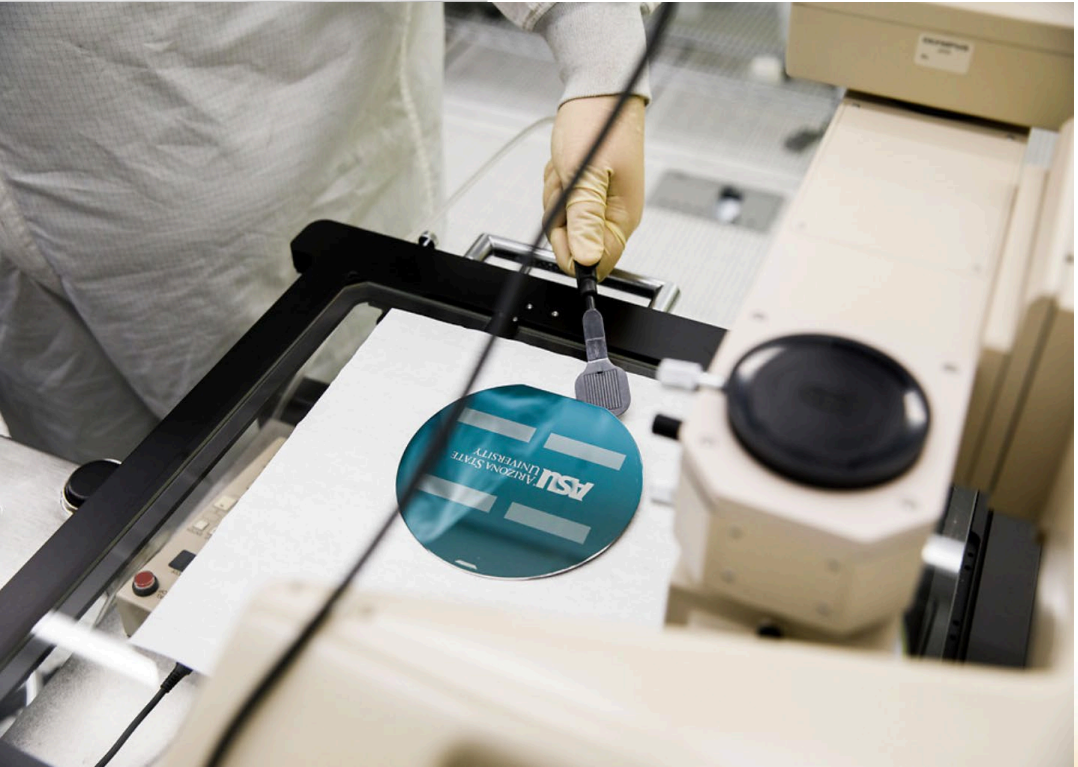
**Kicked off
in 2021**

Setting the Scene: America's Semiconductor Capabilities Gap

- U.S. leads in R&D but only 12% of semiconductors are manufactured domestically
- U.S. lacks the ability to scale innovations - a "Lab-to-Fab" Valley of Death
- America's economic competitiveness and national security is threatened
- CHIPS and Science Act appropriated \$52B to boost America's competitiveness in microelectronics



ASU is Propelling Arizona to be Microelectronics Central

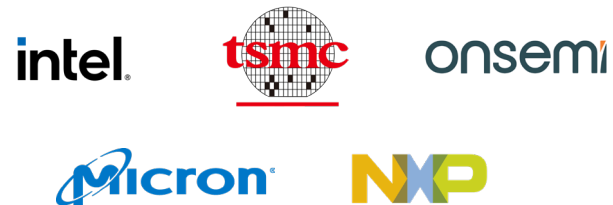


NEI is supported by industry partners committed to Arizona's success

Aerospace and Defense



Semiconductor



Industrial Equipment



MedTech



Utility



Automotive



Health Care



Others





New

Economy

Initiative

Accelerates talent and skills development

Advances innovation that drives industrial growth by leveraging Arizona's public universities

Strengthens Arizona as a New Economy leader



Arizona's economy is growing... but remains vulnerable

Arizona depends on industries that service population growth

- 86% of jobs created from May 2020-May 2021 were in leisure/hospitality, transportation, utilities, education, and health (Office of Economic Opportunity, 2021)

Arizona is still creating mostly low wage jobs

- Arizona ranks 42nd for per capita personal income (Bureau of Economic Analysis, 2021)

45% of Arizonans have lost income due to COVID-19 (Gallup, 2021)

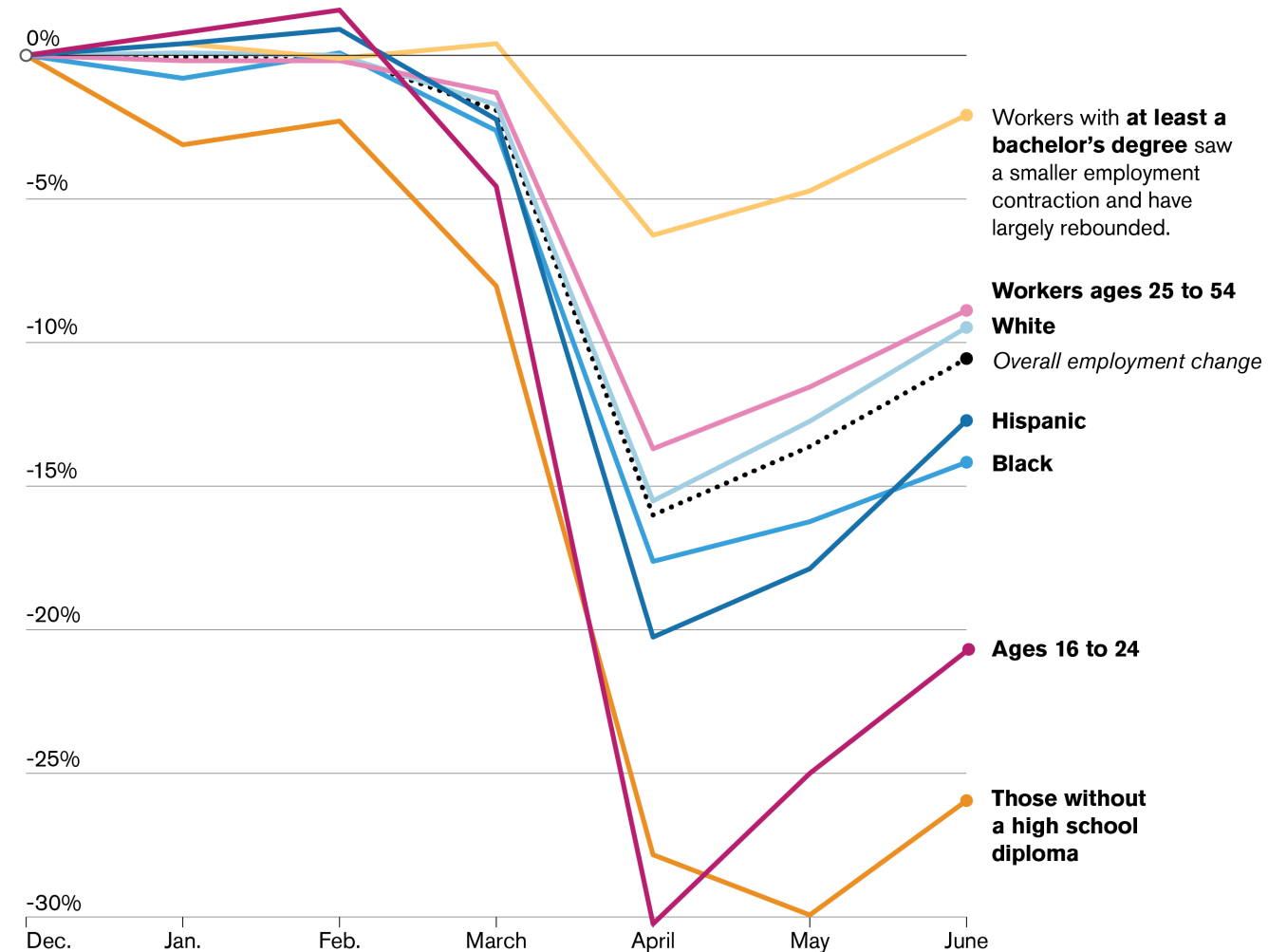
What COVID-19 revealed about the New Economy

- 10 million+ jobs lost
- Workers with a bachelor's degree or more were less affected and recovered more quickly
- Metros with clusters of New Economy industries were least affected

THE WALL STREET JOURNAL.

Pandemic Employment: Winners and Losers

Change in employment (2020)





Accomplishments

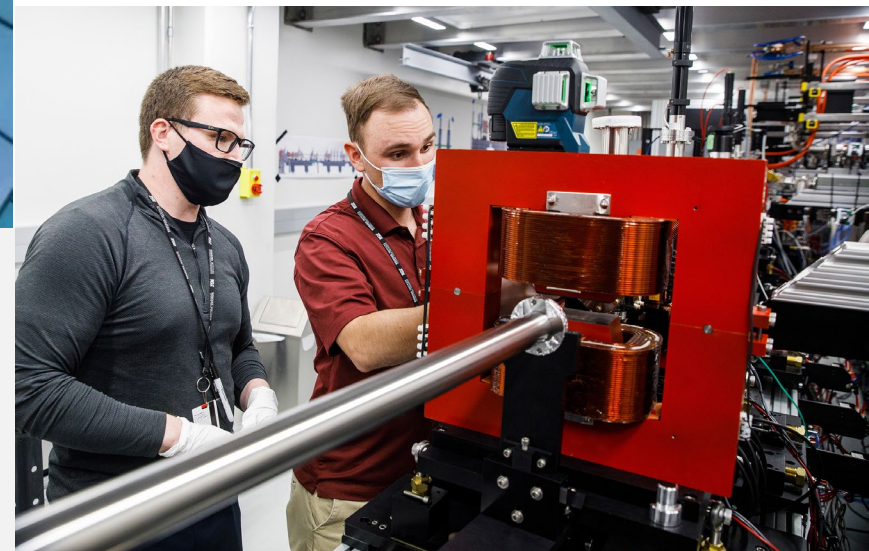
- Launched **5** Science & Technology Centers
- Attracted corporate partnerships
- Increased co-funded projects
- Created Industry Council
- Grew Fulton Schools of Engineering
- Launched CareerCatalyst
- Enhanced research facilities
- Solidified Arizona and ASU as microelectronics leader

Funding for the Future

Ability to nimbly respond to **new opportunities**

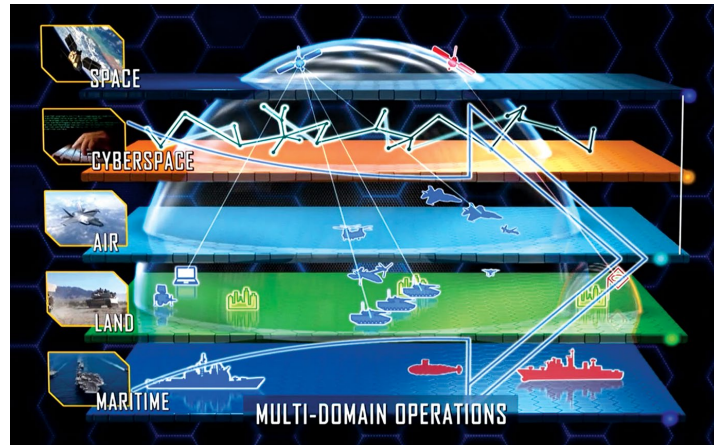
Growing partnerships and excitement among industry community

Efficient and effective Science and Technology Center Model



National Security Implications of Microelectronics

Domains



Platforms



Weapons



Agencies



Advanced Technology and Innovation for DoD



Domestic microelectronics innovation is critical to all elements of national security and economic competitiveness

ASU Innovations 2022

In fiscal year 2022, ASU innovators working with Skysong Innovations* generated:

305
invention
disclosures

166
U.S. patents

21
new startup
companies

#1
in the U.S. for
innovation



ASU ahead of MIT and Stanford
– U.S. News & World Report
8 years, 2016–2023

* Skysong Innovations is ASU's exclusive intellectual property management company.