THE NEW ECONOMY INITIATIVE:
ENHANCING ARIZONA’S COMPETITIVENESS
SYNOPSIS

Led by Governor Ducey, the Arizona economy has not only recovered its economic footing, but is also outperforming most others. Today, Arizona enjoys a far more competitive economy. The state ranks in the top 5 for key economic growth categories such as employment, population, personal income, and state GDP growth. Local economic experts have opined that with the right strategic investment, Arizona will lead the nation during the remainder of this expansion and throughout the 2020s. But this is likely only if the right public policy decisions are made today.

One key to maximizing Arizona’s economic potential is to support strategic investment, with focus on those reasons that will yield a positive return on investment (ROI) for taxpayers. Estimates of job displacement by the New Economy are 22-27% of all current jobs with all Arizona counties impacted. Economic development programs must focus on productivity enhancement, among both labor readiness and capital investment. This will be achieved with additional emphasis being placed on high value-added, high wage industries of what is becoming the New Economy. This focus will lead to more business location and expansion opportunities, and additional small business development.

Very minor improvements to the state’s rate of economic growth, in terms of both quantity and quality, will yield significant fiscal returns. For example, economic modeling identifies that every 0.1 percentage point increase in the rate of statewide job growth (a very modest number) will equate to an additional $1.0 billion in state and local tax collections and 40,000 net new jobs in just ten years. Furthermore, every $1,200 increase in the average wage for forecasted new jobs will yield an additional $500 million in state and local tax revenues and 15,000 new jobs during the same decade. Lastly, if new business recruitment and expansion opportunities increase by as little as 10%, the ten-year state and local fiscal impact will grow by another $700 million and 25,000 jobs will be created.

This investment and return potential is what will be needed to advance Arizona into the top economic growth through the next decade. The following budget request builds on these core economic principles. The goal is to not just grow, but to grow well.

THE ECONOMIC EVOLUTION OF ARIZONA

Under the Governor’s leadership and with the support and endorsement of the Arizona Legislature, the State has gone from a position of more than a $1.0 billion deficit to enjoying a Rainy Day Fund that exceeds $1 billion. Arizona has also invested roughly $3.0 billion in K-12 education plus investments in significant infrastructure and safety. The state is currently experiencing strong economic momentum, and it ranks fourth in the nation in growth of state GDP, which stands at 4%, exceeding the growth rates of California, Texas, Florida and 43 other states. With Governor Ducey’s leadership and his signature, new legislation made Arizona the first state in the nation to recognize occupational licenses for new residents, making Arizona a more attractive location for skilled labor. Arizona has advanced more than any other state since the Great Recession. However, the job is never done. Now is the time to capitalize on the state’s momentum and add to Arizona’s readiness for the New Economy.

“The state is currently experiencing strong economic momentum, and it ranks fourth in the nation in growth of state GDP, which stands at 4%, exceeding the growth rates of California, Texas, Florida and 43 other states.”

A vibrant business market with an innovation ecosystem and the attraction and retention of highly skilled labor are essential for the New Economy – along with business dynamism, strong institutions, and financing mechanisms. Drivers of the changing market and the need for even more highly skilled labor are revolutionizing how we work. Lower skill-level jobs like office support, food services, and
production work are expected to see significant declines. Even as jobs are lost, McKinsey and Company estimates that three Arizona counties – Yavapai, Maricopa and Pima – will be among the highest growth counties with more than 15% growth in New Economy jobs.iii A special challenge for Arizona will be the McKinsey forecast for very substantial job losses by 2030 in the rural counties of the state. The drivers include emerging technologies from fields as diverse as robotics, optics, artificial intelligence (AI), computing and cybersecurity, energy, advanced manufacturing, engineering and biotechnology. The transformation caused by these drivers has been called the 4th Industrial Revolution.iv In simple terms, the government lays the foundation for the private sector to succeed. Major pillars of the foundation are workforce development and productivity advancement through new technologies.

There also exist headwinds. Job growth has increasingly been focused on those with a college education or specialized, technical certification. However, the available supply of educated labor will fall by 2030 due to the coming demographic declines associated with Generation Z and the differential educational attainment rates associated with family income, gender, and race/ethnicity.v An aging population will also diminish the active and highly skilled workforce during the next several decades. This means Arizona must develop policies that raise its competitiveness by increasing post-secondary attainment, educating graduates for the new economy, retaining highly skilled labor, and fostering advanced, research-driven technology that results in new market-driven businesses from the sciences, healthcare, biomedicine and engineering.

The FY 2021 budget request advances a New Economic Initiative: Enhancing Arizona’s Competitiveness based on accelerating the transformation of the universities into adaptive drivers of Arizona’s economic success:

- Enhance the universities’ capacity to graduate more men and women in 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 in competing more aggressively for major, national research grants that focus on transformative ideas, innovative technology and emerging economy business start-ups 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.

THE BUDGET PROPOSAL
A new $165 million state initiative is requested that focuses on laying the foundation for Arizona to become a Tier 1 state for the new economy, increase employment growth, and raise incomes:

1. New Economy: Workforce - $100 million
   - ASU: $46 million
   - NAU: $22 million
   - UA: $32 million

2. New Economy: Defined Statewide Financial Aid - $30 million

3. New Economy: The Teachers Academy - $15 million

4. New Economy: Distributed Learning Centers in Arizona - $10 million

5. New Economy: New Industry Research Competitiveness - $10 million

6. New Economy: Career and Technical Educationvi

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iii The numbers are a combination of the ASU, NAU, and UA capital investments.

iv The number represents the expected percentage of economic activity.

v The numbers reflect the expected percentage of economic activity.

vi The numbers reflect the expected percentage of economic activity.
THE NEW ECONOMY INITIATIVE: ENHANCING ARIZONA’S COMPETITIVENESS

For the last 100 years, Arizona has been a place where people moved with a continuous mixture of one-third of its residents born here and two-thirds having moved to Arizona. The state has been wildly successful at building a great place to live, work, and raise a family with rapid growth and very positive outcomes.

In the 10 years since the peak of the Great Recession, Arizona has encountered and managed the complexities of the economic shifts that resulted from that recession and the subsequent new economy that is emerging. We have made great economic progress since the great recession, reversing the highly negative outcomes and stabilizing the state’s finances. Nonetheless, several facts and lessons, resultant from the rapidly changing overall economy, are cause for action at our universities. The facts include:

- A national decline in jobs in the market for those with a high school education or less of more than 25% since 2010;
- A continuing low college going rate in the US with Arizona’s remaining among the lowest in the country;
- A national challenge in raising the college graduation rate;
- A very low Hispanic college attainment level (~10%) for which Arizona is among the lowest;
- A very high risk of future job replacement through automation and AI because of Arizona’s being highly service sector oriented with one of the largest percentages of workers likely to be replaced through AI and automation in the USA;
- Despite progress in Arizona, an ongoing lag in median household income - Arizona is 92% of the national average, below California (117%), Colorado (114%), Nevada (96%), Utah (113%), and Texas (99%), all regional economic competitors;
- A very low influx of college graduates under 30 to Arizona;
- A long-term, slow decline in keeping Arizona college graduates in Arizona: high initial retention (80.6%) with more than 53.6% leaving the state over the next 20 years of their lives; and
- Challenges in attracting and retaining the most technology-driven businesses that depend on a highly educated labor force.

The Governor is asking the three public universities of Arizona to step up and facilitate an enhanced transition for Arizona to the new economy of the Fourth Industrial Revolution. This is no simple request. As part of this budget request, each university will be asked to:

- Significantly enhance both state-wide college-going rates and specifically college graduation rates by at least 25 percent by 2030, raising total production of graduates by at least 40 percent by 2030;
- Become even more entrepreneurial in raising their own revenue through innovation, new technologies, partnerships with industry and other educational institutions;
- Reduce time to degree and modernize degrees and programs via improvements to general education and majors;
- Work more closely with local school districts to achieve a 90 percent high school graduation rate;
- Greatly enhance university productivity on all levels, while lowering the cost to the state to produce a college graduate;
- Expand college degrees in all subjects while also preparing all graduates with the tools of the new economy (coding, AI awareness, advanced systems, entrepreneurship);
- Reinforce Arizona values of individual freedom, self-reliance, equality under the law and full participation in our democracy;
- Enhance all pathways, including collaboration with community colleges, online education and regional degree sites throughout the state for the 1.2 million Arizonans who attended and didn’t finish college, with new economy enhancements and adaptability enhancements;
- Eliminate barriers to access to the universities’ assets for new economy learners; and,
- Develop plans, partners programs to increase the number of critical need graduates (STEM, Nursing, Allied Health, Teaching) 40 percent by 2030 with all being equipped for the New Economy.
In addition to the unified objectives above, each university will take the lead in the following:

**UNIVERSITY OF ARIZONA**

Prepare Arizona for a leading role in those elements of the New Economy related to the Fourth Industrial Revolution, including personalized medicine (precision health), advances in communication and connectivity, and expanded medical access, new public health and economic enhancement initiatives, new health care strategies and tools.

Through investments, partnerships, alliances, and innovations move the University of Arizona College of Medicine to a top quartile performer among academic medical centers in the United States and raise further its research profile in the sciences, biosciences and information sciences along with their practical application through technology transfer to the marketplace.

**NORTHERN ARIZONA UNIVERSITY**

Prepare a robust talent pipeline in high demand fields, with an emphasis on healthcare, including mental and behavioral health, as the largest private industry in Arizona. Expand opportunities for students to enter high demand fields in increasing numbers by increasing the educational opportunities available in Arizona through a variety of delivery models and at a variety of locations.

Expand and support pathway and expedited degree programs that provide students access to high demand programs through continued development of partnerships with CTEDS, community colleges and expedited bachelor to masters programs in support of needed career and technical fields of the New Economy.

Respond to Arizona’s growing technology industry and expand NAU’s programs in the new School of Informatics and Computing.

**ARIZONA STATE UNIVERSITY**

Provide a workforce ready for success in the new economy, and design and launch the largest center for engineering education and research in the United States, growing enrollments to 25,000+ and making Metro Phoenix the leading center for engineer production in America.

Accelerate investment in faculty recruitment to keep pace with student demand, and leverage the depth and breadth of the expertise of the Fulton Schools of Engineering disciplines to develop Science and Technology Centers which rely upon close partnerships among government, industry, and the university sponsor. These disciplines are critical to the state’s success in the new economy and include artificial intelligence, advanced communications, cybersecurity, materials science, neural engineering, power systems, semiconductors, sensors and signal processing, structures, renewable energy, robotics tissue engineering, and water resources.
THE $165 MILLION INVESTMENT

NEW ECONOMY: WORKFORCE
With a $100 million initialization investment from the state of Arizona the universities will be asked to mount all out efforts to lay the foundations and build the means to attain these objectives. The allocation of the additional $100 million for New Economy workforce development is:

- University of Arizona: $32 million
- Northern Arizona University: $22 million
- Arizona State University: $46 million

NEW ECONOMY: DEFINED STATEWIDE FINANCIAL AID
An expansion of need based financial aid for the most meritorious high school graduates would increase the extent to which homegrown talent graduates from high school and receives advanced college education. The $30 million investment would be used as last dollar financial aid to increase the college going rate for fully qualified students who, due to family income, gender or race/ethnicity, are not now choosing the college path. The university would commit to providing full, last dollar tuition scholarships for all students meeting income and merit thresholds (e.g. $45,000 family income and high school GPA of 3.0). ABOR would establish income and academic performance criteria. A clear and transparent program could increase enrollment in segments of demographics not previously reached.

NEW ECONOMY: ARIZONA TEACHERS ACADEMY CONTINUING EDUCATION
A $15 million investment to expand the scale of the academy, focusing on its availability for all college students, including those who take majors in math, science and other fields for which there is a shortage in Arizona's schools and to provide continuing education scholarships and programs for current teachers, counselors and education leaders.

NEW ECONOMY: DISTRIBUTED LEARNING CENTERS
A $10 million investment to enhance the viability and scale of the various university learning centers in locations outside of Tucson, Flagstaff and Metro Phoenix. Allocations would be made by ABOR to specific centers around the state with special focus on the more rural counties.

NEW ECONOMY: NEW INDUSTRY RESEARCH COMPETITIVENESS
The $10 million fund will raise the competitiveness of the universities’ capacity to compete for major, federal research funding where a state match can make a difference. These funds would be allocated by the Office of the Governor, targeted where new industry collaborative research especially benefits Arizona.

NEW ECONOMY: CAREER AND TECHNICAL EDUCATION
Specialized career and technical education will be needed for jobs in advanced manufacturing, IT/cybersecurity, healthcare, and energy. In order to ready Arizona for the economy’s transformation in its workforce, it will be essential that Arizona complete the identification of competencies needed for industry by developing sets of “stackable credentials” for each technical career through partnerships with industry and educators; coordinate community colleges’ development of common curricula; develop courses and train middle school and high school teachers; and support a work-based intermediary to codify competencies, develop stackable credentials, develop teacher training and support, and coordinate post-secondary educational curricula.
The universities support expanded access to vocational education and community college programs. The emerging economy will have a continued need for manufacturing, business and financial services, health care and construction expertise at varying skill levels. The universities will partner with and support programs that result in two-year degrees, certificates or other technical credentials.

THE RETURN ON THE $165 MILLION INVESTMENT
A base investment at this level would allow for enhance job creation; and higher levels of productivity, income, and tax revenues. Focus areas include:

- Enhanced national visibility for Arizona and Arizona leaders as leading movers toward the New Economy;
- Greatly enhanced outcomes for economic transformation of the Arizona economy, thereby developing and retaining the skilled labor force needed for attraction and retention of New Economy industries;
- Improved high school completion rates and college attendance and completion rates that address the forthcoming labor shortage of the New Economy and the demographic changes;
- Increased enrollment and expanded programs at distributed learning centers across Arizona; and,
- Additional, new teachers to meet the teacher shortage for K-12.

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vi No amount is specified by the ABOR due to the need for the development of funding streams by non-ABOR-related educators.

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v Percentages are expressed as the percent of US median household income, which is $57,652 from 2017.

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FY21 Public Investment in New Economy Initiative

**$46M**

ASU’s Workforce Readiness initiative is comprised of three primary components totaling $46M

**$10M**

to grow the Fulton Schools of Engineering

**$10M**

to grow the world-class faculty in the Fulton Schools of Engineering to accelerate research intensity to the levels of Stanford, MIT, and Georgia Tech, to broaden student access and graduate over 6,000 engineers by 2025, to complete the launch of a global school alliance for engineering design, to emerge as a top 15 U.S. engineering college, and to make Phoenix metro one of the largest producers of technology and engineering talent in the country and a first-tier center for knowledge-driven economic change.

**$26M**

for the development and expansion of education programs

**$26M** for faculty, classroom space, experiential learning programs and student support services. This investment will shorten the time to earn a degree and increase options for current students. It will also be used to accelerate the development and deployment of new ways of learning across New Economy fields and 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, AI-infused advising platforms and portals will be included as well as additional faculty to serve an expanded student and lifelong learning population.

**$10M**

for the establishment of five Science and Technology Centers (STCs) that will foster the growth of New Economy industries in energy, human performance, extreme environments, advanced manufacturing, and future communications technologies. These STCs will produce a minimum 15 times return on public investment, driving job creation, 250+ new industrial partnerships, startups, and advancing 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.

These five STCs will add to Arizona’s existing two applied research centers focused on industry led research — one for WearTech, the other for Blockchain.

**STC on Extreme Environments**

will focus on management and technology opportunities associated with growing population centers; research outcomes to engineer resiliency into the energy, water, materials and transportation systems in the built environment of future cities and regions.

**STC on Energy and Materials**

will be a national research resource for advancing new energy materials and device technologies to market, growing industry engagement and workforce training.

**STC on Future Communication Technologies**

will drive ASU and the region to the forefront of physical information systems as the “internet of things” continues to develop, and as users increasingly desire greater access, information, reliability, and communications diversity. New paradigms for both sensing and communications are critical.

**STC on Advanced Manufacturing**

will focus on the new technologies aimed at transforming manufacturing through 3D printing, robotics and automation, and new materials that leverages current manufacturing strength and evolving maker technologies with strong links to private industry support in aerospace, defense and space systems.

**STC on Human Performance**

will capitalize on regional strength and technology opportunity to enhance physical and cognitive performance, medical prevention and intervention and drive research from discovery to marketplace.
## 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

### 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

<table>
<thead>
<tr>
<th>FSE Current</th>
<th>Goal</th>
<th>Arizona Benefit</th>
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<tbody>
<tr>
<td><strong>Students</strong></td>
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<tr>
<td>16,800 In-person</td>
<td>25,000 In-person</td>
<td><strong>$14B</strong> over 20-year increased income impact</td>
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<tr>
<td>7,100 Online</td>
<td>15,000 Online</td>
<td><strong>&gt;15x</strong> return on public investment</td>
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<tr>
<td>4,200 Graduates</td>
<td>6,000 Graduates</td>
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<tr>
<td>6,000 First generation students</td>
<td><strong>&gt;90%</strong> Average starting salary</td>
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<tr>
<td>5,300 Female students</td>
<td><strong>#1</strong> Producer of technical talent in the U.S.</td>
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<td>4,800 Hispanic students</td>
<td><strong>#1</strong> Producer of technical talent in the U.S.</td>
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<tr>
<td><strong>$85,000</strong> Average starting salary</td>
<td><strong>#1</strong> Producer of technical talent in the U.S.</td>
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<tr>
<th><strong>Faculty</strong></th>
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<tbody>
<tr>
<td>350 Faculty</td>
<td>100 New faculty</td>
<td><strong>5x</strong> multiplier on job growth</td>
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<tr>
<td>25 Young investigator awards</td>
<td><strong>#5</strong> Worldwide in patents (2x output)</td>
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<tr>
<td>804 Invention disclosures</td>
<td><strong>#5</strong> Worldwide in patents (2x output)</td>
<td></td>
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<tr>
<td>35 Start-ups</td>
<td><strong>#5</strong> Worldwide in patents (2x output)</td>
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<tr>
<td><strong>#26</strong> Worldwide in patents</td>
<td><strong>#5</strong> Worldwide in patents (2x output)</td>
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<tr>
<th><strong>Research</strong></th>
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<tr>
<td><strong>$115M</strong> Research output</td>
<td><strong>$215M</strong> Research output</td>
<td><strong>New industry attraction and formation</strong></td>
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<tr>
<td>2 Engineering research centers</td>
<td>250+ New industrial partnerships</td>
<td></td>
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<tr>
<td><strong>$44M</strong> DARPA awards</td>
<td></td>
<td></td>
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<tr>
<td>8 Industry/University research collaborative centers</td>
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NAU’s historic commitment to local and rural communities across Arizona is evidenced by our partnerships with every community college in every county across the state. The university also delivers programs to government organizations and community partners specific to the workforce needs of the community. Under this budget request, NAU can expand program delivery to local law enforcement agencies, implement more 90/30 programs for the construction and manufacturing communities, and expand our pathways with CTEDs across the state.

On the cover: NAU has a long history as a leader providing access to teacher-preparation programs to Arizona students. We are continuing that tradition with nearly 800 Teachers Academy students.
NAU is a critical partner in guaranteeing Arizona has the talent pipeline it needs to succeed in the new economy. More than 6,000 NAU students are currently pursuing degrees in the health sciences and the university currently operates the only public programs in Arizona for Physician Assistants, Physical Therapy, Occupational Therapy, Athletic Training, and Dental Hygiene. State funding for the following areas will address patient care in Arizona to reduce industry shortfalls and prepare the workforce of Arizona’s future.

HEALTHCARE: MEETING THE WORKFORCE DEMANDS OF ARIZONA’S #1 EMPLOYER

Nursing
NAU offers a variety of nursing programs throughout Arizona and online capturing individuals new to the workforce and those who are pursuing a new career. Expansion of these programs will reduce long student waitlists, and specialization opportunities will provide employers with the specific workforce they need.

Physical Therapy
The US Bureau of Labor Statistics reports there are approximately 17,800 annual openings for physical therapists in the United States and growing. Consistently ranked as one of the nation’s top programs for PT, NAU proposes growing its existing program by 25 percent to meet the Arizona and national shortage.

Physician Assistant
The university proposes to expand our Physician Assistant Studies program by 20 percent. The allied health professions are serving increasingly important roles in primary care—especially in Arizona’s rural areas. Our program gives preference to Arizona’s residents which translates to 84 percent of our graduates remaining in our state after graduation.

Behavioral Health
The Arizona Department of Health Services and the Health Resources and Services Administration (HRSA) have designated many parts of Arizona as Mental Health Professional Shortage Areas. The Arizona state average for the ratio of mental health providers to population is 839:1. In 2016, the national average was 640:1. Meanwhile, Arizona’s public schools’ student to counselor ratio at approximately 900:1 nearly doubles the national average. A partnership with the state will help bolster our already excellent and established programs in School Counseling, Psychology, and Social Work and lift NAU’s newly implemented PsyD program in Clinical Psychology.

NAU’s WORKFORCE BUDGET REQUEST: $22M

NAU IMPACT IN ARIZONA

24,000+ jobs throughout Arizona are supported by NAU
$185 M in state and local taxes

$2.064B is generated annually for the Arizona economy by NAU

Physical Therapy
NAU’s Doctor of Physical Therapy program has a 100% employment rate after graduation.

Physician Assistant
84% of NAU’s Physician Assistant graduates are employed in Arizona.

Employers need a strong pipeline.
NAU is training the workforce of the future.
We adapt our programs to ensure that teach the skills our students need to thrive in a changing economy and diversified industry.

CYBERSECURITY

Across the region, there are thousands of vacant positions for cybersecurity professionals at all levels. A state investment will assist NAU as it develops and implements bachelor’s and master’s degrees in cybersecurity to provide high-quality programs for students seeking career opportunities at the local and national level.

Professor of Practice Bertrand Cambou (left) was recently named to the inaugural class of National Academy of Inventors senior members.
THE NEW ECONOMY

FY21 BUDGET REQUEST
$11.2 M on-going | $9.4 M one-time | $10 M Competitive Grant one-time

This initiative provides state funding to Arizona's public universities to develop a skilled workforce and enhance economic opportunity. Our request leverages existing strengths in Health, Mining and Space & Defense to address critical workforce shortages and establish Arizona as a leader in solving national and global challenges.
SPACE AND DEFENSE
State investment will enhance UA’s capacity to train and educate students for high demand/high paying careers in national security, space technology and planetary defense.

WORKFORCE DEVELOPMENT
Expand undergraduate programs that directly support the aerospace and defense industry by 1,300 additional students.

- UA is one of the top 4 higher education institutions in the nation positioned to fill the research and workforce needs for the defense industry, specifically related to hypersonics.
- Federal funding for hypersonics related research is expected to grow by over $200M in the next 5 years.
- DoD, Raytheon, and other defense companies have expressed the need for more students graduating with degrees related to hypersonics.

INFRASTRUCTURE: DEFENSE
State investment will upgrade wind tunnels to meet current hypersonics modeling & simulation needs for testing, research, and training.

- DoD is planning to double its research in hypersonic capabilities from $6.2 billion to $11.2 billion by FY2024.
- Accessible hypersonics wind tunnels will help UA compete for this research.
- Companies like Raytheon currently spend millions of dollars per year traveling to the handful of commercially available hypersonic testing facilities in the U.S.
- Ensuring students are workforce ready requires hands-on training and exposure to state-of-the-art infrastructure.

OPERATIONS: SPACE
State investment will help establish the Arizona Space Institute furthering UA’s competitiveness for DoD and NASA missions, industry partnerships and other large contracts.

- UA is #1 in astronomy and astrophysics, #4 in NASA funding among public universities and growing rapidly in DoD funding.
- NASA’s FY20 budget shows an increase from $927 million to $1.5 billion for “Space Technology”. DoD FY20 indicates $30M for “Space Technology Development”.
- The cost to develop a competitive proposal for a large NASA or DoD contract has escalated dramatically over the last decade.
- Proposal development for a major mission or contract can easily cost $1 million over two years, however the payoff is very large (major NASA mission - $500; major DoD contract - $50-$100M).

HEALTH SCIENCES
Additional state investment will address Arizona’s medical workforce shortage to improve health while fueling economic growth and opportunity throughout the state.

WORKFORCE DEVELOPMENT
Launch new programs, such as those highlighted below, to create the necessary pipeline of healthcare providers.

7-year bachelor/MD Program: Develop a 7-year Bachelor of Science/Medical Degree program.

- Debt has become a barrier for students interested in medical school, a BS/MD program will reduce debt and accelerate entry into the workforce.

K-12 Health Sciences Education: Create a high school dual enrollment course in health sciences and develop curriculum and teacher training to prepare K-12 students for STEM and health careers.

- Addressing the healthcare workforce shortage requires a multifaceted approach, early engagement and education will help build a pipeline.

IMPROVING HEALTH
Digital Psychiatry: Develop a program with capabilities to use smart devices and facial and voice recognition to improve behavioral health and identify symptoms of high-risk behaviors. The technologies developed will help better diagnose and monitor individuals suffering with mental illness.

- Only 40.3% of Arizonans living with mental illness received treatment in 2018.
- In 2017, suicide was the eighth-highest cause of death in Arizona and rate per 100,000 that was 24% higher than the national average.
- Native Americans and individuals living in rural areas, who may benefit from remote monitoring, have significantly higher suicide rates.

Telemedicine Expansion: Expand telemedicine for rural communities and develop new sensors for remote monitoring to reduce emergency room visits and hospital readmissions.

- Telemedicine can provide accessible healthcare for Arizonans that must currently drive one to two hours just to see the nearest physician.
- In some rural communities there might only be one doctor for every 10,000 Arizonans living in the area.
MINING FOR THE 21ST CENTURY

UAricana is a world leader in Mineral Resources and Geological Engineering. Additional state investment will develop the future workforce of mining by establishing Arizona’s only School of Mining and create interdisciplinary degree programs across engineering, science, law, and business.

- The demand for copper is expected to rise 275 – 350% by 2050 due to the electrification of energy.
- Remaining mineral deposits that are more difficult to extract as well as new societal expectations requires modernization of the mining workforce.

COMPETITIVE RESEARCH GRANTS FUND

This fund will provide a state match for federal grants pursued by Arizona’s public universities that require matching funds. Below are examples of current federal grants that require matching dollars.

<table>
<thead>
<tr>
<th>Grant</th>
<th>Matching Requirement</th>
<th>Grant Supports</th>
</tr>
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<tbody>
<tr>
<td>Agriculture and Food Research Initiative</td>
<td>100% match if the grant is for applied research that is commodity-specific and not of national scope.</td>
<td>Research, education, and extension grants to improve rural economies, increase food production, address water availability issues and train the next generation of the agricultural workforce.</td>
</tr>
<tr>
<td>Women and Minorities in Science, Technology, Engineering and Mathematics Fields</td>
<td>100% match required if a grant benefits a specific agricultural commodity</td>
<td>Research, education/teaching, and extension projects that increase participation by women and under-represented minorities from rural areas in STEM.</td>
</tr>
<tr>
<td>Beginning Farmer and Rancher Development Program</td>
<td>25% match required</td>
<td>Programs that develop and offer education, training, outreach and mentoring programs to enhance the sustainability of the next generation of farmers</td>
</tr>
<tr>
<td>Biomass Research and Development Initiative</td>
<td>50% match required for demonstration or commercial projects</td>
<td>Research that demonstrates new ways to refine various types of feedstocks and crops into biofuels or biobased chemical and products.</td>
</tr>
<tr>
<td>Community Food Projects Competitive Grants Program</td>
<td>100% match required</td>
<td>Projects designed to increase food security in communities and create systems that improve the self-reliance of community members over their food needs.</td>
</tr>
<tr>
<td>Crop Protection and Pest Management</td>
<td>100% match required if a grant benefits a specific agricultural commodity</td>
<td>Projects that will ensure food security and respond effectively to major societal pest management challenges.</td>
</tr>
<tr>
<td>Methyl Bromide Transitions Program</td>
<td>100% match required if a grant benefits a specific agricultural commodity</td>
<td>Projects that address the immediate needs and the costs of transition that have resulted from the phase-out of the pesticide methyl bromide</td>
</tr>
<tr>
<td>National Integrated Water Quality Program</td>
<td>100% match required if a grant benefits a specific agricultural commodity</td>
<td>Projects that protect and improve the quality of water resources throughout the United States and its territories, particularly in agriculturally managed watersheds.</td>
</tr>
<tr>
<td>New Beginning for Tribal Students</td>
<td>100% match required</td>
<td>Programs at land-grant universities and colleges that support Tribal students through tuition fees, recruiting, tutoring, counseling or any service that would increase student retention and graduation</td>
</tr>
<tr>
<td>Smith-Lever Special Needs Projects</td>
<td>100% match required</td>
<td>Special needs projects to implement applied scientific programs that serve public needs in preparation for, during and after local or regional emergency situations</td>
</tr>
</tbody>
</table>