

ARIZONA'S
BIOSCIENCE
ROADMAP

THE LATEST PROGRESS OF THE
BIOSCIENCES
IN ARIZONA



ADVANCING THE BIOSCIENCES AND IMPROVING HEALTH OUTCOMES

Making Arizona Ready For What's Coming Next

We're not done with disruption. But with the right investments, we can be prepared for what will be an amazing opportunity set.

There's a solid argument that the most important news in 2022 for Arizona's bioscience sector wasn't a bio development. In December, Taiwan Semiconductor Manufacturing Company said it would triple its Phoenix chip-factory investment, to a total of \$40 billion. What made the decision possible:

- **Leaders leading.** Local and state officials and economic-development teams understood how to negotiate effectively from decades of productive experience with Intel and more than 100 smaller semiconductor firms.
- **Partnership up top.** Over the summer, Congress passed the CHIPS and Science Act, which will provide support for manufacturers, major awards for university research, and subsidies for workforce development.
- **Talent at scale.** More than 25,000 undergraduates already study engineering and computer science at Arizona's three public universities—an abundant future workforce.

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TSMC's investment in Arizona is significant for the biosciences in part because it confirms the recipe. The big advances in the era of Arizona's Bioscience Roadmap have similarly required all hands on deck, from the formation of the Translational Genomics Research Institute through the renewal of the Technology and Research Initiative Fund. Like her predecessors, Gov. Katie Hobbs will have opportunities to assemble coalitions to drive further progress.

The arrival of a semiconductor giant also matters to bio because of where the two sectors are heading: straight toward one another. Sequencing a human genome now takes a day. Machine learning is supercharging CRISPR gene-editing. The AI system AlphaFold has predicted the structures of 200 million proteins. The Fourth Industrial Revolution? It's here.

Revolution means disruption, with risks to people, companies, and whole regions. To navigate successfully, Arizonans' commitment to collaboration—across institutions, cities, industries—cannot waver. Meanwhile, we must double down on both our research discovery engine and the training of our future workforce. The world is speeding up, and we'll need everyone along for the ride.

» Prominent Long-Term Investments

UArizona plans new Phoenix research center

The University of Arizona announces that the new Center for Advanced Molecular and Immunological Therapies, or CAMI, will be built at the Phoenix Bioscience Core to pursue advanced research and innovative treatments. The project receives a boost when the state allocates \$150 million of federal money to CAMI.

NAU earns another \$21M for health-equity research

The Center for Health Equity Research at Northern Arizona University receives a \$21 million National Institutes of Health grant—five years after an initial grant of the same amount—to continue its work to support health and study disparities among diverse populations in the Southwest.

Semiconductors boom throughout Arizona

Construction continues on the Taiwan Semiconductor Manufacturing Company factory on more than 1,000 acres in north Phoenix. Intel's expansion in Chandler marches on. The CHIPS and Science Act of 2022, signed into law by President Joe Biden, is expected to bolster research and manufacturing of semiconductors with billions in incentives and positively impact bioscience advances in the state.

Caris Life Sciences opens \$45M Phoenix lab

Caris Life Sciences, which provides cancer patients and oncologists comprehensive molecular information to deliver personalized treatment, opens a \$45 million, 34,000-square-foot liquid-biopsy laboratory in Phoenix. Caris is named 2022 Arizona Bioscience Company of the Year by the Arizona Bioindustry Association during Arizona Bioscience Week, which also features the White Hat Life Science Investor Conference.

» Enhance Hospital Research, Clinical Care

Banner Health expands cancer centers, proceeds on sports-medicine campus

Banner MD Anderson Cancer Center completes a nearly \$20 million expansion at Banner-University Medical Center Phoenix and opens a \$1 million investigational cancer-therapeutics research unit in Gilbert for patients enrolled in first-in-human and early therapeutic trials. Banner Health also breaks ground on a \$54 million, 80,000-square-foot sports-medicine center in Scottsdale to serve athletes at all levels.

RECENT HIGHLIGHTS

HonorHealth breaks ground on new Scottsdale campus

The HonorHealth Medical Campus at Pima Center starts construction off Loop 101 in Scottsdale. The \$50 million campus, featuring a 100,000-square-foot ambulatory building, will include sports medicine, primary care, imaging, physical therapy, and a membership-based medical fitness center. HonorHealth's Cardiovascular Center of Excellence at Scottsdale Shea Medical Center introduces new technology to better treat heart arrhythmias.

New hospitals planned across Arizona

Hospitals are planned and under construction statewide. Northern Arizona Healthcare intends to break ground this year on a new campus on the south end of Flagstaff. Phoenix Children's Hospital is building West Valley facilities, Dignity Health is planning a hospital in Surprise, Abrazo Health has acquired land for a Buckeye medical campus, and the city of Maricopa is planning a medical and innovation campus with a specialty emergency hospital.

Navajo Nation cancer center receives federal money

Tuba City Regional Health Care Corporation on the Navajo Nation receives \$8 million in federal money for its cancer-treatment center and to serve Navajo elders with long-term care and skilled-nursing services.

Barrow Neurological Institute opens new neuroscience facility

Barrow Neuroplex is the new Barrow Neurological Institute facility at Dignity Health St. Joseph's Hospital and Medical Center in Phoenix. The 130,050-square-foot, five-story facility provides easier access to physicians, laboratories, imaging, and pre-admission care.

Mayo Clinic in midst of Phoenix campus expansion

Mayo Clinic breaks ground on the Integrated Education and Research Building on its north Phoenix campus, which will be the future home for Mayo Clinic Alix School of Medicine students. The building, next to Arizona State University's Health Futures Center, will offer scientific training and continuing education for patients.



“High-tech industries are increasingly complementary and intertwined. The multi-billion-dollar investments Arizona has seen in manufacturing will have spillover benefits for bio, in areas from AI drug discovery, to precision-ag, to wearables.”

Heather Carter
Vice Chair, Arizona's
Bioscience Roadmap
Steering Committee

» Promote Entrepreneurial Climate

Cancer Prevention Pharmaceuticals acquired for \$60M

Cancer Prevention Pharmaceuticals, which has developed therapeutics to reduce the risk and recurrence of cancer and rare diseases, is acquired for up to \$60 million by Minnesota-based Panbela Therapeutics Inc.

RECENT HIGHLIGHTS

Pitch competitions throughout Arizona reward bio firms

Botco.ai, Centauri Health Solutions, Humabiologics, Metfora, and Taproot Interventions and Solutions take home prizes from the 25th annual IdeaFunding at TENWEST Impact Festival in Tucson, the Arizona Innovation Challenge, Venture Madness, and the inaugural AZ Inno Fire Awards and AZ Inno Madness.

Arizona Tech Council celebrates 20 years

The Arizona Technology Council, a trade association for science and technology companies with more than 700 members, celebrates its 20th anniversary and hosts its annual Governor's Celebration of Innovation awards to honor companies, innovators, legislators, teachers, and more.



CLINICAL PROVIDERS

HB 2691

Gov. Doug Ducey signed a bill in June investing nearly \$150 million over three years to address Arizona's dire nursing shortage.

Tech Launch Arizona sets record for inventions

Tech Launch Arizona has the most faculty inventions in a single year in UArizona's history with 303, up from 274 the previous year. Also, a report shows the university's commercialization arm had a \$1.6 billion impact between 2016 and 2021.

MedTech Accelerator welcomes third cohort

Eight companies from Arizona and around the world are selected for the MedTech Accelerator, a flagship program of the Mayo Clinic and ASU Alliance for Health Care, where the emerging companies will take part in an immersive curriculum in health-care entrepreneurship.

Phoenix Children's partners with Coplex

The pediatric health system and a venture studio and corporate innovation firm announce an agreement to launch six new health-care technology startups—using patented innovations developed at Phoenix Children's—over the next three years.

StartupAZ Collective supports innovation program

The 2022 Startup AZ Collective, based in downtown Phoenix, provides a yearlong program for 18 firms divided into growth and launch categories. The 2022 cohort includes Navi Nurses, which offers on-demand, personalized nursing care, and Nymbly Systems, maker of health-care management software for orthotics and prosthetics clinics.

» Build Critical Mass of Companies, Raise Venture Capital

AZ-VC launches new \$110M fund for Arizona startups

AZ-VC, formerly InvisionAZ Fund, closes its first fund with a raise of \$110 million. AZ-VC is a Series A and beyond venture-capital fund based in Phoenix with primarily in-state investors that specifically targets Arizona startups.

RECENT HIGHLIGHTS

Xcellerant Ventures to invest in future of health tech

Life-science and startup experts in the Phoenix area launch Xcellerant Ventures, which invests in medical innovators that seek to improve the quality of and access to health care while reducing its cost.

Accelerate Diagnostics has public offering of \$35M

Accelerate Diagnostics raises \$35 million to help bring to market its products for treating sepsis and other serious infections. The Tucson company makes test kits for hospitals and labs that shorten the time for patients to receive the best antibiotic therapy.

Cranial Technologies to expand with new majority investor

Global investment company Eurazeo purchases a majority stake in Cranial Technologies to help the Phoenix firm expand into new clinics in the United States and international markets. Cranial Technologies, founded in 1986, treats infants with plagiocephaly, or flat-head syndrome, with its custom cranial orthotic helmets.

HTG Molecular Diagnostics raises \$10M

HTG Molecular Diagnostics Inc. of Tucson, which advances precision medicine through its transcriptome-wide profiling and advanced medicinal-chemistry technology, raises \$10 million in a public offering for research and development and clinical trials.

C-Path names new leaders, plays role in rare-disease treatments

The Tucson-based Critical Path Institute names Daniel M. Jorgensen, an experienced leader in drug development, health care and business, as its new CEO, and Kristen Swingle its president and COO. C-Path will serve as the convener of the Critical Path for Rare Neurodegenerative Diseases, a public-private partnership announced by the NIH and FDA.

Roche Tissue Diagnostics expands production in Marana

Roche Tissue Diagnostics of Oro Valley opens a new 60,000-square-foot building in Marana for instrument and service manufacturing. The facility, built next to an existing Roche distribution center, allows for the expansion of diagnostic-assay production on the Oro Valley campus.

Aqualung Therapeutics Corp. receives \$4.8M from NIH

The NIH awards Aqualung Therapeutics Corp., a firm led by a UArizona pulmonologist, \$4.8 million to develop the ALT-100 monoclonal antibody for pulmonary arterial hypertension and inflammatory bowel disease.



“Arizona’s startup community is maturing, but the collaborative spirit is unchanged. Ready to solve a problem? There are people here to help you get moving.”

Eve Ross
Chair, Arizona’s
Bioscience Roadmap
Steering Committee

RECENT HIGHLIGHTS

Aesthetics Biomedical device receives federal approval

Aesthetics Biomedical Inc.'s Vivace RF micro-needling device receives FDA clearance. The device, which stimulates collagen growth, will be manufactured in Mesa.

» Advance Research Base

Arizona collaboration to host vaccine-effectiveness project

ASU, Phoenix Children's, and Valleywise Health will work together on a five-year, \$12.5 million Centers for Disease Control and Prevention project. The collaboration will be one of seven centers across the country gathering real-world data to study the effectiveness of influenza and COVID-19 vaccines. In addition, the CDC allocates \$22 million to UArizona to continue COVID-19 research and \$7.3 million to monitor long-COVID progression over a two-year period.

Arizona universities retain strong R&D rankings

In the latest ranking by the National Science Foundation of research-and-development expenditures, NAU breaks into the top 20% of all U.S. institutions. UArizona (36th) and ASU (42nd) are in the top 5%.



The Arizona BioMap

Search a regularly updated directory of more than 1,200 organizations across the state at flinn.org/biomap.

ABOR allocates \$4.5M toward Valley fever research

The Arizona Board of Regents is putting \$4.5 million toward Valley fever research over the next three years, which will enable researchers from the state's three public universities to work alongside state health officials and the Arizona Department of Environmental Quality to identify Valley fever hotspots. Also, UArizona announces that a Valley fever vaccine for dogs is ready for vet offices.

UArizona researcher creates falloscope to detect ovarian cancer

Jennifer Barton, director of UArizona's BIO5 Institute, creates a falloscope 0.8 millimeters in diameter with a tiny camera to look into the fallopian tubes to detect ovarian cancer before it spreads. Also at BIO5, a \$1 million grant will enable work on a portable device to improve the diagnosis of ulcers.

Dignity Health uses DNA to figure heart risk

Dignity Health in Arizona launches the first research study in North America that uses DNA samples to identify people at risk of developing heart disease.

Meanwhile, Phoenix's Muhammad Ali Parkinson Center at Barrow Neurological Institute is joining a Michael J. Fox Foundation study to learn how Parkinson's starts and develops over time.

RECENT HIGHLIGHTS

TGen launches update to MindCrowd aging study

MindCrowd 2.0 is a revised version of a decade-long online research project led by the Translational Genomics Research Institute that includes eight new “brain game” tests and the ability to participate on the main site using a smartphone. TGen researchers are also involved in a project that could lead to a universal coronavirus vaccine.

Arizona Commerce Authority funds wearable research projects

The WearTech Applied Research Center at Park Central in Phoenix, which partners with Arizona universities, research institutions, and hospitals, receives a \$1.6 million matching grant from the Arizona Commerce Authority to support eight applied-research projects. New projects will help those with walking disabilities, reduce stress and anxiety, monitor a baby’s health, and treat thrush.

ASU Biodesign seeks to better understand autoimmune diseases

ASU Biodesign Institute executive director Joshua LaBaer and colleagues learn that autoantibodies are found in healthy individuals as well as playing a major role in serious autoimmune diseases. ASU also partners with TGen and Phoenix Children’s to study nonalcoholic fatty liver disease in Latino youth and teams up with TGen to examine how the chemical compound glyphosate crosses the blood-brain barrier in mice.

NAU to create online platform to forecast epidemics

NAU receives a \$3.5 million NIH grant to create EpiMoRPH, envisioned as a collaborative online hub that will make forecasting epidemics more transparent and reliable. TGen and ASU researchers are also contributing to the project.



NIH GRANTS

\$344 million

Arizona set another record in the gold-standard measure of bioscience research funding, up 12.5% over 2021.

» Expand STEM Education, Develop Talent

Legislation dedicates \$150 million to nursing shortage

Gov. Doug Ducey signs HB2691, which allocates nearly \$150 million over the next three years to increase enrollment in nursing programs, expand clinical training opportunities, and offer support to new nurses in hospitals.

Luminosity Lab at ASU to fund scholarships with \$15M donation

The student-driven Luminosity Lab at ASU, winners of global innovation challenges, welcomes the inaugural group of 20 Vanderploeg Luminosity Scholars in fall 2022, endowed by Workiva CEO Marty Vanderploeg’s \$15 million gift. The Scholars will receive \$5,000, renewable for a second year, for unmet financial needs.

RECENT HIGHLIGHTS

CEI LabForce to use \$1M grant for bioscience workforce development

Center for Entrepreneurial Innovation LabForce, a program of the Maricopa Community Colleges at 850 PBC at the Phoenix Bioscience Core, receives a \$1 million federal grant secured by Rep. Greg Stanton to prepare students for careers in the biosciences. Wexford Science and Technology, developer of 850 PBC, announces plans to partner with ASU and the city of Phoenix to construct two new buildings.



WORKFORCE NEEDS

+48.3%

A new report warned that Arizona needs to train workers for healthcare jobs expected to grow at more than twice the rate of overall employment (23.8%) in the coming decade.

UArizona receives grant to support Hispanic students in science careers

A \$5 million grant from the U.S. Department of Education will enable UArizona to better support students from Hispanic or low-income households in STEM majors. The five-year U.S. Department of Education grant is intended to increase graduation rates of Hispanic students with STEM majors and allow an easier transfer to UArizona.

NAU serves as regional hub in program to add students with disabilities

NAU has joined the federally funded TAPDINTO-STEM Alliance to help increase the number of students with disabilities who complete STEM degrees at all levels and enter the STEM workforce. NAU is serving as one of five regional hubs collaborating to address the national need.

TRIF revenue reaches \$126 million in 2022

The 2022 fiscal year report reveals the Arizona Board of Regents received approximately \$126 million in Technology and Research Initiative Fund, or TRIF, revenue, bringing its total since the program's inception to more than \$1.4 billion. The allocations for universities include funding for improving health and providing higher-education access for workforce development.

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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.