

Accelerating the Pace



Picking up Speed

The fourth year in a decade-long push to bring Arizona to national stature in the biosciences was marked by continued commitment of leadership and collaborative success on the research front. Regional business coalitions assumed strong roles in both leadership and funding. Grants from the private sector opened new doors. The Legislature created a sizeable research fund. Federal grants increased markedly. Institutions and facilities continued to debut. Collaborative efforts began blazing a new path in translational research.

Arizona's Bioscience Roadmap expanded in 2006, reaching 17 committees of nearly 300 statewide experts in science, business, communications, workforce, and education. Regional roadmaps were launched in Tucson and Flagstaff, keying on local strengths and needs. Statewide efforts formalized in the areas of agricultural biotech, asthma, diabetes, and infectious disease.

Key priorities in 2007...

Translational research: A comprehensive model has been launched with leadership from the Arizona Biomedical Research Commission to move Arizona to the forefront in getting discoveries from the lab to the patient quickly and efficiently. Pilot projects and events are planned throughout the year to galvanize statewide researchers, clinicians, institutional review board panels, attorneys, policymakers, and others key to this increasingly critical area.

Wet-lab space: Several regional efforts are gaining momentum to address the state's dearth of commercial wet-lab space. Progress must continue to provide the sophisticated research space needed to support emerging local companies and attract established firms from other states.

Capital formation: Always a priority, coordinated efforts to attract private capital are needed to provide early-stage companies with leverage to grow. Public-private partnerships must continue to expand to successfully recruit and retain top talent.

ARIZONA'S BIOSCIENCE ROADMAP

- > Arizona's long-term plan to bring its bioscience sector to national competitiveness
- > Driven by an extensive collaboration among statewide leaders in science, business, and policy
- > Research and facilitation provided by Battelle
- > Commissioned and coordinated by the Flinn Foundation
- > Translational research component co-sponsored by Arizona Biomedical Research Commission
- > Details available at www.flinn.org

Road Test

The latest data reflect initial *Roadmap* implementation efforts begun in 2003. How is Arizona performing on fundamental measures?

R&D expenditures: Bioscience-related academic research and development expenditures at Arizona's universities increased 23% between 2002-04, besting the 20% average of the top-10 states.

NIH grants: Research-grant funding increased 30% between 2002-05, compared to 21% for the top-10 states. By surpassing the leading states in growth rate, Arizona accomplished a 2007 goal two years early. In 2005, Arizona's total NIH funding grew by 10%, compared to 3% for the nation.

Jobs and firms: Up 16% and 8%, respectively, during 2001-05. In non-hospital biosciences, employment grew nearly 17% compared to the national average of less than 4%.

Wages: Up 13% (inflation adjusted) between 2001-05, compared to a 3% real wage gain for the overall state private sector. Bioscience workers in Arizona earn an annual salary of \$45,182, on average, compared to \$37,709 for all industries.

Venture capital: Arizona exceeded the *Roadmap* goal of \$100 million for 2003-05, though the 2006 pace slowed considerably from 2005.

Entrepreneurialism: In 2002, Arizona's universities spun off only two bioscience startup companies. Since then, there have been 33. Results have improved similarly in patents issued, licenses and options executed, and invention disclosures.

MAJOR ARIZONA ACHIEVEMENTS

2000

- > Arizona voters pass Proposition 301, in part providing \$1 billion over 20 years for science and technology at the state's universities.

2002

- > TGen forms; International Genomics Consortium moves to Arizona.
- > *Arizona's Bioscience Roadmap* launched.

2003

- > Legislation authorizes \$440 million for construction of university research facilities.

2004

- > ASU and UA agree to partner on expansion of the UA medical school in Phoenix.
- > Voters approve \$100 million for bioscience and healthcare training and facilities at Maricopa Community Colleges.

2005

- > C-Path debuts in Tucson.
- > Legislation passes to provide tax credits for angel investors.

2006

- > Legislature creates Arizona 21st Century Fund.
- > Science Foundation Arizona established.
- > \$50 million committed for Piper Chairs in personalized medicine.

A Statewide “Bio-Tapestry”


NEARLY 300 STATEWIDE EXPERTS FROM THE FOLLOWING ORGANIZATIONS SERVE ON 17 COMMITTEES THAT ARE ADVANCING ARIZONA’S BIOSCIENCE ROADMAP.

■ ASSOCIATIONS ■ CORPORATE ■ EDUCATION ■ GOVERNMENT, TRIBES ■ HOSPITALS, RESEARCH INSTITUTES ■ FOUNDATIONS



- **Legislature creates research fund:** Following through on a proposal by Gov. Janet Napolitano, the Legislature establishes the Arizona 21st Century Fund and appropriates \$35 million to support medical, scientific, and engineering research programs.
- **Science Foundation Arizona established:** Statewide business leadership groups – Greater Phoenix Leadership, Southern Arizona Leadership Council, and Flagstaff 40 – collaborate to create and fund a new nonprofit organization to build and strengthen medical, scientific, and engineering research programs in Arizona. Heralded science-business leader William C. Harris leaves his post as director general of Science Foundation Ireland to lead the new organization.
- **Piper Trust commits \$50 million:** The Virginia G. Piper Charitable Trust pledges the largest single gift in state history to advance biomedical research by committing \$50 million to recruit to Arizona 10 world leaders in personalized medicine.
- **Medical school officially opens:** More than 800 celebrate the opening of the University of Arizona College of Medicine-Phoenix in collaboration with Arizona State University. The unique collaborative medical school will help to address Arizona's physician shortage and provide an essential asset in the state's biomedical research infrastructure.
- **IGC to lead key cancer project:** The International Genomics Consortium, in partnership with TGen, is chosen from 370 applicants to manage tissue samples for the Cancer Genome Atlas project, the next phase of the Human Genome Project. A \$6.6-million grant from the National Institutes of Health will support IGC's efforts in this international undertaking to map the genomes of most forms of cancer.
- **Translational grants secured:** A network of 20 Arizona organizations involved in biomedical research receives an important Clinical and Translational Science Award planning grant from NIH. While small in terms of dollars (\$150,000), the award positions the state favorably to compete for a multimillion-dollar CTSA grant down the road. In a separate application, Mayo Clinic's local operations share in a \$72 million CTSA award with Mayo campuses in Minnesota and Florida.

- > **Covance buys new site in Chandler:** Global drug development services firm Covance purchases 50 acres of industrially zoned land in Chandler for a 600,000 square-foot research facility designed to eventually support up to 2,000 high-wage jobs.
- > **Wet-lab plans advancing:** Efforts to address Arizona's shortage of wet-lab space make progress. UA furthers plans to build the Arizona Bioscience Park in Tucson. Bioscience incubator space is studied in Surprise and Chandler. Flagstaff includes an incubator in its plans to build a science park. Grand Canyon University announces plans for a major wet-lab facility, while a San Diego-based developer pursues a multi-floor building featuring wet-lab space in Tempe.
- > **Firms choose Arizona:** Several bioscience-related companies announce plans to relocate to or start operations in Arizona. Included in the Phoenix area are Aurigin Technology, Dedicated Phase I, Insys Therapeutics, NutraCea Corp, and Qualia Clinical Services; in Tucson, Genomics USA and Systems Medicine; and in Flagstaff, Neural Intervention Technologies. Singapore-based Aurigin becomes the first foreign company to commit to space at SkySong, the ASU Scottsdale Innovation Center. In addition, Humana, a Fortune-500 company, prepares for a new mail-order drug facility in Phoenix.
- > **Sanofi-Aventis expands:** Sanofi-Aventis, the state's largest pharmaceutical firm, releases plans to build a new 100,000 square-foot facility near its operations in Oro Valley, tripling its space.
- > **ASU spinout acquired:** Molecular Imaging Corp., a 1993 spinout of ASU that manufactures atomic-force microscopes, is purchased by scientific instrument giant Agilent.
- > **GE Healthcare, St. Joe's partner:** GE Healthcare signs an agreement to a six-year research partnership with St. Joseph's Hospital and Medical Center to develop next-generation MRI equipment.
- > **C-Path off to fast start:** The Critical Path Institute reaches an agreement with 15 major pharmaceutical firms to share internal protocols for measuring drug safety, an unprecedented move in the industry. The two-year old nonprofit moves into larger office space in Tucson and opens offices in Phoenix and Washington, D.C.

- **Biozona brand launches:** A statewide network of communications and marketing officials develops and launches “Biozona,” a creative identity for Arizona biosciences. The brand will enable Arizona to more effectively market its strengths to out-of-state audiences and inform Arizonans on the importance of its bioscience ambitions. 
- **Angel tax credit commences:** The Small Business Capital Investment Incentive Program goes into effect to boost investment in young companies. Passed by the Legislature in 2005, the program offers tax credits of 30% for investors of early-stage small businesses. Investors in bioscience and rural firms qualify for credits of 35%.
- **Venture capital slows but grows:** Though failing to keep pace with 2005’s banner year, venture capital supporting Arizona bioscience firms in 2006 outpaced year-end totals for both 2004 and 2003. Leading financings include \$13 million for ImaRx Therapeutics of Tucson and \$5.2 million for Sensys Medical of Chandler.
- **ASU to host major nano meeting:** ASU announces that it will host a major conference in nanotechnology in March 2007. The Nano and Giga Challenges Conference will involve about 500 experts from 50 countries over five days.
- **Trade shows gain presence:** A delegation of 50 represents Arizona at BIO 2006, the world’s largest bioscience convention, in Chicago. Efforts are underway for an expanded effort at BIO 2007 in Boston. In Arizona, the centerpiece events of the state’s two bioscience trade associations draw about 250 apiece – the second-annual Arizona Bioscience Awards Dinner of the Arizona BioIndustry Association in Scottsdale and the Bio Southwest conference of the Bioindustry Organization of Southern Arizona in Tucson.

- > **Grants advance bio education:** Major federal, state, and private grants are awarded to boost bioscience education efforts statewide:
 - TGen and Northern Arizona University will partner to train high school teachers in biosciences, piloting a new effort in Mesa Public Schools, Chino Valley School District, and other school districts.
 - ASU Polytechnic, Mesa Community College, and Mesa Public Schools will collaborate on a “2+2+2” model to provide seamless bioscience education from high school to community college to university.
 - ASU and UA each receive grants from the Howard Hughes Medical Institute to boost undergraduate bioscience training programs.
- > **Science-based schools debut:** Three new schools focused on science and math open their doors: Bioscience High School in downtown Phoenix; Copper Ridge Math and Science Academy in Scottsdale, and the Wildcat School in Tucson, affiliated with UA. Bioscience High benefits from a \$60,000 grant from Honeywell.
- > **Bio labs expand in Mesa schools:** Mesa Public Schools approves nearly \$4.5 million to construct and remodel bioscience labs at five public high schools. In addition, the bioscience academy at Mesa High completes its first year offering students interdisciplinary studies with an emphasis on biotechnology.
- > **New academic programs introduced:** Numerous curricula and training programs are launched, including a joint law and medicine program offered by ASU and Mayo Clinic; a pharmaceutical technician program by Phoenix College; an ASU master’s program in healthcare innovation; and a multi-disciplinary graduate program in integrative biosciences at NAU. ASU introduces the Department of Biomedical Informatics in collaboration with UA, linked with the UA College of Medicine-Phoenix. UA accelerates the expansion of its colleges of Medicine and Pharmacy into Phoenix.
- > **Bio education inventory underway:** A first-ever statewide survey of high school bioscience training programs is launched to gain insights on existing resources and unmet needs.