In 1997, the Arizona Bioindustry Cluster was founded by Bob Case and Michael E. Berens, PhD, laying the foundation for what would become the Arizona Bioindustry Association, or AZBio.

The Human Genome project, which began in 1990, had yet to reach a conclusion and would not be completed until 2003. Scientific leaders believed that it would lead us to great insights on how to treat disease, but they also knew that completing the project would be the beginning of a great era of scientific inquiry, not the end.

In the year 2000, work by the Arizona Legislature and a coalition of community leaders supported voter passage of Proposition 301. Prop. 301 established a six-tenths-of-one-cent sales tax to support education that included funding for an estimated $1 billion (generated and disbursed over 20 years) for research at Arizona universities. The resulting Technology Research Initiative Fund (TRIF) is administered by the Arizona Board of Regents and has distributed $892 million for the period from 2001-2016 and is well on its way to reaching the $1 billion goal by June 30, 2021.

ROADMAP GUIDES GROWTH

The following year, the Flinn Foundation committed to 10 years of major funding for Arizona biosciences and brought together more than 100 leaders to begin to craft what would become the Arizona Bioscience Roadmap. Under the stewardship of the Flinn Foundation, the strategic plan for the biosciences in Arizona would include key initiatives, along with a commitment to measure the results.

The first decade of the new century marked the completion of The Human Genome Project and a new era for life science research and development globally.

From 2000 to 2010, Arizona’s Bioscience community activity included International Genomics Consortium establishing its home in Phoenix and the subsequent creation of the Translational Genomics Research Institute (TGen), which was funded by a $90 million fundraising effort and spun out of IGC. In addition to the funding from Prop. 301, the Arizona Legislature approved $440 million for construction of new university research facilities, supporting the growth of the Biodesign Institute at Arizona State University, the BIOS Institute at the University of Arizona, new research facilities at Northern Arizona University and more. An additional $100 million was approved by the voters for bioscience and healthcare training and facilities at Maricopa Community Colleges. The Virginia G. Piper Charitable Trust committed $50 million to personalized medicine in Arizona and local philanthropists supported the community with additional resources for research and patient care across the state.

Over the last two decades, Arizona’s bioscience industry has focused and grown. Arizona has risen in the rankings to take its place in the second tier of the bioscience rankings, based on number of firms. The Biodesign Institute at Arizona State University has grown from one building to two, with a third building under construction. Arizona is now home to the Critical Path Institute, the National Biomarker Development Alliance, the Arizona Alzheimer’s Alliance, the Banner Alzheimer’s Institute, Cancer Treatment Centers of America and Banner MD Anderson. Barrow Neurological Institute, founded in 1962 as a regional specialty center, has grown into one of the premier destinations in the world for neurology and neurosurgery. Phoenix Children’s Hospital is now one of the largest children’s hospitals in the country and is ranked in 10 out of 10 specialties. Mayo Clinic has expanded its research and patient care capacity, added proton beam capabilities and welcomed the first class to its Arizona-based Mayo Medical School in 2017. The University of Arizona extended its reach from Tucson to Phoenix, which now includes The University of Arizona College of Medicine-Phoenix and The University of Arizona Cancer Center at Dignity Health St. Joseph’s Hospital and Medical Center on the Phoenix Biomedical Campus.

NUMBERS GAME

The number of life science companies in Arizona is now more than 1,400 and multi-billion dollar exits include the sale of Ventana Medical Systems to Roche for $3.4 billion and Abraxis Biosciences for $2.9 billion to Celgene.

Today, companies that were born in Arizona are publicly traded, including Insys, HTG Molecular and SensTech, while others that have been acquired by AMAG Pharmaceuticals, Becton Dickinson (BD), Caris Diagnostics, Thermo Fischer, IMS Health, Merz,
Stryker and more. These companies have continued to grow in Arizona, joining global leaders that include BARD Peripheral Vascular, Medtronic and W.L. Gore.

The combined benefits of Arizona’s world-class healthcare institutions and diverse population demographics are driving the number of active clinical trials in the state, which more than doubled from 2012-2017, based on data at ClinicalTrials.gov.

Long-time residents and new industry partners are benefiting from Arizona’s business-friendly public policy and regulatory environment, affordable operating cost structures, stable and reliable energy suppliers, well-managed water resources, talent and an affordable cost of living that provide employees the opportunity for an excellent quality of life. Free from the business disruptions that can be caused by earthquakes, hurricanes, tornadoes and floods, Arizona has become a go-to site for both high-tech manufacturing and corporate data centers.

The Arizona Innovation Challenge, which made its first awards in 2011 and is powered by the Arizona Commerce Authority, awards the most money in the country for a technology commercialization challenge — $3 million ($1.5 million twice yearly) to the world’s most promising technology ventures. Awards range from $100,000 to $250,000 per company.

**IMPROVING REPUTATION**

Over this 20-year span, Arizona has gained a reputation as the state with the “collaborative gene” and attracts thought leaders looking to discover, develop and deliver life-changing and life-saving innovations to patients. Globally recognized thought leaders have left the hallowed halls of Harvard, the National Institutes of Health and other world-class institutions to innovate and collaborate in Arizona.

One real-world example of this collaboration is Arizona State University’s International School of Biomedical Diagnostics. A global center for research, teaching and service in the emerging field of biomedical diagnostics, the school pulls expertise from faculty across ASU, in collaboration with Dublin City University (DCU), Ventana Medical Systems and other industry partners. ASU faculty come from the Biodesig Institute, College of Health Solutions, Ira A. Fulton Schools of Engineering, School of Life Sciences in the College of Liberal Arts and Sciences, the W. P. Carey School of Business and the Consortium for Science, Policy & Outcomes. The initiative also leverages the expertise of the National Biomarker Development Alliance that is led by ASU. Under the leadership of President Michael Crow, ASU has been named the Most Innovative University in the United States for two years running, out-ranking Stanford and MIT.

Throughout the Arizona Bioscience Roadmap’s first decade, Battelle tracked performance data that was released annually by the Flinn Foundation. The performance metrics released in 2014 serve as the benchmark for the second decade of the Roadmap, with new data reported on a biennial basis. The most current data is available in “2015 Progress of the Biosciences in Arizona,”

**WHAT’S NEW?**

Here are the organizations who have joined Arizona’s life sciences landscape since 1997:

- Arizona Alzheimer’s Consortium
- Alzheimer’s Prevention Initiative
- Arizona Bioscience Steering Committee
- Arizona State University-Banner Neurodegenerative Research Collaborative
- Banner MD Anderson Cancer Center
- Banner University Medicine
- Barrow Neurological Institute at Phoenix Children’s Hospital
- BioAccel
- Biodesign Institute at ASU
- Cancer Treatment Center of America (Surprise)
- Center for Entrepreneurial Innovation (CEI) at GateWay Community College
- Critical Path Institute
- Gregory W. Fulton ALS and Neuromuscular Disease Center at Barrow Neurological
- HonorHealth Virginia G. Piper Cancer Center
- International Genomics Consortium (IGC)
- International School of Biomedical Diagnostics (ASU)
- Mayo Clinic Hospital
- Mayo Clinic Cancer Center & Proton Beam facility
- Midwest University
- Mayo Medical School
- Muhammad Ali Parkinson Center at Barrow Neurological
- NACET (Flagstaff)
- National Biomarker Development Alliance at ASU
- Phoenix Biomedical Campus
- Science Foundation Arizona
- TGen (Translational Genomics Research Institute an affiliate of City of Hope)
- TGen North
- UA BIO5
- University of Arizona Cancer Center at Dignity Health
- St. Joseph’s Hospital and Medical Center (Phoenix)
- UA College of Medicine-Phoenix

**WHO’S NEW?**

Here are the significant employers that have joined Arizona’s life sciences landscape since 1997:

- Accelerate Diagnostics
- AMAG Pharmaceuticals (CBR)
- Arizona Technology Enterprises (AzTE)
- Bard Peripheral Vascular
- Cancer Prevention Pharmaceuticals
- Castle Biosciences
- Celgene (Abraxis Bioscience)
- DexCom
- GlobalMed
- Heliae
- HTG Molecular Diagnostics
- Insys Therapeutics, Inc.
- Icagen
- Isagenics
- Pinnacle Transplant Technologies
- Primus Pharmaceuticals
- Regenesis Biomedical
- Roche (Ventana Medical
- SenesTech
- St. Jude Medical
- Stryker’s Sustainability Solutions, Inc.
- Syncardia Systems
- Tech Launch Arizona
- TD2
- Ulthera, Merz Innovation Center
- VisionGate
- WL Gore Phoenix Campus
For over 15 years, the Translational Genomics Research Institute—an affiliate of City of Hope—has fought against cancer and other diseases through innovative research and clinical trials. Each day we work to transform the diagnosis, treatment and prevention of life-threatening diseases and deliver on the promise of precision medicine by accelerating the speed at which scientists and doctors can convert research discoveries into cures for patients. Learn more at tgen.org
a report produced by TEConomy Partners that was released in March 2016. In April, the Flinn Foundation released its most recent update, the 2016 Progress of the Biosciences in Arizona.

LOOKING TO THE FUTURE

Could Arizona achieve the growth necessary to reach the top tiers? Absolutely.

Twenty years into the process, Arizona’s bioindustry has a new funding catalyst. With the governor’s vision and the Legislature’s support, an additional $1 billion dollars will be invested in university research infrastructure beginning in July of 2018. The university bonding bill passed this year represents the state’s biggest investment in our public universities in a generation. It makes possible the development of new research and education facilities to meet the needs of future generations of Arizonans.

This infrastructure plan will deliver benefits for the State of Arizona for decades to come and supports key state strategies, such as the Arizona Bioscience Roadmap.

The Arizona public university system is a major economic force that represents a fundamental relationship between higher education and the economy, generating $11.1 billion in economic impact and 102,000 jobs in fiscal year 2015 alone, according to Eileen Klein, president of the Arizona Board of Regents.

The real impact of this investment is in the education of our students and the discoveries that will unfold, impacting our community and our world. The construction alone that will result from these dollars is expected to generate 2,200 jobs and add $166 million to Arizona’s gross domestic product and $148 million in personal income for each of the next five years.

The plan will also help ensure our campuses remain safe, vibrant and high-quality places for students to learn, conduct research and grow as members of the community and thrive as contributors to the bright future of Arizona.

“On behalf of the Arizona Board of Regents and Arizona’s public universities, I applaud Gov. Doug Ducey and our legislators for their bold vision and the courage and tenacity to deliver a significant plan to fund Arizona’s public universities,” said Klein. “Beyond infrastructure, this budget represents real progress toward the State of Arizona reclaiming greater financial responsibility for the university education of Arizona-resident students. We all have a stake in their success.”

Arizona’s leaders are continuing the journey to take the state into the top tiers of the bioscience rankings and are already discussing what the next iteration of Prop. 301 will look like as it approaches its renewal on or before 2020.

The Flinn Foundation has extended its commitment to steward the Arizona Bioscience Roadmap through the year 2025. With the support of the 100-person Arizona Bioscience Roadmap Steering Committee and the Arizona Bioindustry Association (AZBio) board of directors, the state’s leaders are committed to the vision of making Arizona a top-tier bioscience state and working collaboratively to make that vision a reality.

BIOSCIENCE EMPLOYMENT

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>2001</th>
<th>2014</th>
<th>Change 2001-2014</th>
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<tr>
<td>Hospitals and laboratories</td>
<td>62,775</td>
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<tr>
<td>Bioscience related distribution</td>
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<td>NA</td>
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<td>+16.6%</td>
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<tr>
<td>Research and testing</td>
<td>1,463</td>
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<tr>
<td>Non-hospital biotech employment</td>
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<tr>
<td>Total bioscience sector</td>
<td>71,876</td>
<td>110,410</td>
<td>+153.6%</td>
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</table>

Source: TEConomy/Flinn Foundation

ARIZONA BIOSCIENCE WEEK

WHAT: Arizona Bioscience Week brings together Arizonans and visitors from Oct. 8-Oct. 14 to connect and share ideas on how we can build solutions that make life better for people today and for generations to come.

FAMILY OFFICE ROUNDTABLES: AZBio and the Stetson Family Office will host Family Office Roundtables in Phoenix on Oct. 9 and in Tucson on Oct. 10. The theme of the Family Office Roundtables will be “Lasting impact: How our actions impact our communities today and in the future.”

THE AZBIO AWARDS: Arizona’s life science and leadership community will come together Oct. 11 with visitors from around the country to celebrate life-science innovation and innovators at the Phoenix Convention Center. Highlights of the evening will include honoring Dr. Marvin Slepian with the AZBio Pioneer Award for Lifetime Achievement and Gov. Doug Ducey as the 2017 Arizona Bioscience Leader of the Year. Attendees will also have the opportunity to see examples of Arizona life science innovations and meet the innovators.

THE STUDENT DISCOVERY ZONE: The Student Discovery Zone showcases the work of 50 students from Arizona high schools, community colleges and universities during the AZBio Awards.

BMES 2017: The Biomedical Engineering Society annual meeting will bring more than 4,000 attendees from across the country together at the Phoenix Convention Center from Oct. 11-Oct. 14.

INFORMATION: AZBio.org/AZBW2017
PHOENIX IS...

Invested. Focused. Advancing Precision Medicine. Phoenix is transforming care and delivering cures. Phoenix is home to world-class institutions and brilliant scientists.

PHOENIX IS HOT.

Phoenix's bioscience ecosystem collaborates to advance and improve health outcomes on a global scale. As the 5th largest city in the nation, Phoenix boasts centers of excellence in precision medicine, genomics, molecular medicine, cancer research, healthcare analytics and others. This leading-edge research takes place on the Phoenix Biomedical Campus, in the Arizona Biomedical Corridor, and throughout the community.

Join innovators such as: Mayo Clinic • TGen • IGC • Paradigm • University of Arizona Cancer Center at Dignity Health • Center of Applied NanoBioscience and Medicine • NIH • Barrow Neurological Institute • Banner Alzheimer's Institute • MIHS • Phoenix Children's Hospital • University of Arizona College of Medicine-Phoenix • Arizona State University Health Solutions Campus • W.L. Gore • Celgene

City of Phoenix Community & Economic Development
602-262-5040
phoenix.gov/ econdev/bio
2017 Bioscience Company of the Year

Congratulations to all of the employees of Bard Peripheral Vascular for being recognized as Arizona’s Bioscience Company of the Year 2017.

BARD
PERIPHERAL VASCULAR
IDEAS THAT MOVE MEDICINE FORWARD

We are a medical device company whose impassioned people believe in the power of ideas. Working shoulder-to-shoulder with clinicians from around the globe, we develop and deliver these ideas into innovative technologies that help to transform the standard of care.

To find out more about our game-changing devices and patient-focused programs or to explore opportunities to join our team of inventors, visit BardPV.com.

Proud recipient of the 2017 AZ Bioscience Company of the Year Award
While healthcare has certainly been a major topic of conversation across the country in recent months, the political becomes personal when you or a loved one is affected.

Bard Peripheral Vascular, a division of C. R. Bard, is a company in Tempe that understands the importance of quality patient care and remains focused on developing innovative medical devices to detect, treat and help manage disease.

Bard Peripheral Vascular specializes in the development of surgical and interventional devices for the treatment of diseases affecting the peripheral vascular system, which consists of veins and arteries in the arms, hands, legs and feet. The peripheral arteries supply oxygenated blood to the body and the peripheral veins lead deoxygenated blood from the capillaries in the extremities back to the heart.

Additionally, Bard devices are used in the treatment of cancer, end-stage renal disease (including diabetes and dialysis) and venous disease. Some Bard products, such as biopsy needles, are used to help detect disease, while others, such as catheters, angioplasty balloons and chemotherapy ports, are used to treat disease. In the last year alone, the company has launched more than 11 new products designed to make life better for patients and the people who care for them. In fact, a patient is treated with a Bard Peripheral Vascular device approximately every two seconds.

Bard Peripheral Vascular was established in 1996, with the purchase of IMPRA, an Arizona company, which launched the first commercially available ePTFE graft used for AV access. Today, Bard Peripheral Vascular is the largest and fastest-growing division within C. R. Bard, with more than $1 billion dollars in revenue. In Arizona, Bard Peripheral Vascular employs more than 500 people and its labor force is growing at more than five percent each year. Bard Peripheral Vascular products are used to treat more than 18 million patients annually and hold the No. 1 or No. 2 leadership position in most of their product lines.

Some of the company’s recent technologies include a novel balloon-expandable covered stent developed to improve blood flow in the leg for patients with iliac occlusive disease, and a device designed to preserve vascular access for hemodialysis patients.

The strong growth and portfolio of C. R. Bard, with the Bard Peripheral Vascular division leading the way, resulted in Becton Dickinson announcing the acquisition of C. R. Bard for $24 billion in April 2017, which is expected to close in fall 2017. After the acquisition, Becton Dickinson will be the third-largest medical device company in the world.

Bard Peripheral Vascular and its employees believe in supporting and giving back to their community through volunteer work and charitable contributions. The Bard Peripheral Vascular team has worked with many great local charities, including Child Crisis Center/Arizona Adoption & Foster Care, the Ronald McDonald House of Phoenix, HopeKids Arizona, Making Strides Against Breast Cancer, United Way, Amanda Hope Rainbow Angels and the American Diabetes Association. Together, the team has raised or donated more than $600,000 in the last three years to support local communities and charities.

Bard Peripheral Vascular also hosts internships and funds engineering research projects with Arizona State University and The University of Arizona.

Patients and caregivers around the world continue to benefit from the tireless work, innovation and dedication of the employees at Bard Peripheral Vascular.
MEDICAL TECHNOLOGY: SAVING LIVES ONE PATIENT AT A TIME.

50% of U.S. cancer patients have radiotherapy to shrink their tumors.

AdvaMed
Advanced Medical Technology Association
www.AdvaMed.org
The maxim, “If you need to get something done, ask a busy person,” has often been attributed to Benjamin Franklin.

The 2017 Arizona Bioscience Pioneer honoree, Marvin J. Slepian, MD, is someone Franklin would have recognized as a kindred spirit.

Dr. Slepian is a cardiologist, inventor, entrepreneur, educator, innovator and more. At the University of Arizona, he serves as professor of medicine, professor and associate department head of biomedical engineering, professor of material sciences and engineering, professor of medical imaging and McGuire Scholar in the Eller College of Management. Dr. Slepian is also the founder and director of the newly created Arizona Center for Accelerated Biomedical Innovation (ACABI) — a “creativity engine” focused on novel solution development for unmet medical needs.

Dr. Slepian attended Princeton and received his MD from the University of Cincinnati College of Medicine. He completed his residency at New York University–Bellevue Hospital, where he served as chief resident in medicine; clinical and research fellowships in cardiology at Johns Hopkins University School of Medicine; and clinical and research fellowships in interventional cardiology and a research fellowship in artificial organs at the Cleveland Clinic. He also received post-doctoral training in chemical engineering and polymer chemistry at Washington University and MIT.

With a career that spans the spectrum from basic and translational research to technology transfer, Dr. Slepian exemplifies how keen clinical observation coupled with solid basic science knowledge and exploration in the lab can successfully transition to commercial products that make life better for patients. At the basic level, his laboratory has focused on three main areas:

- The role of cell-matrix interactions in vascular disease
- The role of physical forces in modulating vascular cell and platelet behavior
- The utility of polymeric biomaterials to modulate cell-matrix interactions as well as serve as novel therapeutic structural, barrier or drug delivery materials.

On the translational level, his lab has developed many novel therapeutic solutions based on polymeric biomaterials, which have found their way into clinical use today, including drug-eluting stent technologies, stent coatings, “polymer paving,” surgical anti-adhesive barriers, synthetic tissue and vascular sealants, myocardial revascularization and cell delivery methods and cardiovascular prosthetic devices, including the total artificial heart.

Dr. Slepian has founded or co-founded several medical device companies, including Focal, which went public in 1997 and was acquired by Genzyme Biosurgery in 2001; EndoTex Interventional Systems, which was acquired by Boston Scientific in 2007; Angiotrax; Hansen Medical, which went public in 2006 and was acquired by Auris Surgical Robotics in 2016; Arsenal Medical and its spinout company, 480 BioMedical; and MC10, which takes high-performance electronics and reshapes them into human compatible form factors that stretch, bend and twist to move with the body.

Dr Slepian has been involved with bringing many new devices through the FDA regulatory process into clinical use, including most notably the total artificial heart. Dr. Slepian was the founding president of SynCardia Systems and served in multiple roles, including chief scientific officer, president and chairman for more than a decade. Today, the SynCardia Total Artificial Heart is the only artificial heart that is commercially available in the United States, European Union and Canada for use as a bridge to donor heart transplantation.
GROUNDBREAKING DISCOVERIES.
COLLABORATIVE SPIRIT.
REAL WORLD IMPACT.

Congratulations to the University of Arizona’s 2017 AZBio Award Honorees. From labs to marketplace and bench to bedside, UA research is leading the way in helping create a better Arizona with research that saves lives to inventions that create new businesses and jobs. Our R&D goal is to do more.


The University of Arizona
Health Sciences
uahs.arizona.edu

Research, Discovery & Innovation
research.arizona.edu

TECH LAUNCH ARIZONA
techlaunch.arizona.edu

THE UNIVERSITY OF ARIZONA
bio5.org
In recent decades, tremendous — almost unimaginable — progress has been made in the fight against cancer. Advances in molecular and genomic research have revealed underlying complexities and provided insights into cancer. Continued research has expanded our knowledge of how this disease develops and how to target medicines for specific cancer types and individual patients, resulting in more effective therapies. The road to a cure is long, takes many turns and requires investments on a scale that necessitates support from government, academia and industry. Each of these journeys begins in the lab as researchers explore new compounds that may one day provide a cure.

Dr. Laurence Hurley is the leading authority on the identification of small molecule therapeutic agents that target DNA quadruplexes, which are unique four-stranded DNA structures that control gene expression.

“A quadruplex is like a knot in DNA and we have the capability, using drugs that act like natural proteins, to undo or tie up these knots,” said Hurley, who pioneered the method nearly 20 years ago. “In effect, this process allows us to turn on or turn off genes. With this approach, we can turn off cancer genes and thereby mitigate the progression of the disease. In a similar vein, we have the capacity to turn on genes, which may be important to other disease areas, such as those related to the natural process of aging.”

Dr. Hurley and his team work to design and develop novel antitumor agents that will extend the productive lives of patients who have cancer. Hurley’s team applies structural biology techniques to validate quadruplex control systems, high-throughput assay technologies to identify drug leads and medicinal chemistry intertwined with clinical oncology programs in cancer therapeutics to create new medicines. Dr. Hurley has built an impressive network of clinical collaborators, including the best of Arizona. He has active collaborations with clinicians at the Translational Genomics Research Institute (TGen) and the Virginia G. Piper Cancer Center at HonorHealth, both directed by Dr. Daniel Von Hoff, and with research groups within the University of Arizona Cancer Center. The translational aspects of the research emerging from Dr. Hurley’s laboratory at the University of Arizona are being developed by Reglagene, a Tucson-based company for which Dr. Hurley is CSO. Dr. Richard Austin is CEO.

Throughout his distinguished career, Dr. Hurley has pioneered several novel drug therapies and this research has been recognized internationally with numerous top scientific awards. Since his arrival at the University of Arizona in 2000, Dr. Hurley has trained more than 40 graduate and postdoctoral students. He has placed two novel cancer medicines into human clinical trials, founded three biotech companies (Cylene, Tetrugene and Reglagene) and provided the technology for a fourth company (Horizon Biotechnologies). He has also published more than 265 peer-reviewed articles and has 25 issued patents or patent applications.

“Dr. Hurley’s work is an excellent example of the value that is created through basic research and the impact that is made possible as we continue along the road to find a cure for cancer,” said Joan Koerber-Walker, president and CEO of the Arizona Bioindustry Association.
THERE WERE THOSE WHO BELIEVED THE BODY COULD NEVER FIGHT CANCER.
NEVER SAY NEVER.

Today, researchers are using immunotherapy treatments to stimulate the body’s immune system to destroy invading cancer cells. Welcome to the future of medicine. For all of us. GO BOLDLY.
Life science innovators are discovering, developing and delivering new products and services that will help people to live better and to live longer. Today’s breakthroughs are just the beginning. Our greatest opportunities to improve the human condition will come from the work of the bioscience and healthcare leaders of tomorrow. Inspiring these future leaders requires an excellent foundation that starts in the classroom and is refined by a wide range of real-world opportunities that expose students to the wonders of science, that allow them to learn from today’s leaders and that encourage students to explore new opportunities.

Carol Bender creates opportunities for students.

At the University of Arizona, Carol Bender leads the development and assessment of programs that produce students who are well prepared to enter graduate and professional degree programs that lead to careers in biomedical research and health careers. Inspired by the ideas of the late Dr. Michael A. Wells, Regents’ professor of biochemistry at the University of Arizona, Professor Bender was at the forefront of the movement to get undergraduates out of the classroom and into apprentice-style research lab experiences before this concept was popular or its impact well understood, particularly in STEM fields, where it is imperative that professionals work together on issues facing humankind.

“Carol Bender’s commitment to student success is unrivaled,” shared Leslie Tolbert, Regents’ professor in neuroscience and in cellular and molecular medicine at The University of Arizona. “Using the model of apprentice-style lab experiences, undergraduates get individual attention as they work side by side with graduate students and faculty members on cutting-edge lab or field research. She gives of herself far beyond the walls of our science buildings. Her students are inspired by her, not just because she helps them find exciting research experiences, but also because she travels with them, hikes with them, hosts gatherings for international groups with them and generally takes an interest in them as individuals.”

Under her inspiring leadership over the last 28-plus years, the Undergraduate Biology Research Program and other UA-affiliated programs in the life sciences have provided paid research experience to more than 2,300 students. UBRP and the international program Bender founded — Prozkoumat! (formerly Biomedical Research Abroad: Vistas Open Program or BRAVO!) — were recognized in 1999 by The National Science Foundation with a Recognition Award for the Integration of Research and Education (RAIRE). UA was one of only 10 institutions to receive a $500,000 RAIRE award, with the intent that the highly impactful UBRP program model be shared with other institutions around the country.

“Great educators open our eyes to possibilities,” said Joan Koerber-Walker, president and CEO of the Arizona Bioindustry Association. “Their work inspires new generations and lays the groundwork for tomorrow’s miracles. For those of us who may have left the classroom years ago, they create for us the gift of future scientists, engineers, medical professionals, entrepreneurs and leaders. Through her work with and commitment to thousands of students and her leadership in our community, Carol Bender has inspired us all.”

For her commitment to creating opportunities for the next generation of bioscience leaders, Carol Bender of The University of Arizona is the 2017 Michael A. Cusanovich Arizona Bioscience Educator of the Year.
The Wonder of Discovery

We’re thankful that our Arizona Life Science Innovators are constantly searching for new ways to make life better for all of us and have never lost their sense of wonder.
“Leadership is the capacity to translate vision into reality.” These are the words of Warren Bennis, an American scholar who is widely regarded as a pioneer in the field of leadership studies.

Bennis also wrote, “There are two ways of being creative. One can sing and dance or one can create an environment in which singers and dancers flourish.”

Arizona Gov. Doug Ducey is a leader who know the importance of doing both. He develops innovative solutions to address challenges that leverage Arizona’s key resources and he is creating an environment where innovators and businesses can flourish.

In 2017, Ducey signed a landmark $1 billion investment plan supporting Arizona higher education. The legislation enables approximately $1 billion in new investments to be directed toward research and development infrastructure at Arizona State University, the University of Arizona and Northern Arizona University. Ducey’s University Research Infrastructure Plan represented fulfillment of one of his top priorities during Arizona’s 2017 legislative session.

On the day that the legislation was signed into law, Gov. Ducey stated, “Today will be remembered as one that paved the way for decades of breakthroughs at our universities; one that opened the door for Arizona students to receive the highest-caliber university experience; and one that makes Arizona second to none in support of higher education.”

Gov. Ducey believes a great economy requires great public schools. During his first year in office, the governor presented an historic $3.5 billion funding plan for Arizona public schools to Arizona voters. The people of Arizona voted “Yes” on Prop. 123, providing more opportunities for students and better resources for teachers and schools.

Great ideas can grow into great companies. In 2017, Gov. Ducey approved raising the cap on Arizona’s successful Angel Investor Tax Credit program by an additional $10 million, which authorizes $2.5 million a year in tax credits for the next four years.

The Angel Investor program was approved in 2006 with a $20 million cap, which was met in July 2015. Over that period, the 125 small businesses that used the tax credit received approximately $62 million in certified investments. In 2012, the number of jobs at these companies averaged 334 annually and by 2015, the number had jumped to 1,378. In addition, the 94 companies known to be active when data for the most recent study was being gathered had raised more than $420 million in seed capital, venture capital and other sources of financing. State and local tax revenue generated by the 94 small businesses was estimated to be $44 million and expected to grow as operations ramp up.

Led by Gov. Ducey, the Arizona Commerce Authority provides a full portfolio of resources that are key components of Arizona’s entrepreneurial tool kit. Growing Arizona bioscience companies are benefiting from ACA administered programs, including Arizona’s R&D Tax Credit, support services that help companies win growth capital by applying for SBIR grants and access business loans to support their expansions. In addition, the Arizona Innovation Challenge (AIC) awards $3 million in grants annually to some of our most exciting young companies to speed them on their way.

“Governor Ducey has led the way in developing plans to make strategic investments in our state that benefit our bioscience industry and all Arizonans,” said Joan Koerber-Walker, president and CEO of the Arizona BioIndustry Association. “More importantly, thanks to the governor’s ability to communicate the vision and bring people together to work towards a shared goal, this vision becomes reality.”
Something big, bold and exciting is happening in the Grand Canyon state. Cutting-edge companies are launching, testing and scaling new technologies in Arizona. Our culture of innovation, highly-skilled talent pool, lean regulatory environment and affordable operating costs provide the perfect platform for business growth and success. Beyond being a place where you can achieve your professional goals, Arizona also provides a lifestyle that allows you to achieve your personal goals. With year-round sunshine, endless outdoor activities and a positive outlook, we play as hard as we work. It’s this perfect balance that makes life better here.
Avery Therapeutics

More than 26 million people worldwide suffer from heart failure and the number of cases is increasing at more than 13 percent per year. The progression of heart failure results in a 50 percent mortality rate within 5 years of diagnosis. But what if it didn’t have to be like this?

That is a question being addressed by the team at Avery Therapeutics, Inc. The startup company is based on the application of technology invented at the University of Arizona College of Medicine-Tucson and the Southern Arizona VA. In 2017, Avery Therapeutics licensed the beating heart graft technology from the University of Arizona. Pre-clinical studies have already shown that the technology, called MyCardia, improves heart function. MyCardia is implanted on the surface of the heart and treats heart failure by generating new blood vessels and heart muscle. Today, no other technology does this except for heart transplantation.

MyCardia has the potential to stop the progression of heart failure and has demonstrated improvements in heart function in pre-clinical models at levels that would translate to a significant improvement in quality of life for patients with heart failure. Avery Therapeutics is currently on track to start clinical trials with MyCardia in 2020.

NuvOx Pharma

NuvOx Pharma is a biotechnology company based in Tucson that is developing an innovative nanotechnology for oxygen delivery to treat life-threatening diseases where hypoxia — when there is a deficiency in the amount of oxygen reaching the tissues — plays a role, like cancer, stroke, sickle cell disease, hemorrhagic shock, traumatic brain injury and heart attack. NuvOx is currently in clinical trials for brain cancer and stroke.

NuvOx’s formulations are based on dodecafluoropentane emulsion (DDFPe). Upon intravenous administration, DDFPe travels through the bloodstream, arriving first at the lungs to pick up oxygen and finally to hypoxic tissue, where it passively delivers oxygen. Compared with other oxygen therapeutics studied previously, NuvOx’s DDFPe is active at less than 1/200th the dose because it delivers oxygen much more effectively.

Most tumors have defective blood supplies, resulting in low oxygen within the tumor tissue. NuvOx’s drug restores the oxygen level in the tumor tissue, making radiation and chemotherapy more effective. NuvOx’s Phase II clinical trial in the hypoxic brain tumor, glioblastoma, was allowed by the FDA in April and will be performed at four different clinical sites — Banner University Medical Center-Tucson, Banner Gateway MD Anderson (AZ), Barrow Neurological Institute (AZ) and Miami Cancer Institute (FL).

Rowpar Pharmaceuticals

Many chronic systemic diseases are linked to bacteria originating in the mouth. The Rowpar Pharmaceuticals team believes that oral care needs to be more than just about fresh breath and whiter teeth. ClōSYS reduces oral pathogens associated with oral and systemic diseases, while not impeding the healing process and not disrupting the oral ecology. Fresh breath and whiter teeth are a bonus ClōSYS delivers.

Headquartered in Scottsdale since 1991, Rowpar Pharmaceuticals’ motto is “A Cleaner Mouth, A Healthier You®”, connecting oral and systemic health. Cloralstan® is Rowpar’s patented core technology. Created by Dr. Perry Ratcliff and a team of dental professionals, ClōSYS products are proven effective in killing oral pathogens associated with plaque, gum diseases, oral diseases and for reducing oral malodor, dry mouth, sensitive mouth and oral mucositis resulting from chemotherapy.

ClōSYS® Unflavored Oral Rinse and ClōSYS® Gentle Mint Oral Rinse are the first mouth rinses to be awarded the American Dental Association Seal of Acceptance for the management of oral malodor, commonly referred to as bad breath. Originally envisioned as a boutique product for gum disease marketed exclusively to dentists, ClōSYS is now a premium oral brand dispensed nationally by dentists, hygienists, doctors and nurses.
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Bob Grant | P: 623.866.5313 | C: 602.565.0889 | bgrant@nfp.com | nfp.com
Mayor Mark W. Mitchell is committed to the growth of the bioscience industry in Tempe and across Arizona. He currently serves on the Arizona Bioscience Roadmap Steering Committee and the executive committee for the League of Arizona Cities and Towns. He is also involved with the U.S. Conference of Mayors and the National League of Cities.

Under Mitchell’s leadership, Tempe is developing a new bioscience and technology campus called I.D.E.A. Tempe at Tempe Town Lake next to the Tempe Center for the Arts. The city’s high-tech community includes approximately 15,000 people employed in technology-related fields, with an average salary of $95,000.

“The city is already home to the main campus of Arizona State University, including the Ira A. Fulton Schools of Engineering and the Biodesign Institute. Tech leaders, including global companies BARD Peripheral Vascular and Medtronic, along with homegrown start-ups Apex Environmental, Applied Micro Arrays, Calviri, GenoSensor, INanoBio, Korwave, Life365, PADT, Susavion and SynBuild all call Tempe “home.”

“We’re a magnet for technology companies, world-class researchers and talented students who either begin their technology journey in Tempe or grow their reputation or tech company,” said Mayor Mitchell. “Tempe is building for the future because we understand that our community can have an impact on individuals, fight diseases across the globe and create technologies that will change life as we know it. Think of the impact this will have on our worldwide community. Just look at the ASU Biodesign Institute — it has generated more than $1.5 billion in impact on the regional economy and supported more than 3,000 jobs since it opened in 2003. Biodesign Building C opens in 2018 and there is so much more to come.”

“Powered by intellect, energy and innovation, our researchers believe they can accomplish what others often find impossible,” said world-renowned cancer researcher Dr. Joshua LaBaer, who serves as the executive director of the Biodesign Institute. “With the addition of Biodesign C, we will soon have nearly 700 scientists of all kinds — biologists, engineers, chemists, physicists, mathematicians, computer technologists — and students working together to find creative and clean solutions for energy, air and water. We will invent new diagnostics and treatments that are accessible and affordable, and in some cases, we expect to be able to halt disease before it even begins.”

Mayor Mitchell is a third-generation Arizonan with deep roots in the Tempe community.

Mitchell was elected to the Tempe City Council in March 2000 and served three four-year terms. A native of Tempe, Mitchell attended elementary and middle school in the community before graduating from McClintock High School. He also earned a political science degree from Arizona State University. During his time as mayor, Mitchell has focused on strengthening Tempe’s local economy by working to attract new businesses and retain current business partners. Since his election as mayor in 2012, the City of Tempe has announced the addition of more than 28,000 jobs. In addition to the biosciences, the city has significantly grown its financial sector, with new campuses for companies including Chase, Northern Trust, State Farm, Silicon Valley Bank and Union Bank. With its combined tech and financial sector focus, Tempe is looking forward to welcoming tens of thousands of jobs over the next decade.
Tempe has been the favorite home for innovators since 1894, when the community was founded by Charles Trumbull Hayden, who created a business out of finding a safe way to cross a then-raging river then harnessing that river’s energy to mill grains; establishing Hayden Flour Mill. Today, Tempe’s innovation ecosystem includes tech companies large and small; the nation’s leading university for innovation; manufacturing centers; Mill Avenue entertainment and world-class events and recreation at Tempe Town Lake.

Downtown Tempe is alive with urban energy. Top finance, insurance and real estate companies such as Chase, Silicon Valley Bank, ADP and the regional headquarters for State Farm insurance made Tempe their choice for top talent and atmosphere. Within walking distance of these businesses is the famous Mill Avenue nightlife, with restaurants, nightclubs and shops - and nature. Hayden Butte, otherwise known as A Mountain, is a great hike, and there are miles of bicycle and jogging paths at Tempe Town Lake.

Tempe’s got a pulse on biotechnology. ASU Biodesign Institute is the largest single investment in research infrastructure in Arizona history. Research scientists there partner with local and global companies to fight ebola, cure cancer, create better biofuels and so much more.

Tempe Mayor Mark Mitchell said. “The discoveries made in our community make personal and global impacts.”

Tempe will help those exploring the science of this world with a new innovation campus adjacent to Tempe Center for the Arts. Soon, we will be able to welcome even more groundbreaking companies to our community.

BIOSCIENCE COMMUNITY SPOTLIGHT:

The City of Tempe

ASU Biodesign Institute is the LARGEST SINGLE INVESTMENT in research infrastructure in Arizona history.

KinetX, ASU Earth and Space Exploration and more than a dozen aerospace companies look for answers to the universe’s questions while providing new technology and products. Our community is part of the forthcoming missions to Europa and beyond, designing and sending new satellites into space and more.

The best ideas often start small, and with that in mind, Tempe offers incubation and coworking spaces. Tempe serves its small and emerging businesses with its Business Resource and Innovation Center at the Tempe Public Library. Entrepreneurs can get training, use conference space and get one on one business help from experts. FABRiC, Tempe’s fashion incubator provides training, manufacturing and services for more than 150 fashion labels.

To find out more about how to be involved with this forward-thinking community, contact Tempe Economic Development Director Donna Kennedy at donna_kennedy@tempe.gov or 480 350-2395...
Making LIFE Better

Keeping people healthy, catching disease early so that we have the best chance of beating it, improving the quality of life and extending it.

Along the way, we also create great companies and high paying jobs, are helping to reduce healthcare costs and are strengthening the economy.

AZBio is the only organization exclusively focused on supporting the growth of Arizona’s life science and healthcare sector. Our members are entrepreneurs and global leaders, educators and students, researchers and inventors, philanthropists and investors, municipalities and economic developers, patient advocates and Arizona’s leading healthcare systems. We come together with a shared vision to make Arizona a global destination for life science and healthcare innovators and a shared commitment to make life better today and for generations to come.

Learn more at AZBio.org

Creating Value by Focusing on What Matters
Arizona, let’s make sure cancer doesn’t become our sixth ‘C’

There was a time when Arizona’s schoolchildren learned the importance of the 5 Cs to the vitality of our state: copper, cattle, cotton, citrus and climate. Today Arizona’s bioscience sector is briskly outpacing the nation.

It’s our can-do spirit, coupled with the audacity to believe that the world’s greatest challenges can be solved right here.

Whether it’s stopping disease at its source or finding ways to catch it at its earliest stage; discovering new forms of clean energy; or protecting our planet against toxins and terrorism, the nearly 700 scientists at the Biodesign Institute at Arizona State University are determined to make Arizona – and our world – a better place.

Take Stephen Albert Johnston, for example. Johnston leads the Biodesign Center for Innovations in Medicine. He is in hot pursuit of a vaccine to prevent all cancers – an idea that others says is impossible. Johnston’s response is, “Does that mean we shouldn’t try?” His vaccine has passed safety trials and is now moving into efficacy trials with pet dogs.

Biodesign scientists Joshua LaBaer and Karen Anderson have created a simple blood test that can provide precise diagnosis breast cancer. Tony Hu, who recently moved from Houston to the Valley, is energized by the people, partners and ideas he has found at ASU. Already, he has created an important diagnostic for early detection of pancreatic cancer.

Students from Arizona and around the world are training here today, to build a better future for tomorrow.

The Biodesign Institute
A new kind of research center at the New American University

ASU Biodesign Institute
Arizona State University biodesign.asu.edu
Imagine a world without cancer. Envision a day when we can prevent Alzheimer’s disease. Discover new ways to prevent disease. Develop new treatments to make the sick well again. Deliver innovations that will make life better for people in Arizona and around the world. Teach a new generation to achieve even more than we can hope to do today.

Helping these visions become reality are key reasons why as individual investors, philanthropists, companies, states, nations, and as a world, we are investing in life science innovation.

A global population trend: A global challenge

Over 10 billion people around the world by 2060. That’s what demographers are predicting. It’s over 4 billion more people than in the year 2000. It’s an increase of more than the total world population in 1975.

Global population growth is creating global challenges as researchers, industry, and governments seek better solutions to support the world’s growing population.

According to a joint report by the National Institute on Aging, National institutes of Health, U.S. Department of Health and Human Services and the U.S. Department of State, “We are aging—not just as individuals or communities but as a world. In 2006, almost 500 million people worldwide were 65 and older. By 2030, that total is projected to increase to 1 billion—1 in every 8 of the earth’s inhabitants will be over 65. Significantly, the most rapid increases in the 65-and-older population are occurring in developing countries, which will see a jump of 140 percent by 2030.”

Studies estimate that between 2010 and 2050, the United States population ages 65 and older will nearly double, the population ages 80 and older will nearly triple, and the number of nonagenarians and centenarians — people in their 90s and 100s — will quadruple.

Additional studies predict a very large increase in disability caused by increases in age-related chronic disease across all regions of the world. In a few decades, it is estimated that the loss of health and life worldwide will be greater from noncommunicable or chronic diseases (e.g., cardiovascular disease, dementia and Alzheimer’s disease, cancer, arthritis, and diabetes) than from infectious diseases, childhood diseases, and accidents.

Why we are living longer

Health innovations of the 20th and 21st century play a significant role in the changing demographics.

It is hard for us to imagine today that there was a time when about 15 percent of infants would die.

One of the biggest reasons for this was diarrhea brought about by unclean water and milk. Improvements in sanitation and food safety across the developed world have benefited people of all ages. Diseases like cholera, dysentery, typhoid fever, diphtheria and parasitic infections have all but disappeared in North America and the European Union. (Global efforts are ongoing to address these diseases and others in the developing world where millions of lives are still lost each year.)

Vaccines

The first polio vaccine was the inactivated polio vaccine. It was developed...
The first shingles vaccine was also introduced in 2006. While rarely life threatening, shingles is painful and can be debilitating. The CDC has estimated that, without vaccination, 1 in 3 people will get shingles in their lifetime. In 2014, 28% of adults aged 60 years and older reported already receiving the shingles vaccine.

New vaccines are in development for more diseases including HIV, Malaria, Ebola, Valley Fever, and Lyme Disease. In addition, a new generation of cancer vaccines, designed to train the body to better fight cancers, is also in development.

Lifesaving medical innovations
In addition to vaccines that help to prevent disease, lifesaving medicines and devices are another key reason that our population is growing. According to the National Bureau of Economic Research (NBER), between 1960 and 1997, new therapies accounted for 45 percent of the increase in life expectancy in 30 developing and high-income countries. Between 2000 and 2009, new therapies accounted for 73 percent of the increased life expectancy for these countries.

Thanks to vaccines, public health initiatives, and antibiotics that help us to control infectious diseases, some of our greatest health challenges at the turn of the century are now greatly diminished.

Heart disease is the leading cause of death in the United States today and has been since 1921. In 2015, stroke and heart disease combined was the cause of 30% of all deaths in the United States.

Thanks to innovative diagnostics, medicines medical devices combined with public health initiatives relating to tobacco, exercise and healthier eating, age-adjusted death rates from cardiovascular disease (CVD) have actually declined over 60% since 1950, representing one of the most important public health achievements of the 20th century.

In recent decades, tremendous progress has been made in the fight against cancer. Advances in molecular and genomic research have revealed underlying complexities and provided insights into cancer, which we now know is actually more than 200 unique diseases. Continued research has expanded our knowledge of how the disease develops and how to target medicines for specific cancer types – resulting in more effective therapies for patients. Cancer death rates have declined over 22% since the 1990’s and over 83% of
Best medicine.

Dignity Health
Physicians | Nurses | Hospitals
survival gains in cancer are attributable to new treatments and medicines. With 836 medicines and vaccines in development for cancer, 80 percent of which have the potential to be first-in-class treatments, millions of Americans living with cancer have hope for a brighter future.

Diabetes and other metabolic diseases have been studied by physician scientists for over 1,000 years. Insulin was first used to manage the disease in 1922. Before that, diet and exercise were the most common treatments. A 2017 CDC report estimated that 30.3 million people in the US (9.4% of the U.S. population) are living with diabetes and that as many as 7.2 million of them are undiagnosed. Diabetes is a general term for a chronic condition where there is too much glucose (sugar) in the blood. Normally, the pancreas makes insulin to help convert glucose into energy. With diabetes, the body either does not make enough insulin (type-1 diabetes) or does not use it properly (type-2 diabetes), leading to high blood glucose levels. Uncontrolled diabetes can lead to serious health complications, such as heart attack, lower-limb amputation, vision impairment and blindness. Type 2 diabetes makes up 90 – 95% of all diabetes cases. Research shows that the incidence of diabetes increases with age and that diabetes affects 1 in 4 people over the age of 65. In addition, an estimated 33.9% of U.S. adults aged 18 years or older (84.1 million people) had prediabetes in 2015, based on their fasting glucose or A1C level. Nearly half (48.3%) of adults aged 65 years or older had prediabetes. For these people, the goal is to modify behavior and support their systems so that they do not cross over from pre-diabetes to type-2 diabetes.

Successful management of diabetes requires constant and diligent monitoring of glucose levels.

To control their glucose, patients may need multiple daily injections and/or multiple oral medicines. Insulin pumps and even an “artificial pancreas” help patients to better manage their disease. Until we can find a cure, better disease management is the best way to for people with diabetes to avoid costly and sometimes life-threatening complications.

In recent years, researchers have focused on making treatments much easier for patients, from fewer pills to less frequent injections. Careful monitoring and treatment are still needed, but current medicines in development offer a promising future.

There are 171 medicines currently in development for type-1 and type-2 diabetes and diabetes-related conditions. A new wave of treatments and devices are offering patients better or more sustained control over their glucose levels. Other medicines in the pipeline may address diabetes-related complications that affect the kidneys, blood vessels and eyes. All of these new medicines are in clinical trials or awaiting review by the FDA.

These are just a few of the many examples of how life changing and lifesaving innovations are making life better for patients and shaping our world.

**Shaping generations**

In 1960, the first oral contraceptive, Enovid, was approved by the US Food and Drug Administration (FDA) as contraception. By 1965, just five years after the FDA approval, 6.5 million American women are on pill, making it the most popular form of birth control in the U.S. A key factor on why Gen X, the generation sandwiched between the Baby Boom and the Millennial Generation, is significantly smaller is that as birth control became more widely used and more effective, women gained greater control of both the size of their families and the timing.

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**Population Trends**

<table>
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<th>Birth Year</th>
<th>U.S. Life Expectancy</th>
<th>U.S. Population (Millions)</th>
<th>World Population (Billions)</th>
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</table>

Sources: Centers for Disease Control and Prevention. Statista
ANOTHER DECADE WITH A SPOUSE.
A FEW MORE YEARS WITH YOUR VERY BEST FRIEND.
HOW DO WE PLACE VALUE ON THESE?

Time is precious. Life

Thanks to a system that has long encouraged entrepreneurial investment, breakthroughs in biopharmaceutical research are delivering more than stunning outcomes.
More than cures. They are giving us time.
More years – better years

According to data reported by PEW Research on U.S. population trends in 2016, Millennials have surpassed Baby Boomers as the nation’s largest living generation based on 2015 population estimates by the U.S. Census Bureau. Millennials now number 75.4 million, surpassing the 74.9 million Baby Boomers. Generation X is projected to pass the Boomers in population by 2028.

Members of these generations will not only live longer, they have the benefit of health innovations that make life better. Today’s diagnostics, medicines, and medical devices are making life better for people of all ages, but as we age, many of us will need them more. Joints can wear out. Bones can get brittle. Eye sight can fade or get clouded. Our veins can clog and our hearts can fail. Our bodies natural ability to fight off disease is not as strong as it was before. Today’s medical innovations are addressing these challenges and many more. They help to ensure we don’t just have more years. They help us make the most of the yeas we have.

Nothing has the power to curb health care costs quite like a cure.

Life Science and Health Innovations save lives. They also save money. Every reduced hospital stay, every surgery avoided, every inoculation can help reduce healthcare costs and help ensure a better quality of life for our friends and loved ones. We are making important progress in addressing the diseases that steal our quality of life for our friends and loved ones and burden our healthcare system.

21st Century cures

Designed to harness America’s best minds of science, medicine and technology to tackle some of our biggest and most complex health challenges of today, the 21st Century Cures Act was signed into law on December 13, 2016. A truly bi-partisan effort that included input from industry, academia and patients from across the nation, the bill committed $6.3 billion over seven years, dealing with opioid addiction, cancer research and care, precision medicine, the BRAIN initiative, mental illness, Alzheimer’s disease, and so much more.

America’s biopharmaceutical companies invest more than $70 billion in R&D each year and reinvest on average 20 percent of their revenue into the search for new treatments and cures.

No other industry in America comes close to this. The biopharmaceutical industry’s investment in R&D is more than twice the entire budget of the National Institutes of Health. The sector as a whole accounts for 17 percent of all domestic R&D funded by U.S. businesses – far more than the software (13 percent), automobile (5 percent) and aerospace (4 percent) industries.

It’s hard to visualize that much money. The $70 billion biopharmaceutical companies invest on R&D is more than the combined 2016 sales of some of Arizona’s largest companies: Avnet + Freeport McMoran + Republic Services + Southern Copper + APS + SRP + Insight.

Innovation saves

How the world and individual nations will be able to afford quality healthcare for our growing and aging population is a one of our greatest societal and economic challenges. But just as it has been in the past, where there is innovation there is hope:

• There are 836 medicines and vaccines in development for cancer. If these medicines can help to reduce the cancer death rate by 10%, it represents an estimated $4.4 trillion savings.
• As Baby Boomers age, the rate of Alzheimer’s disease will reach epic proportions. Unless new breakthrough treatments are developed soon, the consequences will be devastating for patients, families, and our healthcare system. Biopharmaceuticals are the best hope at stemming the tide of Alzheimer’s. There are 75 new diagnostics and treatments in development for Alzheimer’s Disease. If just ONE new treatment can delay the onset of Alzheimer’s by 5 years, the number of Alzheimer’s patients would drop by nearly one half, saving over $367 billion in healthcare costs in the U.S. alone.
• Hospital stays represented 32% of to the total cost of healthcare in 2015. According to the National Center for Health Statistics, from 1980 – 2010, advanced medical devices helped reduce the duration of hospital stays by 58%.
• Non-adherence (not taking your medicine as directed or not following your doctor’s instructions after a procedure) is estimated to add over $290 billion to U.S healthcare costs annually according to the Network for Excellence in Health Innovation. Medication non-adherence is not only a leading driver of high-health-care costs. It is also the leading cause of preventable morbidity and mortality, responsible for 30% to 50% of treatment failures and 125,000 deaths annually according to the American College of Preventive Medicine. New Health Tech Applications are now available to help us remember what out doctor told us to do, remind us to take our medicine, and in some cases even administer the treatment when our body tells a sensor that we need it!

So, what does this all mean?

Our global community and our nation is growing thanks in part to the lifesaving innovations that are helping us to live longer lives. Medical technology helps us to stay healthy, helps us manage or control disease when it happens, and can provide cost savings that are necessary so that we can afford the costs of healthcare as a world, as nations, as states, and as individuals.

Most of all, these lifesaving and life-changing innovations give us the opportunity to make the most of our years.

Joan Koerber-Walker is president and CEO of the Arizona Bioindustry Association (AZBio).
Stretch your Budget

BIO Business Solutions® is the largest cost-savings program for the life science industry - in 2016, over 3,300 companies saved nearly $300 million allowing for the preservation of precious resources and an increased investment in the growth of the life science industry. AZBio members can participate and save with these top vendors...

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Enroll and start saving today!