

20
YEARS

ARIZONA'S
BIOSCIENCE
ROADMAP

THE LATEST PROGRESS OF THE
BIOSCIENCES
IN ARIZONA



ADVANCING THE BIOSCIENCES AND IMPROVING HEALTH OUTCOMES

After Two Decades The Evidence Is Overwhelming

Consistent strategies, collaboration, and long-term investments are paying off for bio—and for Arizonans

The independent experts who helped to craft Arizona’s Bioscience Roadmap in 2002 preached the importance of patience: A nationally competitive bioscience sector wouldn’t emerge in one year, one gubernatorial term, or one decade. But if we built on fundamental strengths and stuck with our strategies, bio could become one of Arizona’s most important industries.

This report, with progress data on the first 20 years of the Roadmap, has a clear conclusion: It’s happening.

The gold-standard measure of bioscience research strength is National Institutes of Health funding. In 2021, Arizona secured a record \$297 million from NIH—225% of its 2002 total and the highest share of NIH nationally since the Roadmap began. Year by year, Arizona’s public universities and scientific institutes are getting better at this foundational work.

Research is stronger than ever at Arizona’s universities and scientific institutes. Over time, research becomes patents, licenses, and new technologies and companies, enabling better health outcomes.









Over time, research becomes patents, licenses, and new technologies and companies, enabling better health outcomes. In 2021, venture capital for Arizona bioscience firms hit a record \$240 million—7 times higher than in 2002. But most of our VC deals are still at the pre-seed and angel stages, indicating room to grow.

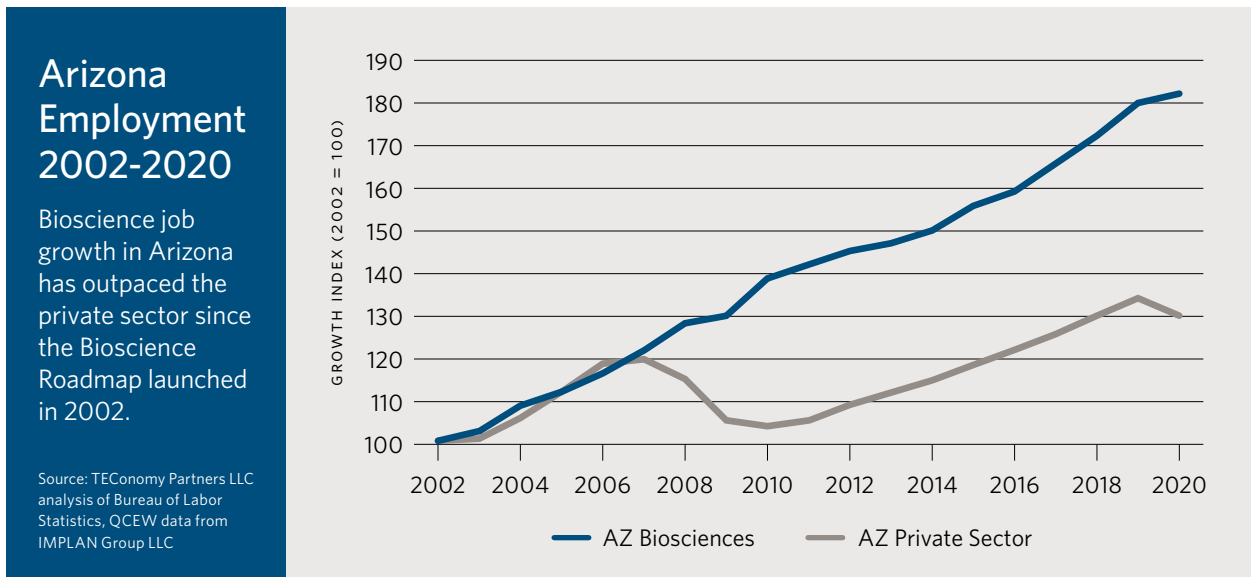
A striking lesson from the Great Recession was the resilience of bioscience and hospital jobs. Arizona’s overall private sector took years to recover, but bio employment never stopped growing—also outpacing the sector nationally—a trend that has held through the COVID-19 pandemic. And Arizona’s median bio job today pays 31% above the overall private-sector average.

Critical decisions since 2000 have enabled Arizona’s progress: The Legislature’s passage and renewal of the angel investor tax credit and the Technology and Research Initiative Fund (TRIF) for university research; funding from the state, cities, hospital systems, and private firms for infrastructure; daily commitments from Arizona leaders to work together.

The good news in this report is the product of intention. Onward.

» Making an Impact THE LATEST DATA

 <p>JOBS</p> <p>+5.4%</p> <p>From 2018-2020, Arizona bioscience jobs kept growing, even through the COVID-19 economic shock.</p>	 <p>AVERAGE WAGES</p> <p>31% higher</p> <p>In 2020, bioscience workers' annual wages were \$18,000 above Arizona's private-sector average.</p>	 <p>WAGE GROWTH</p> <p>+9.4%</p> <p>2018-2020 saw solid wage growth for Arizona bio workers—though the total private sector grew faster.</p>	 <p>NIH GRANTS</p> <p>\$297 million</p> <p>The gold-standard measure of research funding hit another new high in 2021—in dollars and national share.</p>
 <p>R&D</p> <p>+3.6%</p> <p>Bio R&D has never been greater at Arizona's universities, though it lagged the national growth rate from 2018 to 2020.</p>	 <p>VENTURE CAPITAL</p> <p>\$240 million</p> <p>VC funding for bio firms in Arizona saw a record high in 2021, though nationally it surged even faster.</p>	 <p>PATENTS</p> <p>+30%</p> <p>In 2020-2021, Arizona universities received 234 bio-related patents, up from 180 in the previous period.</p>	 <p>STARTUPS</p> <p>52</p> <p>The new bio firms created from university IP in 2020-2021 represented 63% of all university spinouts.</p>



» Prominent Long-Term Investments

University of Arizona receives \$60M for Precision Aging Network

The five-year, \$60 million grant from the National Institutes of Health to create the Precision Aging Network will enable researchers from UArizona and around the country to study brain aging with the goal of developing more effective and targeted treatments.

Angel tax credit extended for 10 years

Arizona Gov. Doug Ducey signs a bill that will allow for \$2.5 million in investor tax credits per year over the next 10 years, extending a program that began in 2006 to encourage investment in Arizona startups. Also, new Arizona legislation expands access to telemedicine for patients following successful piloting during the COVID-19 pandemic.

Mayo Clinic buys north Phoenix land for biotechnology corridor

Mayo Clinic acquires 228 acres to expand its current campus and develop the “Discovery Oasis” biotechnology corridor, where collaborators will help to advance novel medical and health-care solutions. Mayo is also adding a \$131 million education-and-research building on its current Phoenix campus.

Creighton University opens Health Sciences Campus with medical school

The Phoenix area welcomes a new medical school as Creighton unveils its \$100 million, 185,000-square-foot facility at Park Central. The campus also includes programs in nursing, pharmacy, physician assistant, and physical and occupational therapy.



» Enhance Hospital Research, Clinical Care

HonorHealth opens \$44M neuroscience institute

The Bob Bové Neuroscience Institute at HonorHealth Scottsdale Osborn Medical Center features nearly 120,000 square feet of space with patient access to top neurological care, support services, and research, including clinical trials.

Ivy Brain Tumor Center starts construction on new headquarters

A 75,000-square-foot building at Barrow Neurological Institute on the campus of St. Joseph’s Hospital and Medical Center will become the largest translational-research center dedicated to brain-tumor drug development.

RECENT HIGHLIGHTS

Banner Health opens Diamond Children's Medical Center

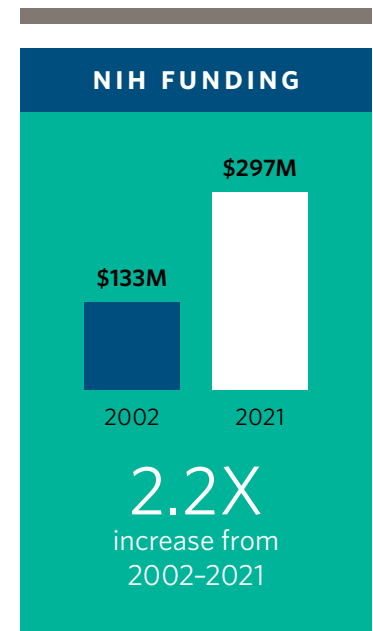
Banner Children's at Diamond Children's Medical Center in Tucson is a new \$3 million children's-cancer outpatient clinic that provides treatment and services to children with cancer or blood disorders. Banner Health also breaks ground on a \$243 million expansion of its Banner Gateway Medical Center campus in Gilbert.

Phoenix Children's expanding in the West Valley

Phoenix Children's breaks ground on a freestanding emergency department and expanded specialty clinic on its Avondale campus, while announcing plans to build a three-story, \$135 million hospital in Glendale that will include inpatient care, an emergency department, an outpatient surgery center, and a multi-specialty clinic.

Navajo Nation to welcome new hospital campus

Construction begins on Sage Memorial Hospital's new campus in Ganado, which will serve several communities with expanded services from a new 90,000-square-foot hospital with 40 beds. Meanwhile, Abrazo Health announces plans to build the first hospital in Buckeye.



» Promote Entrepreneurial Climate

TGen secures largest licensing deal to date; sells spinout

Translational Genomics Research Institute licenses its proprietary TARDIS technology, which uses a blood-biopsy method to test for cancer, to Exact Sciences Corp. The Wisconsin-based company later agrees to acquire TGen spinout Ashion Analytics, a sequencing lab, and the institutions enter into a 10-year research collaboration.

Arizona business accelerators win grants to increase diversity

Seed Spot, the University of Arizona Center for Innovation, and Startup Tucson are awarded \$50,000 each as part of the federal Growth Accelerator Fund Competition to inclusively support entrepreneurs researching and developing STEM-related innovations.

Tech Launch Arizona continues commercialization growth

The University of Arizona commercialization arm's most recent reported figures show year-over-year increases in invention disclosures, licenses, patents filed and issued, and the launch of 17 startups.

RECENT HIGHLIGHTS

Arizona Bioscience Week promotes life sciences

The Arizona Bioindustry Association hosts Arizona Bioscience Week, featuring a television broadcast, “Celebrating Life & Science;” a drug-discovery conference; AZAdvances Innovation Showcase; and the pitch competition Venture Madness.

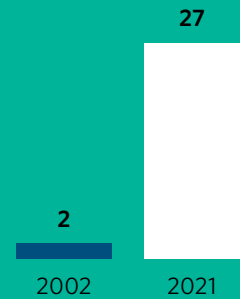
850 PBC adds incubator space, labs

The seven-story building at Phoenix Bioscience Core, home to Arizona State University, CEI LabForce, and several startups, will devote 35,000 square feet to incubator space and training labs for companies and students.

ASU once again tops innovation rankings

For the seventh straight year, U.S. News & World Report ranks Arizona State University No. 1 in innovation. Skysong Innovations, which helps bring ASU discoveries to market, has now raised more than \$1 billion in external funding from its startups.

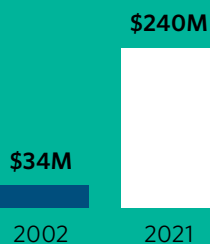
BIO-RELATED STARTUPS



13.5X
increase from
2002-2021

» Build Critical Mass of Companies, Raise Venture Capital

VC FUNDING



7.1X
increase from
2002-2021

OncoMyx Therapeutics secures \$50M for cancer treatment

The Phoenix-based spinout from Arizona State University secures \$50 million in Series B funding. The funding will help OncoMyx further develop a novel immune-oncology platform for clinical trials and treating solid tumors and hematological cancers.

eVisit raises \$45M for telehealth platform

Mesa-based eVisit secures \$45 million in Series B funding to grow its Virtual Care platform for large-scale health-care organizations and optimize clinical encounters for patients and providers.

WebPT acquires competitor to become market leader

Phoenix-based WebPT, which provides a rehab-therapy software platform for patient- and practice-management services, acquires Clinicient to form a combined company that serves more than 27,000 clinics and 43 million patients.

RECENT HIGHLIGHTS

Major European lab company expanding to Tucson

Eurofins CellTx announces a \$3 million lab at the University of Arizona Science and Technology Park providing organ-transplant services. Also in Tucson, device-maker Becton, Dickinson and Co. will build a \$65 million plant.

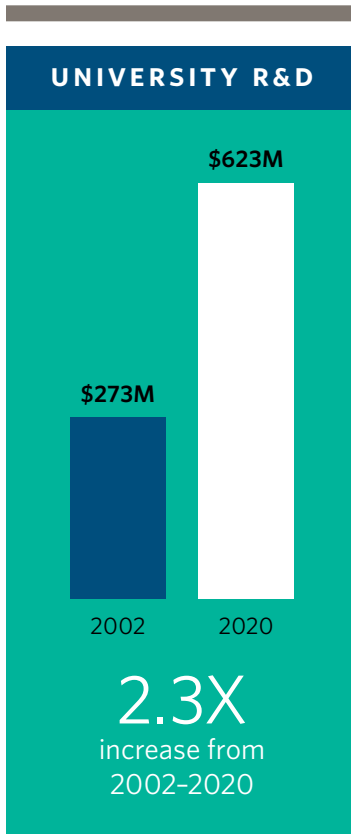
Align Technology moves global headquarters from San Jose

The global medical-device company, maker of the Invisalign orthodontics system, establishes its new corporate headquarters along Tempe Town Lake.

Phoenix startups pitch before global venture capitalists

Vidium Animal Health, using precision medicine to fight canine cancer; Movement Interactive Inc., maker of the Hiji Band to detect concussions; and Translational Sciences, with a therapy to dissolve blood clots and treat inflammation, are finalists at BIO International's Start-Up Stadium.

» Advance Research Base



Banner Health, Mayo Clinic to study Alzheimer's risk in healthy adults

Banner Alzheimer's Institute receives a five-year, \$27.5 million National Institute on Aging grant to study healthy people, preceding the onset of memory problems, at different levels of genetic risk for Alzheimer's disease. Banner Alzheimer's is also the primary site for phase 3 studies of aducanumab, the first Alzheimer's drug approved by the FDA in nearly two decades.

TGen studying COVID-19, cancer detection, dementia

Translational Genomics Research Institute studies long COVID-19 in infants, children, and adults under 26 as part of a major NIH project. Researchers discover screening urine could be used to detect cancer. And TGen's MindCrowd online research project finds smoking and cardiovascular disease impact cognitive function.

ASU Biodesign Institute to explore Parkinson's treatments

The Michael J. Fox Foundation awards three grants totaling \$5.2 million to Arizona State University to fund research targeting the underlying causes of the neurodegenerative disease and exploring three treatments.

RECENT HIGHLIGHTS

C-Path launches Acute Kidney Injury project

Critical Path Institute of Tucson launches the AKI project with the U.S. Food and Drug Administration to develop tools to improve the prediction and detection of drug-induced kidney injury. C-Path also partners to accelerate rare-disease and neonatal research and drug development.

UArizona researchers earn \$15M for comparative asthma study

University of Arizona researchers will use a \$15.3 million grant to compare asthma rates in Hispanic children in Tucson and Nogales, Sonora. Also, a UArizona College of Medicine-Tucson study finds a vaccine prevents nearly all canine Valley fever symptoms, indicating promise for a human vaccine.

» Expand STEM Education, Develop Talent

NAU welcomes new president, hosts STEM workshops for Native Americans

José Luis Cruz Rivera, a patented inventor, electrical engineer, and educator, is named Northern Arizona University's 17th president. NAU launches a program to host STEM workshops for Native American students at K-12 schools in the Four Corners region.

Hispanic students to be supported in STEM fields

The University of Arizona receives a \$5 million grant from the U.S. Department of Education to support Hispanic and lower-income students in their studies of science, technology, engineering, and math.

SARRC expands to Scottsdale campus

The Southwest Autism Research & Resource Center opens its newest campus, featuring the Comprehensive Behavioral Program and the Community School for ages 18 months to 5 years.

Tufts University brings DPT program to downtown Phoenix

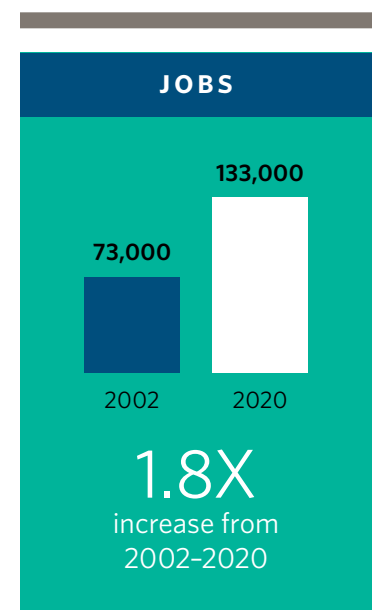
The Massachusetts-based university's School of Medicine Doctor of Physical Therapy program will welcome its first class in Arizona in 2022.

ASU master's program helps fund new startups

Arizona State University's Master of Science in Innovation and Venture Development, or MSIVD, awards a combined \$40,000 in seed money to four student teams from its inaugural class.

UArizona launches health technology consortium

HealthTech Connect, founded by the University of Arizona Health Sciences, will pull together the biotech, health-care, startup, corporate, higher-education, funding and economic-development communities.



2000-04

- Prop. 301 passage secures estimated \$1.25 billion over 20 years for university research
- Flinn Foundation commits to long-term major funding of Arizona biosciences
- BIO5 Institute debuts at UArizona; ASU's Bidesign Institute established
- TGen opens in downtown Phoenix; International Genomics Consortium (IGC) locates in Arizona
- Arizona's Bioscience Roadmap launched
- Arizona Legislature approves \$440 million to build university research facilities
- Phoenix Biomedical Campus established

2005-08

- Critical Path Institute (C-Path) opens in Tucson
- Legislature passes angel investor tax credit, expanded R&D tax credit
- Virginia G. Piper Charitable Trust commits \$50 million to personalized, or precision, medicine
- Classes begin at UArizona College of Medicine-Phoenix
- Roche buys Ventana Medical Systems for \$3.4 billion, later announces major expansion
- BIO5 Institute wins \$50 million iPlant Collaborative grant, later renewed
- NACET high-tech business incubator, TGen North open in Flagstaff

2009-2012

- ASU, UArizona, GateWay Community College, cities of Chandler, Flagstaff, Peoria, and Surprise, devote millions to new incubators, accelerators, research parks
- W.L. Gore announces \$130 million Phoenix expansion
- IGC secures \$59 million for key role in Cancer Genome Atlas project

- State creates Arizona Commerce Authority to promote economic development
- Inaugural Arizona SciTech Festival attracts 200,000 participants
- Banner Alzheimer's Institute wins \$15 million NIH grant, launches \$100 million drug study
- UArizona opens Health Sciences Education Building on Phoenix Biomedical Campus for research, medical students, NAU allied-health programs

2013-15

- Tech Launch Arizona becomes UArizona's commercialization arm
- FDA approves pancreatic-cancer drug combo tested by TGen, Scottsdale Healthcare (now HonorHealth)
- C-Path receives Gates Foundation grants to advance TB treatments
- Arizona's Bioscience Roadmap updated through 2025
- ASU Bidesign research instrumental in fighting Ebola virus
- AZBio hosts White Hat Investors, state's first bioscience capital conference
- Banner Health acquires UArizona Health Network in merger
- Flagstaff Business Accelerator opens doors to startups
- Dignity Health St. Joseph's, UArizona open new cancer center

2016-2018

- NeoLight wins Steve Case's Rise of the Rest pitch competition
- TGen North, NAU develop MRSA, Valley fever tests; NAU launches Pathogen and Microbiome Institute
- TGen acquired by City of Hope
- Arizona Bioscience Week debuts to promote sector
- UArizona Biomedical Sciences Partnership Building opens on Phoenix Biomedical Campus

- Mayo Clinic School of Medicine, partnering with ASU, welcomes inaugural class to Scottsdale campus
- Legislature authorizes \$1 billion for university research infrastructure; extends Prop. 301 for 20 years, including TRIF; approves \$10 million for angel investor tax credit
- NAU obtains \$21 million NIH grant to study Southwest health disparities
- UArizona, Banner Health receive \$60 million for "All of Us" study
- ASU Bidesign opens third building, hosts ASU-Banner Neurodegenerative Disease Research Center

2019-2021

- BD anchors new bio-focused IDEA Tempe campus
- UArizona accepts first class for new College of Veterinary Medicine in Oro Valley; university opens Center for Innovation incubator nearby
- C-Path receives FDA contract to improve Alzheimer's, Parkinson's trial design
- Wisconsin-based Exact Sciences buys Arizona-based companies Ashion, Paradigm Diagnostics, and Viomics, all spinouts of TGen or IGC
- Arizona COVID-19 Genomics Union forms with TGen and state universities to conduct genomic sequencing
- ASU Bidesign develops saliva-based COVID-19 test
- Phoenix Biomedical Campus welcomes 850 PBC research and innovation center, rebrands as Phoenix Bioscience Core
- NIH awards UArizona \$60 million to create Precision Aging Network
- Arizona angel investor tax credit reauthorized for \$25 million over 10 years
- Mayo Clinic acquires 228 acres in north Phoenix for "Discovery Oasis" biotech corridor
- Creighton University opens medical school on new Phoenix health-sciences campus

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