

ARIZONA'S
BIOSCIENCE
ROADMAP

THE LATEST PROGRESS OF THE
BIOSCIENCES
IN ARIZONA



ADVANCING THE BIOSCIENCES AND IMPROVING HEALTH OUTCOMES

When the Needs Are Everywhere Respond Everywhere at Once

The health care workforce shortage poses challenges on many fronts. Arizona has launched a bold plan.

THE CRISIS IS PROFOUND: Americans are short 100,000 physicians and 350,000 registered nurses. Ten percent of physical-therapist positions are vacant, with similar challenges across allied-health fields. In Arizona, the deficit is exacerbated by rapid population growth and archaic federal formulas to fund training. In rural communities, the problem is worse still.

In 2023, Arizona’s public university system responded aggressively. Under the umbrella of AZ Healthy Tomorrow, the Arizona Board of Regents charged Arizona State University, Northern Arizona University, and the University of Arizona to address our workforce needs in distinct ways:

With thousands of qualified applicants currently turned away for lack of space, UArizona will double the number of med students at its two colleges of medicine, maintaining its research focus.

ASU and NAU will launch medical schools of their own—the former cross-training future physicians as engineers ready to discover and apply new technology for patient benefit, the latter boosting the supply of primary-care practitioners in rural, underserved, and Indigenous communities.

Under the umbrella of AZ Healthy Tomorrow, the Arizona Board of Regents has charged each of our public universities to address our workforce needs in distinct ways.

All three universities will expand programs in public health, nursing, and allied health.









Equitable access to high-quality care is a cornerstone of high quality of life. But the set of initiatives the universities have launched go beyond easing the search for a family physician in Mohave County or a specialist in Mesa.

Med schools drive innovation, especially when integrated with training hubs for other health professions. Scientists and clinicians translate lab discoveries into prototype treatments. Industry works with university-affiliated health systems to enroll patients in clinical trials. Students across the health professions, exposed to the latest research and best practices in care, become the next generation of entrepreneurs.

The promise of Arizona’s Bioscience Roadmap is to advance the bio sector and improve health outcomes. AZ Healthy Tomorrow does both.

» Making an Impact

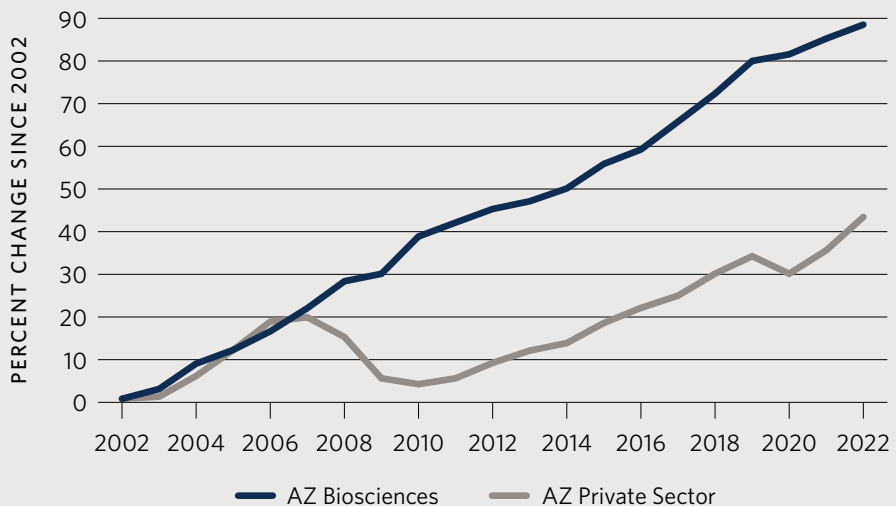
THE LATEST DATA

 <p>JOBS</p> <p>+3.8%</p> <p>From 2020-2022, Arizona bioscience jobs grew slightly faster than the +3.6% national rate of change.</p>	 <p>AVERAGE WAGES</p> <p>31% higher</p> <p>In 2022, bioscience workers annual wages were almost \$20,000 above Arizona's private-sector average.</p>	 <p>WAGE GROWTH</p> <p>+11.5%</p> <p>2020-2022 saw strong wage growth for Arizona bio workers—slightly exceeding that of the total private sector.</p>	 <p>NIH GRANTS</p> <p>\$365 million</p> <p>The gold standard research-funding metric hit a record again in 2023, tripling the national growth rate since 2020.</p>
 <p>R&D</p> <p>+13.2%</p> <p>Bio R&D at Arizona's universities broke \$700 million for the first time, growing slightly slower than the nation from 2020-2022.</p>	 <p>VENTURE CAPITAL</p> <p>\$272 million</p> <p>VC funding for bio companies in Arizona countered a national trend in 2023, rebounding after a dip in 2022.</p>	 <p>PATENTS</p> <p>+8%</p> <p>In 2022-2023, Arizona universities received 253 bio-related patents, up from 234 in the previous period.</p>	 <p>STARTUPS</p> <p>29</p> <p>The new bio firms created from university IP in 2022-2023 represented 47% of all university spinouts.</p>

Arizona Employment 2002-2022

Bioscience job growth in Arizona has outpaced the private sector since the Bioscience Roadmap launched in 2002.

Source: TEconomy Partners LLC analysis of Bureau of Labor Statistics, QCEW data from IMPLAN Group LLC









» Prominent Long-Term Investments

Arizona universities announce major health initiatives

Arizona State University and Northern Arizona University will open their first medical schools in Phoenix and Flagstaff, each with a unique focus, while the University of Arizona will double the size of its medical schools and form the College of Health Sciences to house graduate-level programs addressing workforce needs as part of the AZ Healthy Tomorrow initiative.

What Are the Biosciences?

	Agricultural Feedstock and Industrial Biosciences
	Bioscience-Related Distribution
	Drugs, Pharmaceuticals, and Diagnostics
	Hospitals
	Medical Devices and Equipment
	Research, Testing, and Medical Labs

Mayo Clinic receives city approval to develop Discovery Oasis

The plan for the 120-acre medical and research campus in north Phoenix, adjacent to the existing Mayo Clinic hospital and ASU Health Futures Center, includes collaborative spaces for research and innovation as well as bioscience companies. Meanwhile, Phoenix announces its third bioscience hub designation—Phoenix Medical Quarter at Park Central—to join Discovery Oasis and Phoenix Bioscience Core.

NSF awards \$91M for ASU to build new X-ray technology

The \$90.8 million grant from the National Science Foundation will support a five-year project to build the world's first Compact X-ray Free Electron Laser at the ASU Biodesign Institute. The X-ray technology will help in the understanding of human health and developing new medicines and drugs.

New GME slots coming to Phoenix

Banner Health and the University of Arizona College of Medicine-Phoenix have plans to create 229 new residency and fellowship positions to keep medical school graduates in Arizona, with hopes of alleviating the state's physician shortage.

» Promote Entrepreneurial Climate

Connect Labs by Wexford opens in Phoenix Bioscience Core

The fifth floor of the 850 PBC building opens as a collaborative space featuring secured labs and offices for emerging bioscience companies. Meanwhile, the National Institute of Diabetes and Digestive and Kidney Diseases agrees to occupy the full seventh floor of the Wexford Science & Technology facility.

RECENT HIGHLIGHTS

Journey Venture Studio welcomes first entrepreneurs

Healthcare entrepreneur Justin Bayless launches his inaugural founder-in-residence cohort, where the diverse leaders of three health care-related companies receive \$100,000 plus coaching and training during the six-month venture program.

Illume Innovation Center commits to major renovation

The \$20 million renovation to the 370,000-square-foot life sciences and medical building in north Scottsdale will help the center become a fully lab-enabled life science facility. Nucleate, a nonprofit organization of rising biotech entrepreneurs, selects the building for the headquarters of its Arizona chapter, led by ASU and UArizona graduates.

Arizona startups pitch at international convention

Anticipate Bioscience, ElectraTect Inc., FAKnostics LLC, Prizm Tx, Reference Medicine, Reglagene, and VaxSyna are selected to participate in Start-Up Stadium at the 2023 BIO International Convention in Boston and pitch to potential investors. Prizm Tx is named the Seed-Stage Start-Up Winner in the competition.

Bio companies selected for accelerators

Medical device and health care technology startups Anuncia Medical Inc., Navi Nurses, and TruLite Health are chosen for the Mayo Clinic and ASU MedTech accelerator program. Bio companies Dx4Liver, Inc. and Macula Vision Systems are among the 10 awardees of the 2023 Arizona Innovation Challenge and invited to participate in the Arizona Commerce Authority's Venture Ready Accelerator.

AZBio celebrates 20 years

The Arizona Bioindustry Association celebrates 20 years during the annual Arizona Bioscience Week, where bioscience leaders and companies are honored for the impact they have made on research, education, and building the life science workforce.

» **Build Critical Mass of Companies, Raise Venture Capital**

GT Medical Technologies raises \$45 million

The Tempe-based company, which treats patients with operable brain tumors, will use the Series C funding to support the expanded commercialization of its GammaTile Therapy, a targeted radiation therapy. Reglagene, EvolvedMD, TruLite Health, Planatome, and CND Life Sciences are among other Arizona companies receiving new capital funding.

Exact Sciences to build large cancer detection facility near Sky Harbor

The Wisconsin-based company, which provides earlier cancer detection and treatment guidance and previously acquired a TGen spinout, receives approval to construct a 250,000-square-foot facility with labs, offices, manufacturing, and warehouse space that's projected to create more than 800 jobs.

RECENT HIGHLIGHTS

GPEC earns federal grant to advance medical device manufacturing

The Greater Phoenix Economic Council will lead the MDM2 consortium's strategic work, funded by the federal Tech Hubs program, to accelerate economic growth in the manufacturing of medical devices driven by emerging technologies.

C-Path announces new leadership, collaborations

Dr. Klaus Romero, a clinician scientist, is named the new CEO of the Tucson-based Critical Path Institute, where he has spent the past 16 years. C-Path also announces an expansion of neonatal data in their Real-World Data Project and access to its Parkinson's database to external researchers.

German companies select Phoenix for U.S. expansions

Schott AG opens a \$10 million, 40,000-square-foot facility that will manufacture rapid diagnostic devices. ARENSIA opens a research clinic for Phase I and II trials in neurology, immuno-inflammation, cardiovascular, and infectious diseases.

Five Roadmap Goals:

-  **1: Form a hub of bioscience entrepreneurs and enterprises across Arizona**
-  **2: Increase the ability of research-performing institutions to turn results into products, treatments**
-  **3: Make Arizona a bio-talent powerhouse**
-  **4: Promote Arizona's convergence of research, health care, and commercialization to economic partners in neighboring states, Canada, and Mexico**
-  **5: Sustain and enhance the state's "collaborative gene" reputation**

» Advance Research Base

Barrow Neurological Institute to study ALS, effects of COVID-19 on Alzheimer's

Barrow Neurological Institute receives \$16.7 million in NIH funding to lead a national consortium studying ALS. The Arizona Governor's Office allocates \$10 million in federal funding for BNI to study the effects of COVID-19 on Alzheimer's patients, while the organization announces the Barrow Neuro Analytics Center at Park Central.

TGen to lead pancreatic cancer research with \$4.5M NIH grant

City of Hope and TGen will lead an international group, including HonorHealth and UArizona, to validate a liquid biopsy for the early detection of pancreatic cancer. TGen researchers also find that exposure to Valley fever does not significantly increase after major dust storms, and participate in an international study that finds the choroid plexus in the brain becomes enlarged with Alzheimer's disease.

UArizona, tire company partner to study guayule

The five-year, \$70 million project, in partnership with the U.S. Department of Agriculture and Bridgestone Americas, will grow and process the desert shrub to create an alternative source of natural rubber to be used in tires and other products.

RECENT HIGHLIGHTS

ASU participates in Indigenous health data collection project

ASU is one of six institutions involved in the NIH Rapid Acceleration of Diagnostics Initiative, a \$9 million project to support the first Tribal Data Repository led by Native scientists.

NAU's Center for Native American Cancer Health Equity awarded \$4M

Under the grant, the Center is developing a community advisory board, coordinating an inter-tribal forum, beginning work with participant Native nations to launch community assessments of cancer burden and services, and supporting scientists researching Native American cancer health equity.

UArizona, ADHS partner in Yuma wastewater pilot study

Researchers at the UArizona Yuma Center of Excellence for Desert Agriculture and the state of Arizona will test area wastewater for *Candida auris*, a drug-resistant fungal disease spreading in hospitals and health care facilities.

» Enhance Hospital Research, Clinical Care

Banner Health announces hospital plans in north Scottsdale

Banner Health has proposed a north Scottsdale medical campus scheduled to open in 2026 that will include a four-story, 350,000-square-foot hospital, MD Anderson Cancer Center, and an outpatient center.

HonorHealth expanding across the Phoenix area

HonorHealth breaks ground on a \$170 million addition to its Deer Valley Medical Center, as well as a new Cardiovascular Center of Excellence in north Scottsdale and a medical campus in Peoria that will include cancer care, primary care, and outpatient surgery. City approval is also granted in Surprise for a development anchored by a new HonorHealth hospital.

The Arizona BioMap

Get details on more than 1,200 organizations in Arizona's most comprehensive bioscience directory. Visit flinn.org/biomap.

Rural Arizona hospital receives \$10M federal grant

The Copper Queen Community Hospital in Bisbee will undergo a 27,000-square-foot expansion project with an Emergency Rural Health Care grant. The only Arizona recipient of the grant will use its existing areas for outpatient behavioral health care and specialty physician offices.

New lung cancer treatment comes to Tucson

Bronchoscopy technology, now available at Banner-University Medical Center and Northwest Medical Center, enables a doctor to better diagnose lung cancer and determine how much it has spread.

RECENT HIGHLIGHTS

Phoenix Children's opens new Glendale clinic, creates research institute

The 45,000-square-foot Phoenix Children's Specialty Care-Arrowhead Campus provides care in more than two dozen specialties, and a pediatric hospital is scheduled to open in 2024. Also, the Phoenix Children's Research Institute at the University of Arizona College of Medicine-Phoenix names its director.

» Expand STEM Education, Develop Talent

First class graduates from UArizona College of Veterinary Medicine

The only public veterinary school in the state, which was launched in 2020, graduates its first class of 106 students.

Phoenix Bioscience High School students attend STEM camp

The Center for Entrepreneurial Innovation's weeklong Bioscience Summer Camp introduces high-school students to professionals in STEM fields in downtown Phoenix and beyond while also hosting campers at 850 PBC at Phoenix Bioscience Core. Tucson Unified School District girls participate in the ACES (Applied Career Exploration in STEM) summer camp.

Federal grant funds UArizona Cancer Center STEP-UP training program

A \$1.5 million grant from the National Cancer Institute provides for a 10-week summer research and training program for undergraduate and master's students to work in laboratory and community settings.

GCU's business accelerator partners with venture capital firm

Canyon Ventures, the Grand Canyon University startup business accelerator, which provides opportunities for students and recent graduates, partners with venture capital firm Flagstaff Ventures of Scottsdale.

Dig Deeper

Find a comprehensive catalogue of bioscience developments since the Roadmap's 2002 creation at flinn.org/progress.



Tracking Metrics that Matter

Every two years, the Flinn Foundation commissions a study of performance metrics for the biosciences in Arizona and shares the results with the community. The figures inside this report are drawn from the last biennial dataset before Arizona's Bioscience Roadmap is renewed in late 2025.

Measuring and publicizing progress is a necessary condition for a collective-impact initiative like the Roadmap to succeed. The adaptive challenge of driving Arizona's bioscience sector forward requires concrete data to inform the decision-making of hundreds of institutions and leaders that have committed to our shared agenda.

The metrics derive their power in part from their consistency—dating to the Roadmap's creation in 2002—and in part because we measure Arizona not only against its past self, but also against national benchmarks of competitiveness.

While specific goals and recommended actions will evolve in the Roadmap's next generation, one constant will be the metrics we follow. There's power in these numbers.

» Leading into a New Era

The new leaders of Arizona's Bioscience Roadmap Steering Committee will guide us through the end of the current Roadmap in 2025 and into its next iteration. The committee chair is **Heather Carter**, Senior Vice Chancellor of External Affairs at Maricopa Community Colleges. The vice chair is **Jennifer Barton**, Director of the BIO5 Institute at the University of Arizona.



Heather Carter
Chair, Bioscience Roadmap Steering Committee



Jennifer Barton
Vice Chair, Bioscience Roadmap Steering Committee

Working alongside Carter and Barton on the Steering Committee are some 125 executive-level leaders from Arizona's public and private sector in science, health care, business, academia, and policy.



ARIZONA'S BIOSCIENCE ROADMAP

Arizona's Bioscience Roadmap is a plan through 2025 to make Arizona a leader in select bioscience fields.

A convening of state leaders in science, business, academia, and government guides the Roadmap.

Roadmap metrics are tracked and reported by outside experts, commissioned by the Flinn Foundation.

CONTENT IN THIS REPORT CURRENT AT DATE OF PUBLICATION, APRIL 2024.



1802 North Central Avenue
Phoenix, AZ 85004-1506

602.744.6800
info@flinn.org

Additional information on Arizona biosciences is at www.flinn.org/progress.