Texas Life Sciences:

Building the Innovations of Tomorrow

2024

THBI
TEXAS HEALTHCARE & BIOSCIENCE INSTITUTE

INNOVATEBIO
National Biotechnology Education Center

ACKNOWLEDGEMENTS

On behalf of the Board of Directors for the Texas Healthcare and Bioscience Institute (THBI), we present ***Texas Life Sciences: Building the Innovations of Tomorrow***. This report provides an updated and in-depth review of the current state of the life science and biotech industry in Texas with a specific focus on efforts to expand the workforce to greater serve the industry and expand services and supports needed to help early and mid-stage companies, all companies, achieve successful product launches.

This report is designed to not only profile the current state of the industry, but also to be a resource and strategic guide to help create greater connections between industry partners across this great state. Many of these partners were actively involved in the development of this report over the fifteen months it has taken to develop it. During that time, we interviewed over 14 industry CEOs who provided insight into their day-to-day challenges. We also interviewed individuals from 17 organizations, many of whom are profiled in this report, who are on the ground actively building the bridges to this future.

While it isn't possible to list every contributor, we do want to highlight some specific contributions, starting with Linnea Fletcher, PhD, Principal Investigator with InnovATEBIO and Chair of the Biotechnology Department at Austin Community College. Without her support, this report would not have been possible. The Austin Community College/InnovATEBIO team has provided insight and support throughout, and we appreciate their commitment to growing the life science industry. The Coalition of State Bioscience Institutes (CSBI) also provided invaluable assistance, beginning with issuing the 2023 CSBI Life Sciences Workforce Trends Report. Additional appreciation goes to our partners at Health Management Associates, including Stephen Palmer, PhD, Managing Principal, who was instrumental in the drafting and preparation of the report.

Other industry partners also contributed to the report, sometimes indirectly, by taking the time and effort to further statewide collaboration by keeping THBI engaged and informed regarding the key advances and achievements across the state. The Greater Houston Partnership, the Dallas Regional Chamber, and regional partner BioMedSA provided background information for the report. Throughout this report, you will find countless additional life science and biotech partners who are all busy ***Building the Innovations of Tomorrow***.

At THBI, we never lose sight of the real meaning of ***Building the Innovations of Tomorrow***. It's not just about building an ecosystem for greater economic opportunity; it's about discovering the future of wellness and medicine and bringing those discoveries to the Texans who need them. We look forward to continuing to work to support this industry through collaboration, partnership, and advocacy, with not only our members, but with all of those who are dedicated to making innovation happen in Texas.

Victoria Ford
President and CEO
Texas Healthcare and Bioscience Institute

David Margrave
Board Chairman
Texas Healthcare and Bioscience Institute

EXECUTIVE SUMMARY

For many years, researchers, entrepreneurs, consultants, manufacturers and everyone in the life science and biotech industry in Texas have been quietly and steadily working to build one of the strongest and most innovative economic industry sectors in Texas. In that time, they have brought to market thousands of patents, over 5,300 between 2018 and 2021 alone, built thriving companies, research collaborations, and an entire ecosystem with very few rivals. While Texas' life science market isn't conveniently concentrated in one narrow region, the whole state has something to bring to the table, which offers an extraordinarily diverse amount of creativity and opportunity.

This report, ***Texas Life Sciences: Building the Innovations of Tomorrow***, provides an insider's look into the breadth and scope of the industry, highlighting many of the key partnerships and collaborative efforts that are building the bridges of progress for this industry long into the future. It is a road map outlining the many partners in government, academia, and industry, who are working daily to support and grow the ecosystem. Additionally, it is a resource guide to some of the leading players, and a strategic plan outlining the next steps forward for industry and public policy makers.

Texas Life Science Industry is world class.

Texas has four sophisticated life science and biotech markets that have extensive infrastructure to support any company, developing on any major platform, identify the workforce and other resources necessary to not only "survive the valley of death" but to thrive and successfully steer a product through the gauntlet that is the product development process.

Texas is investing daily to expand the highly skilled life science and biotech workforce.

There are ongoing efforts across the state to build greater capacity in the workforce for this industry. Efforts include the multi-institution partnership to train and certify more bioscience manufacturing workers. In addition, stakeholders are developing the degree programs, internships, and industry partnerships working to develop next-generation scientists, managers, and executives that can continue to guide the industry forward.

Texas' life science ecosystem support network is comprehensive and robust.

Every life science or biotech company in Texas has the opportunity to identify partnerships, collaborations, service companies, and funding opportunities needed to navigate product development. From local regional economic partners to statewide programs, the support exists in Texas.

As is the case with every industry and ecosystem, there is always more work to do, challenges to overcome, and new opportunities to discover. This report outlines strategic objectives that all industry partners can apply to guide the ecosystem, policy priorities for future exploration to define next step solutions, and policy initiatives that will directly support the industry's future growth.

Taken together, this report outlines the Texas life science and biotech industry and how it is **Building the Innovations of Tomorrow for all Texans.**

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INTRODUCTION

In 2023, the Coalition of State Bioscience Institutes (CSBI) released a report highlighting the state of the life science and biotech workforce in the United States. The CSBI noted that "the U.S. life sciences workforce is a constantly shifting target – continuously evolving to meet the demands of a rapidly growing and highly innovative, science- and technology-driven industry. Despite—and, in part, because of—the global pandemic and resulting economic challenges, the life science industry defied national economic trends, growing through 2020 and continuing to outpace the overall private sector in recent years as it has for two decades." Just one year earlier, a report issued by Biotechnology Innovation Organization (BIO) and TEConomy Partners found that "Texas' bioscience industry employed more than 116,000 across 7,462 business establishments in 2021, and it continues to grow at a rapid rate—from 2018 through 2021, industry employment grew by 15 percent, outpacing national industry growth." Further, "Texas is among the top tier of states not only in the size of its industry base, but in several additional measures of its innovation ecosystem, including university research and development expenditures which exceeded $4.1 billion in 2020."

This report, ***Texas Life Sciences: Building the Innovations of Tomorrow***, will go behind the scenes, take a deeper look at the forces driving this growth in innovation, and describe the efforts taking place across the state to expand and prepare the necessary workforce and industry supports to continue to move Texas to be the national leader in the life science and biotech industry. As Victoria Ford, President and CEO of THBI, noted in The Boston Globe in June 2023, "Everything they can do in Cambridge, we can do in Texas."

TOP BIOTECH & LIFE SCIENCES COMPANIES IN TEXAS

SELECT FIRMS WITH CORPORATE MANAGEMENT, RESEARCH OR MANUFACTURING FACILITIES IN THE STATE

Office of the Governor | Texas Economic Development & Tourism
gov.texas.gov/business | @TexasEconDev

Revised June 2023

Texas Marketplaces

It is impossible to grasp the scope of the life science and biotech industry in Texas without first understanding that the breadth of the state has facilitated the development of multiple major markets within the state, both competing against each other and collaborating when necessary to present the full ecosystem of resources that any company, researcher, or service provider might need to fully grow and thrive. A review of the map on page 2 provides a visual guide not only to the four largest marketplaces in Texas, but also to the far-reaching impact of the industry across the state.

Austin is the state capital and home to The University of Texas System and its flagship campus, The University of Texas at Austin. Opportunity Austin and the Austin Chamber of Commerce note that "Austin's growing cluster of innovative life sciences companies embraces the area's technology infrastructure. The result? A region of both established and emerging companies that are changing the face of healthcare." Austin provides one of the most sophisticated workforces with a strong combination of top-tier academic talent, cutting edge industry, and a vibrant entrepreneurial climate. Austin has the fifth most concentrated workforce in Science, Technology, Engineering, and Mathematics (STEM) among major metropolitan areas.

In the biomedical science and research space, Austin has invested in the new, strategically located, Innovation District adjacent to Dell Medical School, The University of Texas at Austin campus, and the State of Texas Capitol Complex. Additional research campuses and collaborations are also in development with the launch of UT Impact Labs that includes 10,000 square feet of lab space and support for life science start-ups, the development of the Round Rock Life Sciences Strategy, and the refurbished 3M campus research and development site at Highpoint. The Health Transformation Research Institute and Biomedical Science Data Hub at Dell Medical School also collaborate to advance translational research in the region. The University of Texas at Austin leads the nation in National Science Foundation funding ($144 million) and established the National Artificial Intelligence Institute for Foundations of Machine Learning, which is a hub for interdisciplinary research to advance artificial intelligence and machine learning across society, including in healthcare.

Dallas is home to The University of Texas Southwestern Medical Center, ranked #1 globally for publishing high-quality scientific research and producing six Nobel laureates since 1987. This region includes eight major health systems, two public health systems, one major veteran system, and numerous national corporate healthcare headquarters, covering 1,000 acres, employing 37,000 people, and serving 2.9 million patients annually. UT Southwestern's Peter O'Donnell Jr. Brain Institute enlists more than 4,100 scientists, clinical investigators, and educators in an unprecedented model to increase understanding of the brain and transform how neurological and psychiatric disorders are diagnosed and treated. In addition, Dallas leads in attracting corporate headquarters, including McKesson and Verily. It also has Pegasus Park, an impact investment zone focused on biomedical and health care innovation. Located within one mile of the medical district, Pegasus Park is the hub for North Texas' life science entrepreneurial ecosystem, housing many of the region's 104 biotech startups and over 60 biotech companies. Over the last five years, North Texas life science companies attracted around $4.5 billion of private capital, generating 52 successful acquisitions and IPOs. With its #1 ranking for net migration and 70 higher education institutions producing the third most STEM graduates in the country, Dallas has a robust talent pipeline. This growth is expected to continue with the proposed development of Texas Research Quarter, a holistic life science campus in Plano, Texas. The project is designed to foster innovation and collaboration among companies and institutions across the life science sector. In total, the project would create over 4 million square feet of lab, office, and therapeutic production space across four phases of construction.

From curing cancer to developing life-saving diagnostics and preventive interventions, **Houston**'s world-class research institutions and innovative companies are taking on the greatest medical challenges of our time. Houston is home to the Texas Medical Center (TMC), the most concentrated life science cluster in the world including industry-leading patient care, academic and translational research, and innovation. TMC has three Tier 1 universities, three medical schools, six nursing schools, and schools of dentistry, public health, pharmacy, health economics and other health-related programs and institutions. TMC institutions are leaders in research and translation having received over $866.9 million of National Institute of Health (NIH) funding in 2021, more than 50% of the State's total funding. More clinical trials are conducted in the TMC on an annual basis than in any other community, with over 20% of total clinical trials in the United States occurring in Houston. Additionally, the Galveston National Laboratory hosted at The University of Texas Medical Branch (UTMB) is a sophisticated high containment research facility that serves as a critically important resource in the global fight against infectious diseases. Houston has an active entrepreneurial community highly focused on innovation and translation, spawning over 300 life science start-up companies in recent years, raising $6 billion in private funds, and offering over 40 accelerators and incubators across the region. The TMC Innovation Factory with Johnson & Johnson's JLabs co-working office and wet lab space, is home to start-ups, accelerators, and venture funding. Additionally, TMC Helix Park is a $1.8 billion campus on 37 acres dedicated to translational research.

San Antonio's largest economic sector is healthcare and bioscience, which contributes over $44 billion annually and employs 1 of every 5 workers. This ecosystem includes the U.S. Department of Defense's largest military health complex. San Antonio is also home to the only NIH primate center in the country with Biosafety Level (BSL) 3 and BSL-4 containment labs at Texas Biomedical Research Institute (Texas Biomed). This 200-acre campus on the northwest side of San Antonio is focused on infectious diseases and played a critical role in developing safe and effective COVID-19 vaccines. San Antonio hosts three national disease centers:

Clinical Care and Research Locations in San Antonio

- Brooke Army Medical Center
- Audie L. Murphy Veterans Administration Center
- U.S. Army Institute for Surgical Research (USAISR)
- 59th Medical Wing
- Naval Medical Research Unit (NAMRU)
- 17 other DOD centers

- Mays Cancer Center at The University of Texas Health Science Center at San Antonio (UTHSA)
- Interdisciplinary NexGen Tuberculosis Research Advancement Center at Texas Biomed
- The only National Institute on Aging designated Alzheimer's Disease Research Center at the Bigg's Institute for Alzheimer's & Neurodegenerative Diseases at UTHSA.

San Antonio houses two of the largest hospitals in the United States by bed count, two medical schools, six nursing schools, one dental school, four engineering schools, five science schools, one pharmacy school, and a recently established school of public health conducting research and providing training to over 130,000 STEM students annually. The highly diverse population and research infrastructure currently support over 1,800 active clinical trials. Entrepreneurs benefit from 11 entrepreneurial support organizations and access to independent, academic, and military researchers and their facilities, as evidenced by the over 200 biomedical start-ups in the region today. The region has the capabilities to support all the steps in biomedical product development through multiple collaborating institutions, from drug research to manufacturing.

One of only two such entities in the United States, BioBridge Global, has the capabilities to process blood/tissue from donor to tested manufactured product in San Antonio.

In addition to the major life science hubs, promising markets are developing across other areas of Texas. The **Brazos Valley** near Bryan/College Station is emerging as a research cluster focused on agriculture, biotechnology, and life science. Key assets include the RELLIS Campus for technology incubation and industry partnerships associated with Texas A&M University. Further west, **El Paso** and neighboring New Mexico are collaborating to grow a bi-state biosciences hub leveraging research strengths at The University of Texas El Paso and New Mexico State University. This region provides strategic access to cross-border manufacturing, logistics, and talent recruitment opportunities with neighboring Mexico. Several Texas cities are also exploring growth scenarios in these cutting-edge fields to diversify economies and create opportunity. By cooperating to magnify regional specializations while strengthening statewide connections, a powerful network effect can catalyze growth across Texas' urban-suburban-rural continuum.

In combination, these markets define why Texas is one of the country's leading hubs for biotechnology and life science. This is a highly collaborative ecosystem that provides any early-stage researcher, industry start-up, or sophisticated life science market leader with the resources to navigate the complex drug and other product development process, comply with strict regulatory requirements, and successfully enter the market with new innovations and highly successful products.

Every industry ecosystem needs strong support and on-going commitments to continue to thrive and build on each successful development. This report will describe and profile the current state of the life science and biotech industry in Texas. Secondly, this report will dig deeper and focus on two fundamental components within the industry that are key to long-term successful growth: building a successful industry workforce and ensuring effective transitions for early-stage companies and research to the marketplace. Extensive research, analysis and interviews were conducted to provide the most up-to-date data possible related to the growth of the industry.

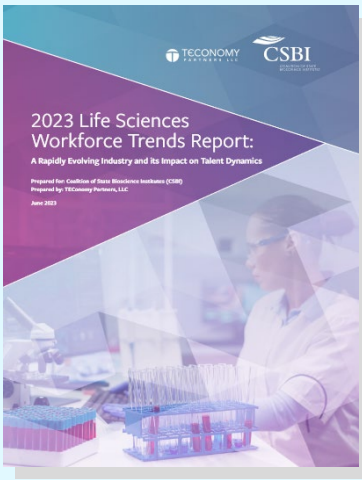
Intellectual Property (IP)

While not the focus of this report, it is important to note that IP is a critical component of life science product development.

Any researcher or entrepreneur seeking to develop a life science product must have a strong claim to the IP associated with their product.

Additionally, included in this report are profiles of some of the most innovative collaborations and partnerships that are currently building the future for the industry. For every researcher and entrepreneur with an idea for an innovation or a new product, Texas has many potential partners and support systems along the arduous road to the marketplace, and this report hopes to help illuminate that path.

For additional information about the industry, visit www.thbi.com/industry-policy-info for these reports.



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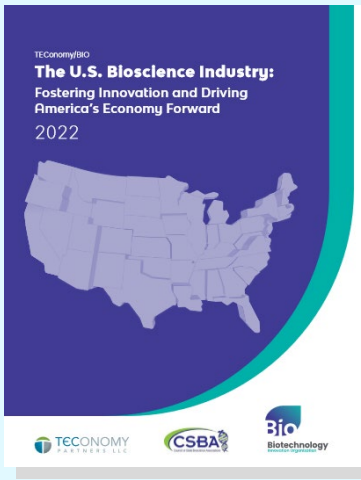

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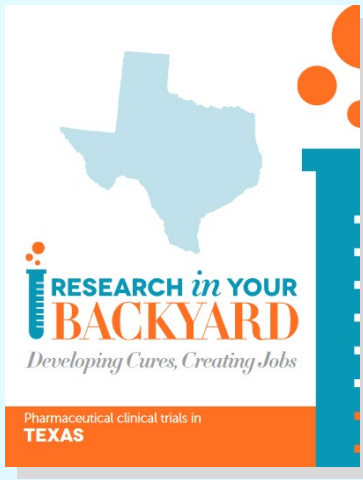

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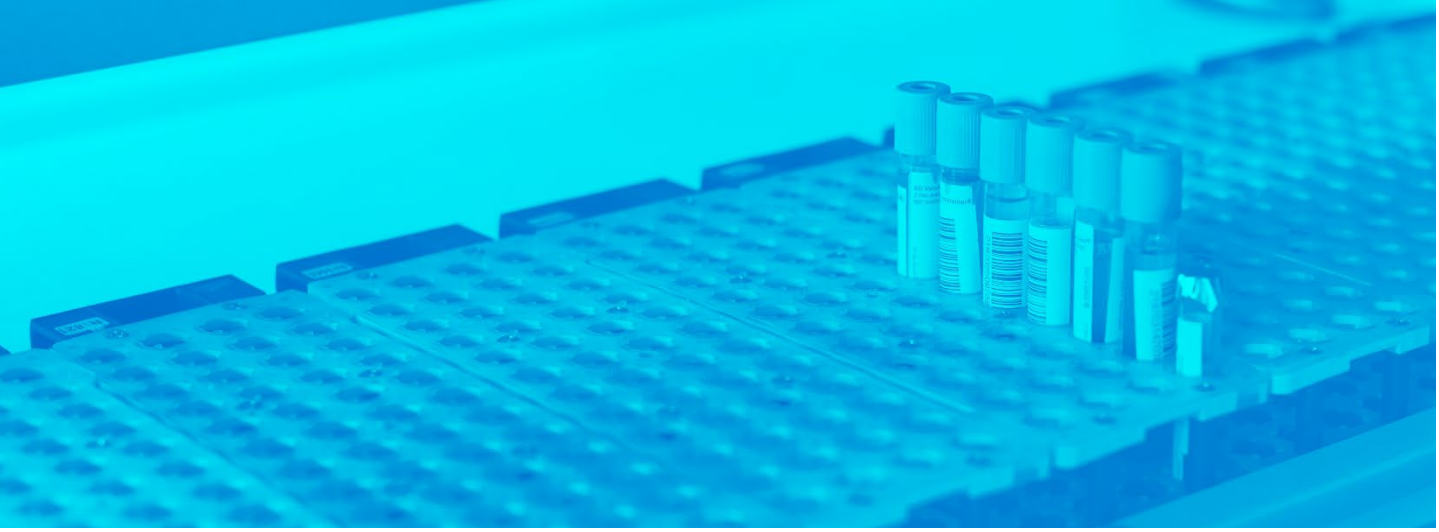


SECTION 1. THE LIFE SCIENCE INDUSTRY IN TEXAS

The life science industry is a broad term that encompasses companies that develop, manufacture, and sell products and services related to human health. This includes a wide range of businesses, from pharmaceutical companies that develop drugs to medical device manufacturers that produce medical devices, implants, and other instruments, as well as biotechnology firms that use living organisms to create new therapies and diagnostics. The life science industry is a major economic force in Texas, generating billions of dollars in revenue and supporting thousands of jobs. The industry directly employs over 116,473 people in the state, with an average annual salary of $100,000. The industry also has a significant indirect impact on the Texas economy, supporting businesses in various sectors, including construction, logistics, and professional services.

Types of Companies in the Life Science Industry

The life science industry consists of a variety of different types of companies and institutions, each with its own focus and expertise. Some of the major categories are:

- **Pharmaceutical Companies:** These companies develop and manufacture prescription drugs. They are responsible for conducting clinical trials to prove the safety and efficacy of their drugs, as well as obtaining regulatory approval from governments around the world.

- **Biotechnology Companies:** These companies use living organisms, such as bacteria, yeast, or cells, to produce new therapies, diagnostics, and other products. Biotechnology companies are at the forefront of many of the most promising advances in medicine today.

- **Medical Device Companies:** These companies design, manufacture, and sell medical devices, such as implants, prosthetics, and diagnostic tools. Medical devices play a critical role in the diagnosis, treatment, and prevention of disease.

- **Research Institutions**: Research is at the heart of every new product and innovation as well as a fundamental aspect of the clinical trial and regulatory approval processes for these companies. Research institutions, both public and private, are fundamental to the success of the industry.

- **Contract Development and Manufacturing Organizations (CDMOs):** These companies provide outsourced manufacturing and development services to pharmaceutical, biotechnology, and medical device companies. CDMOs can help companies with a variety of tasks, such as manufacturing drugs and medical devices, conducting clinical trials, and managing regulatory submissions.

- **Contract Research Organizations (CROs):** These companies provide outsourced research services to pharmaceutical, biotechnology, and medical device companies. CROs can help companies with a variety of tasks, such as conducting preclinical research, managing clinical trials, and developing regulatory submissions.

The future of the life science industry in Texas is bright. With its strong research institutions, thriving biotechnology sector, and favorable regulatory environment, Texas is well-positioned to continue its growth as a leader in this dynamic and innovative field. The state's commitment to investment in research and development, coupled with its focus on fostering a collaborative environment, will further solidify its position as a global hub for life science innovation.

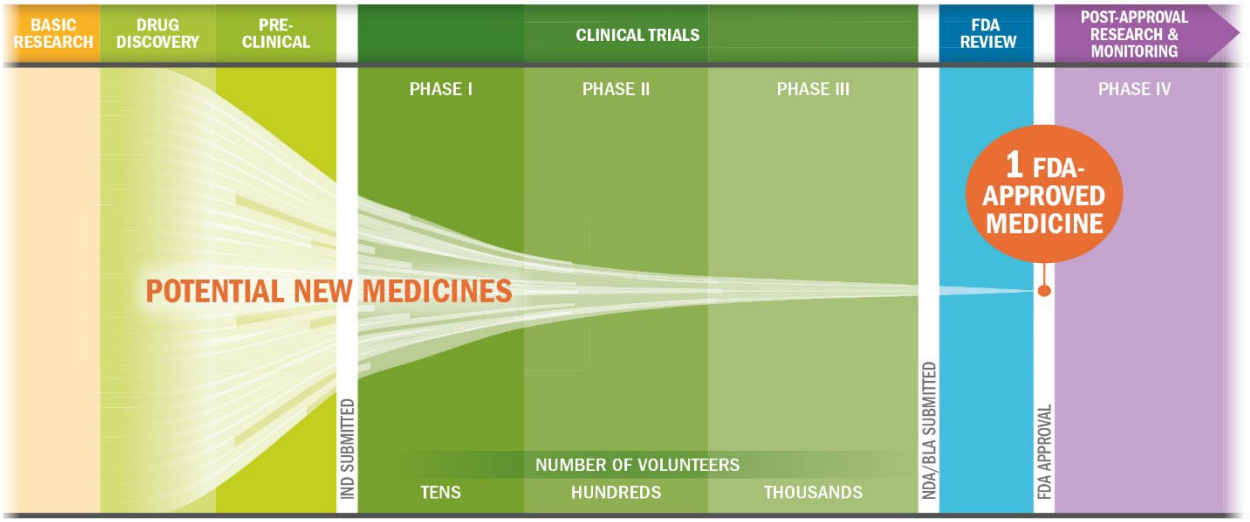
Product Development in the Life Science Industry

The graphic on page 12 illustrates the monumental challenges that researchers and entrepreneurs face when attempting to bring a new drug or therapy to the marketplace. In short, from drug discovery through FDA approval, developing a new medicine takes an average of 10 years, costs an average of $2.6 billion and less than 12% of the candidate medicines that make it into Phase I clinical trials will be approved by the FDA. Other products including medical devices, diagnostic tests, operating room equipment, and other new products also face a challenging journey to the market often involving rigorous regulatory processes and even clinical trials.

For drug developers, the journey of a drug from conception to market has many layers involving great uncertainty, risk, and substantial financial investment. It is a process that demands innovation, perseverance, and a deep understanding of the complexities of human biology. The first step in this intricate process is the discovery phase, where scientists and researchers embark on a quest to identify potential drug candidates from a vast sea of possibilities. This exploration involves sifting through natural sources, synthetic libraries, and computational methods, seeking molecules that hold the promise of therapeutic potential. Once promising drug candidates emerge, they enter the realm of preclinical research, where their safety, efficacy, and potential for human use are meticulously evaluated. This phase involves extensive testing in cell cultures, animal models, and laboratory studies, providing valuable insights into their pharmacological properties and potential side effects. A significant number of the companies that begin this journey will not make it past this most difficult phase. Identifying funding, experience, and other resources are particular challenges in these early stages.

THE BIOPHARMACEUTICAL RESEARCH AND DEVELOPMENT PROCESS

From drug discovery through FDA approval, developing a new medicine takes at least 10 years on average and costs an average of $2.6 billion.* Less than 12% of the candidate medicines that make it into Phase I clinical trials will be approved by the FDA.



Key: IND: Investigational New Drug Application, NDA: New Drug Application, BLA: Biologics License Application

* The average R&D cost required to bring a new, FDA-approved medicine to patients is estimated to be $2.6 billion over the past decade (in 2013 dollars), including the cost of the many potential medicines that do not make it through to FDA approval.

Source: PhRMA adaptation based on Tufts Center for the Study of Drug Development (CSDD) Briefing: "Cost of Developing a New Drug," Nov. 2014. Tufts CSDD & School of Medicine and US FDA Infographic, "Drug Approval Process," http://www.fda.gov/downloads/Drugs/ResourcesForYou/Consumers/UCM284393.pdf (accessed Jan. 20, 2015).

If preclinical studies yield encouraging results, the drug candidate progresses to clinical trials, the critical stage where its safety and efficacy are assessed in humans. Clinical trials are conducted in three phases, each with a specific purpose. In Phase 1, a small group of healthy volunteers or patients are enrolled to assess the drug's safety, tolerability, and dosage. This initial phase serves as a crucial safety checkpoint, identifying any potential adverse effects before proceeding to larger-scale studies. Phase 2 expands the study population to a larger group of patients with the target disease. The primary goal of this phase is to evaluate the drug's effectiveness in treating the disease and further assess its safety profile. Phase 3 represents the pinnacle of clinical research, involving a large-scale, randomized, controlled trial. This definitive phase aims to confirm the drug's effectiveness and safety in a real-world setting, providing robust evidence to support its regulatory approval.

After successfully navigating the clinical trial gauntlet, the drug developer embarks on the regulatory review process, submitting a comprehensive New Drug Application (NDA) or Biologics License Application (BLA) to the FDA or other regulatory agencies. This application contains a wealth of data from preclinical and clinical studies, demonstrating the drug's safety, efficacy, and manufacturing consistency. Upon obtaining regulatory approval, the drug's journey does not end. It enters the phase of post-market surveillance, where its long-term safety and efficacy are continuously monitored. This ongoing evaluation ensures that the drug's benefits continue to outweigh its risks in the real-world setting. The drug development cycle is a complex and challenging endeavor, demanding substantial investment, scientific expertise, and perseverance. Texas is ideally positioned with key drivers in place to support companies through the product development process.

KEY DRIVERS OF TEXAS' LIFE SCIENCE INDUSTRY

Strong Research Institutions

Texas is home to world-class research universities, including Baylor College of Medicine, MD Anderson Cancer Center, and The University of Texas at Austin. These institutions conduct cutting-edge research in various fields of biomedical science, providing fertile ground for innovation and collaboration.

Major Pharmaceutical and Medical Device Companies

Texas is home to the headquarters of several major pharmaceutical and medical device companies, including McKesson, Tenet Healthcare, and Kimberly-Clark. These companies contribute significantly to the state's economy and create numerous jobs in research, development, manufacturing, and sales.

Thriving Biotechnology Sector

Texas has a vibrant biotechnology sector, with a concentration of startups and established companies developing novel therapies, diagnostics, and medical devices. This sector is driven by the state's strong research infrastructure and access to capital.

Favorable Regulatory Environment

Texas has a business-friendly environment that attracts life science companies. The state's tax incentives, streamlined regulatory processes, and support for entrepreneurship make it an appealing location for startups and established companies alike.

Abundant Talent Pool

Texas has a large and diverse population, providing a rich source of talent for the life science industry. The state's universities and colleges graduate a large number of skilled scientists, engineers, and healthcare professionals.

Industry Collaboration and Engagement

Throughout the last 25 years, as the life science industry has expanded in Texas, many creative partnerships and unique collaborations have developed that ensure the industry thrives and grows. As the life science industry has grown in Texas, so too have the services and supports necessary to foster collaboration between educational institutions, industry leaders, and government entities to become a strong, flourishing ecosystem. As referenced previously, each of the major life science markets in Texas includes the key elements of support for the industry, including:

- Strong, growing companies at all stages of development;
- Educational programs that produce exceptional talent and skilled workers;
- Research institutions that develop and support new product ideas and concepts; and
- Growing development investment, creating modern life science and biotech campuses.

Many of these developments have been supported throughout the years by local and regional partners such as chambers of commerce, economic development corporations, and regional industry partnerships. These stakeholders focus attention and resources on the industry, recruit new related companies to those communities to continue growth, and create networking and innovative collaborations between the industry participants to identify challenges and work together to find solutions.

In the Central Texas region, several industry groups have created collaborations that focus on building and enhancing the life science and biotech industry. Opportunity Austin, the Round Rock Chamber of Commerce, the Brazos Valley Economic Development Corporation, and BioAustinCTX are all highly engaged organizations building industry connections and partnerships that facilitate the expansive growth of the industry in the region. The highly educated workforce in the region is another key to success, but the region's universities also provide incredible opportunities for growth such as the STAR One Incubator at Texas State University and the Bioscience Incubator at Austin Community College. Austin is also home to the InnovATE*BIO* National Center for Biotechnology Education.

In the DFW metroplex, the Dallas Regional Chamber, the Irving-Las Colinas Chamber, and BioNTX are leaders in a region filled with multiple chambers of commerce and local regional economic development partners. The region has grown significantly under the leadership of Lyda Hill Philanthropies, which focuses on building this industry sector, including by creating Pegasus Park, which aims to strengthen North Texas as a globally recognized center for life science innovation, business, and social impact. The region also boasts several industry incubators including the Acceleration Lab at The University of North Texas Health Science Center at Fort Worth and one of the largest research institutions at UT Southwestern.

In Houston, the Greater Houston Partnership brings together the surrounding counties to form a formidable regional collaboration that has grown one of the largest and most innovative bioscience industry markets in the country. Anchored by the Texas Medical Center but spread across multiple counties, the region is home to hundreds of research institutions, many business incubators and accelerators, bioscience manufacturing facilities, and life science companies at all stages of growth. BioHouston was founded in 2000 by Houston area research institutions to create an environment to attract and stimulate life science businesses to generate new advancements in medicine and provide jobs and economic growth for the Houston region.

BioMedSA and the GreaterSATX work within the San Antonio region to facilitate collaborations and act as a hub for the life science industry in San Antonio. Additionally, the Texas Research & Technology Foundation (TRTF) and VelocityTX are San Antonio's champions for promoting and developing emerging technologies and the life science industry in the San Antonio area. They fund and develop innovative ventures, building San Antonio's bioscience and technology economy.

In addition to these local and regional partnerships, there are state level resources and partnerships that focus on the growth of this ecosystem. THBI is a key stakeholder at the state level, working to ensure ongoing focus from state officials and industry leaders regarding the strength and benefits of the life science and biotech industry, and ensuring a favorable regulatory and public policy framework for the industry to continue to grow and thrive.

Strong Research Environment

For a life science and biotech ecosystem to grow and thrive, there must be a strong research community and resources to support that research, and Texas has an extraordinary research infrastructure. These institutions not only create the industry workforce, but they also have programs and systems that support their researchers' efforts to transfer innovations and products from the research lab to the marketplace. Today's research innovation is the mature, large employer of tomorrow. Therefore, helping these entrepreneurial projects make it to market is a necessary priority of the industry.

Research Institutions

Texas has seven public university systems, over 75 public and private universities and colleges, 11 health-related institutions, and 11 nationally ranked Tier 1 research institutions. Since 2021, Texas has more Tier 1 and Tier 2 universities (21) than any other state in the country. Through educational programing, these institutions prepare the workforce, conduct extraordinary research, and have built infrastructure that includes offices of commercialization, technology transfer programs, and business accelerators and incubators that help grow new businesses and move innovations into the marketplace. Public research institutions contribute significantly to the training and development of the next generation of entrepreneurs and scientists, fostering a pipeline of skilled researchers who will continue to drive innovation in the life sciences. Through their educational programs and postdoctoral training opportunities, these institutions cultivate a culture of scientific inquiry and equip aspiring scientists with the knowledge and expertise needed to tackle the complex challenges facing human health.

Public research institutions also play a crucial role in driving innovation and advancing the frontiers of life science research. These institutions provide a nurturing environment for scientists and researchers to conduct fundamental research, explore new ideas, and push the boundaries of scientific understanding. Their work lays the groundwork for future discoveries and technological breakthroughs that form the foundation for novel therapies, diagnostics, and medical devices. Private research institutions, armed with resources and entrepreneurial spirit, translate these discoveries into tangible products, navigating the complex and costly process of drug development.

Institutions of higher education across Texas are mobilizing around the state's rapidly expanding yet talent-hungry life science sector through targeted education and training partnerships. Via credentialed pipelines of skilled graduates and aligning facilities-use, curricula, and programs with industry advisors, this assembly of higher education institutions seeks to propel growth that is both economically and intellectually enriching for all Texans.

Clinical Trials in Texas

Texans are also positively impacted by the presence of a strong biopharmaceutical sector and clinical trials in the state. Innovative treatments developed today are helping to expand the frontiers of science and could lead to more and better treatments for patients in the future. In Texas, this innovation is the result of a successful collaboration between biopharmaceutical companies and local research institutions. And the sector's growth and strength in Texas are driving our economy and communities forward.

Since 2004, biopharmaceutical research companies have conducted or are conducting more than 17,000 clinical trials of new medicines in Texas in collaboration with clinical research centers, hospitals, and local research institutions. These clinical trials have investigated or are investigating some of Texas' biggest health care challenges, including asthma, arthritis, cancer, diabetes, cardiovascular disease, and gastrointestinal diseases.

Biopharmaceutical research companies are a good source of jobs, tax revenue, and research spending in Texas. A study by TEConomy Partners found that in 2022, the industry supported more than 116,473 jobs throughout Texas. In 2020, wages and benefits for employees whose jobs were supported by the biopharmaceutical sector resulted in $3.4 billion in state and federal taxes paid. Biopharmaceutical research companies supported the generation of $76.5 million in economic activity in the state, including the direct economic output of the sector itself, the output of the sector's vendors and suppliers, and the output generated by the buying power of its workforce.

Collaborations between the biopharmaceutical research industry and universities play an important role in the development of new medicines. These trials represent studies being funded by industry, research collaboration studies, and research other groups are undertaking on their own. In Texas, of the 2,509 open clinical trials involving the biopharmaceutical research industry, the campuses of The University of Texas are collaborating on more than 500 clinical trials and Baylor College of Medicine is collaborating on approximately 300. Texas Tech University has completed more than 200 clinical trials in the last 15 years, averaging more than 13 per year. Texas A&M University, the University of Houston and the University of North Texas are also collaborating on multiple clinical trials.

Texas Biomedical Research Institute (Texas Biomed**)**

The Texas Biomedical Research Institute is an independent, non-profit biomedical research institution, specializing in genetics and in virology and immunology. Located in San Antonio, this private research partner maintains seven biocontainment laboratories, including two CDC regulated labs with the capacity to study all diseases. They are one of seven National Primate Research Centers in the country and have played a leading role in the development of the first COVID-19 vaccine, the first Ebola treatment, the first Hepatitis-C therapy, and thousands of developmental discoveries. Texas Biomed combines the power and innovation of discovery-based science with the speed and efficiency of a contract research division to pioneer a new approach to research that is accelerating the development of diagnostics, therapies, and vaccines.

Government Support

No industry can grow successfully in a state as large and diverse as Texas without a full spectrum of state-level leaders providing both the prioritization of the industry as well as an array of services to build on each successful industry development. The life science industry in Texas boasts an impressive array of state partners who are invested in the long-term success of the industry, including government agencies at both the state and federal level participating in collaborations and making investments designed to continue the growth and development of this sector.

State agencies in Texas play a vital collaborative role in supporting the life science industry in cultivating a robust talent pipeline to meet the rapidly evolving needs of the state's thriving life science industry.

Office of the Governor's Economic Development & Tourism Office and the Texas Economic Development Corporation

The Office of the Governor's Economic Development and Tourism Office (EDT), recognizing the immense potential for economic growth and societal impact for this industry, has implemented diverse strategies to cultivate a skilled and robust life science industry capable of driving innovation and scientific breakthroughs. The EDT is tasked with marketing and promoting the State of Texas as a premier business location and travel destination. The EDT works side-by-side with the Texas Economic Development Corporation (TxEDC) to market and promote Texas nationally and internationally as the best place for businesses to locate and expand. TxEDC is a public-private partnership, an independently funded and operated 501(c)(3), that promotes Texas through a robust program of activities highlighting Texas' superior business advantages to corporate decision-makers and site selection consultants.

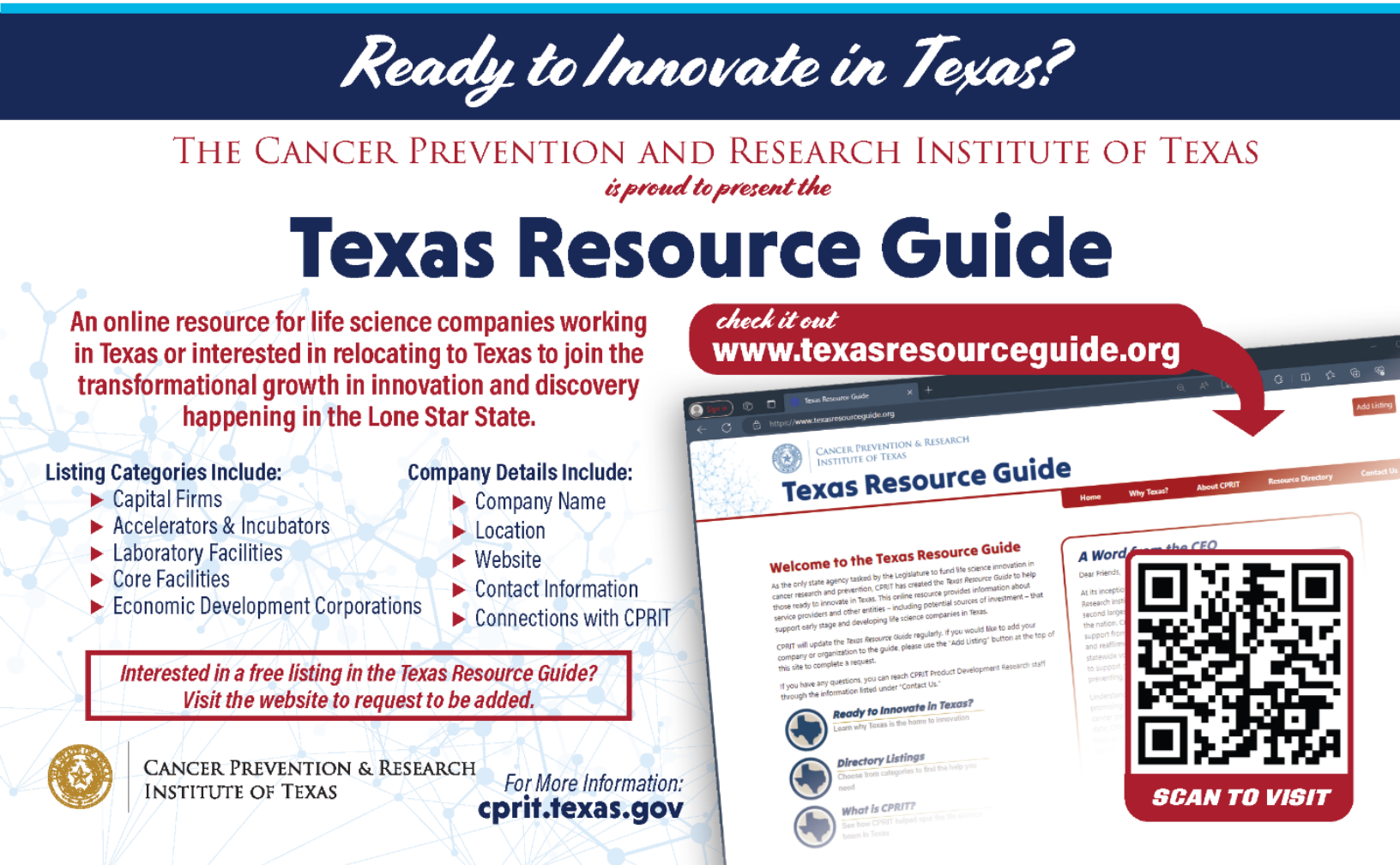
The Texas Life Science Industry

- One of the largest clusters of life science and biotech professionals in the country
- Home to 15 medical universities, seven of which rank among the nation's top 125 medical schools
- More than 970 biotech-related doctorates each year
- #1 in the country for agricultural science, natural resources, and health science doctorates
- More than 2,000 biotechnology-related R&D firms
- #2 nationally for number of clinical trials

Together, both offices work to ensure that Texas has strong business and community development programs, as well as effective business recruitment of both domestic and international investment prospects. They also provide business assistance serving domestic and international businesses of all sizes interested in doing business in Texas. Finally, they provide globally competitive, cost-effective financial tools to new and expanding businesses operating in the state or interested in relocating to Texas. They have identified life science and biotechnology as a key industry sector for Texas and proactively promote and recruit for this industry.

Cancer Prevention and Research Institute of Texas

One of the most unique state resources dedicated to supporting the life science industry in Texas is the Cancer Prevention and Research Institute of Texas (CPRIT.) CPRIT began its Product Development Research program in 2010. To date, CPRIT has committed more than $600 million to identify, develop, and fund innovative approaches at Texas-based companies during the crucial early stages of regulatory development. CPRIT plays a vital role in reducing the substantial human and economic toll of cancer in Texas. Through grants supporting cancer research, prevention, and early detection programs, CPRIT aims to save lives while also serving as an economic catalyst. Its operations, research funding, and prevention efforts generate sizable economic returns. In 2023 alone, accounting for multiplier effects, CPRIT is estimated to support over $23 billion in economic output and nearly 202,000 jobs statewide.



Research enabled by CPRIT grants has brought top scientific talent and companies to Texas, attracted substantial matching funds, and yielded breakthrough discoveries. Prevention and screening services have reached all 254 counties, detecting cancers sooner when treatment is more effective. By fueling impactful innovations and expanding access, CPRIT's diverse initiatives are helping to position Texas as an emerging hub of biomedical advancement while working to alleviate the burden of a devastating disease. The Institute has demonstrated the ability to improve public health and strengthen economic opportunity at a scale far surpassing initial state investments over time. Most recently, CPRIT has developed and released the Texas Resource Guide, which is an online resource guide that provides information about available partners in the life science and biotech industry. The guide includes information on incubators, accelerators, funders, labs, and facilities, as well as industry service providers and others that support early stage and developing life science companies in Texas. CPRIT updates the Texas Resource Guide regularly and companies can add themselves as appropriate.

Education Agencies

In Texas, the state has taken a three-partner approach to planning for the development of the state's workforce. There are two state agencies that oversee the education system and a third which is responsible for the development of the workforce. Together they partner through the Tri-Agency Workforce Initiative to collaborate and ensure alignment of the state's resources and goals which include strategic plans and initiatives targeting expanded STEM education, enriched career pathways, tailored skills training, and impactful industry-academic partnerships. This partnership works across institutional boundaries to stay attuned to real-world workforce demands. Sustained coordination strengthens talent flows at all stages while ensuring Texas' leadership in biopharmaceutical advancement.

In alignment with the dynamic growth of Texas' life science industry, the Texas Education Agency (TEA) has undertaken a strategic initiative to develop a robust talent pipeline by strengthening STEM education across K-12 schools. Recognizing that a solid foundation in science, technology, engineering, and mathematics constitutes the bedrock for career success in biopharmaceutical innovation, the TEA is working diligently to expand student access to enriching STEM learning opportunities. The agency's multifaceted approach integrates engaging STEM lessons into core subjects and specialized courses with the goal to spark an analytical spirit of inquiry and curiosity in students from all backgrounds.

The TEA is also actively coordinating with biopharma leaders, higher education institutions and community organizations to create experiential learning partnerships. By connecting students with real-world applications, these collaborations aim to illuminate diverse STEM career pathways. Ultimately, the TEA seeks to cultivate analytical thinking and problem-solving acumen in all students, regardless of their ultimate career destinations. Nurturing these capacities promises to spur scientific advancements while enriching lives. Texas' future hinges on harnessing every student's full potential.

The Texas Higher Education Coordinating Board (THECB) serves as a resource, partner, and advocate for Texas higher education striving to create a globally competitive workforce. THECB has created a strategic plan for higher education in Texas called *Building a Talent Strong Texas*. This refreshed strategic plan, created to adapt to a changing economy and a rapidly modernized workplace, raises the bar in a state where more Texans have received more degrees, certificates, and credentials over the past decade than at any time in history. The plan focuses on three measurable, data-driven goals:

- Attainment of certificates and degrees so at least 60% of Texans ages 25-64 have a postsecondary credential of value by 2030.

- Postsecondary credentials of value aligned with workforce demands that will raise incomes for individual Texans while reducing debt.

- Research, development, and innovation that drives discovery, improves lives, broadens education, and creates new jobs.

To accomplish these goals, THECB has pledged a commitment to equity and collaboration. By working with public and private sector stakeholders to break down historic silos and serve as a resource, partner, and advocate for Texas higher education, the Board aims to help more students graduate with credentials of value and foster innovation which will ultimately increase Texans' opportunities to succeed.

These goals work together in a way that specifically compliments the life science industry. The third goal has led to the development of additional guidance from the THECB to state institutions regarding research and driving innovation. *From Insights to Impact: Fostering Innovation Through Texas Higher Education* is a strategic and coordinated approach by THECB to help higher education institutions address challenges in translating research into commercial products. The report provides a roadmap for maximizing the return on investment in the state's academic research and technology development. The report provides guidance on three important approaches to success:

- Ease the translation of academic research at higher education institutions into commercial products to accelerate the process between idea and market entry.

- Strengthen connections and collaboration between Texas higher education institutions and existing regional innovation ecosystems.

- Build a robust and dynamic talent pipeline to support innovation, particularly in the state's core industries.

In the opening letter of the report, THECB Commissioner Harrison Keller notes that "[t]o sustain our state's global competitiveness, we must work together, fostering greater collaboration across higher education institutions, industry experts, investors, and community leaders. In particular, accelerating the translation of research discoveries from university laboratories to the marketplace is one of the most important ways we can generate more value and support our state's continued economic growth." For the life science and biotech industry, these goals are fundamental to ensuring the long-term growth of the ecosystem.

THECB's commitment to growth and innovation has also led them to recognize the vast potential of the life science and biotechnology industry and to develop and support a strategic initiative to strengthen career pathways through expanded STEM programming. Fostering enriched STEM learning opportunities has also led to the development of specialized degree offerings, technical certifications, and immersive training in high-demand life science domains. The THECB aims to illuminate a breadth of promising career avenues aligned with students' interests and aptitudes. Hands-on scientific research engagement opportunities represent another core emphasis.

Aligned with the explosive growth within Texas' thriving life science ecosystem, the Texas Workforce Commission (TWC) works diligently to cultivate aligned workforce training initiatives. By consulting extensively with industry pioneers across scales, this innovative agency works to identify in-demand job functions, distill essential skill sets, and design targeted curricula translating needs into trainee competencies. Central to TWC's approach is an uncompromising drive for continual refinement in response to fast-moving technological advancements. Frequent employer engagements surface paradigm-shifting tools and methodological evolutions, which seamlessly inform programmatic enhancements. These approaches interweave holistic career launch tools such as professional networking, resume tuning, and interview preparations to augment technical readiness.

Additionally, TWC plays an indispensable role actively connecting qualified job seekers to fitting roles within an unprecedented array of thriving Texas life science ventures. The agency's extensive network, spanning public and private spheres, allows candidate-organization matchmaking incorporating both candidate aspirations and organizational requirements. This proactive channeling through a deeply respected coordinating entity fosters efficient, equitable, and personalized labor market linkages at scale.

Advanced Research Projects Agency for Health (ARPA-H)

In September 2023, it was announced that Dallas was selected as one of three national hubs for a new federal agency pursuing "game-changing breakthroughs" in science and medicine by the U.S. Department of Health and Human Services. Dallas was selected to be the Customer Experience Hub, focused on developing health solutions that will be accessible, needed, and readily adopted. It will also take a proactive approach to diversify clinical trials, reach representative patient populations, and more, leading to better and more equitable health outcomes for all. The agency has created ARPANET-H, a nationwide health innovation network that connects people, innovators, and institutions anchored by three regional hubs in Dallas, Boston, and Washington to ensure the transition of health research innovations into solutions that reach all Americans. Over time, these collaborations and efforts will expand and engage with the local and regional environment of innovation for life science and for healthcare in Texas and across the country.

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs – America's Seed Fund

Congress established the Small Business Innovation Research (SBIR) program in 1982 to expand the role of small businesses in federal research and development (R&D) and to advance four objectives:

- Stimulate innovation
- Use small businesses to meet federal R&D needs
- Foster and encourage the participation of minority and disadvantaged persons in technological innovation
- Increase private sector commercialization of innovations derived from federally funded R&D

In 1992, Congress also established the Small Business Technology Transfer (STTR) program, which is similar in design to SBIR but with a focus to facilitate the commercialization of university and federal R&D by small companies. The program is coordinated by the Small Business Administration (SBA) which facilitates the execution of requests for proposals from 11 different federal departments and agencies. The SBA also establishes overall policy guidance, reviews agencies' progress, and reports annually to Congress on the operation of the programs. Texas is one of the top ten states which accounted for more than two-thirds of SBIR awards and funding receiving a total of $508.3 million in SBIR funding through 1,094 grant awards between 2015 and 2019. These two programs provide funding during the early stages of research and development of products across all industries. In 2022, the life science and biotech industry in Texas was the second largest sector to receive awards from these important programs.

SECTION 2. THE TEXAS LIFE SCIENCE AND BIOTECH WORKFORCE

The life science sector relies on a mosaic of complementary competencies powering advancements from manufacturing operations to scientific research and executive leadership. Nearly half of industry jobs occupy specialized scientist and engineer roles demanding advanced degrees. Another third are skilled technician and manufacturing positions needing postsecondary training like certificates and associate degrees. Critical knowledge areas range from cell culturing and quality control to automation programming and clinical trial management, with companies increasingly seeking data science and AI capabilities. This multifaceted workforce fuels a rapidly expanding, fiercely competitive industry outpacing broader economic hiring fivefold in certain occupations. However, acute shortages of experienced managers and commercialization experts persist. As technologies and techniques continuously advance, connecting academic pipelines to authentic industry projects and modernizing training infrastructure through business-education cooperation will prove vital to supplying talent for emerging biopharma, gene editing, regenerative medicine, and other scientific frontiers.

Dynamic Workforce Skills and Experience

The life science and biotechnology industries rely on a diverse workforce with a wide range of skills, spanning from laboratory expertise to scientific knowledge and executive leadership.

Bioscience and Biotech Manufacturing Technicians

Bioscience manufacturing technicians execute a wide range of tasks, from preparing samples for analysis to conducting complex experiments. They operate sophisticated equipment, master intricate protocols, and maintain sterile environments, ensuring the integrity and reliability of scientific data. Their expertise extends beyond technical proficiency; they possess a deep understanding of scientific concepts and methodologies, enabling them to make informed decisions and contribute meaningfully to research projects. Laboratory technicians work closely with scientists, providing essential support and collaborating on groundbreaking discoveries.

Scientists, Researchers, and Information Technology Experts

Beyond the production laboratory environment, the life science and biotechnology industries demand a workforce deeply rooted in scientific knowledge. Biologists, with their comprehensive understanding of biochemistry, genetics, and cell biology, delve into the intricate workings of living organisms, unraveling the mysteries of life. Chemists, masters of organic, analytical, and chemical engineering principles, explore the composition, structure, and properties of matter, laying the foundation for groundbreaking discoveries. Pharmacologists, with their expertise in physiology, pharmacology, and toxicology, meticulously study the effects of drugs on living organisms, ensuring the safety and efficacy of treatments. Additionally, information technology experts are a growing and significant necessity for the industry. Research and regulatory compliance require significant amounts of data that must also follow an extensive body of law regarding privacy. Data management experts and data statisticians are fundamental to the industry and are in extremely short supply. Artificial intelligence is expanding the need for these experts as the effective use of AI can shorten the timeline for research and development during the product development cycle.

Management and Executive Leadership

Executive leadership plays a vital role in guiding the life science and biotechnology workforce toward impactful innovations. Business development executives employ persuasive communication, negotiation acumen, and relationship-building skills to systematically identify and cultivate new business opportunities, enabling strategic growth. Similarly, regulatory affairs executives leverage extensive expertise in legal and compliance protocols to ensure adherence to regulatory guidelines, upholding product safety. Additionally, managers and clinical research associates draw on project management proficiency, communication capabilities, and knowledge of regulations to effectively oversee trials, validating research integrity.

Across manufacturing operations, scientific research, and executive leadership, the life science and biotechnology workforce include diverse, complementary competencies that fuel advancements. As the industry continues expanding boundaries toward improving patient outcomes, demand for skilled professionals across these areas is expected to intensify. The collective contributions across functions and roles will shape the future trajectory of healthcare innovations worldwide. With sound leadership setting vision and direction, the workforce is well positioned to actualize this potential.

Employment in the Life Sciences

Industry Title	Average Monthly Employment, Q1 2023	
	TX	US
NAICS 32519 Other basic organic chemical manufacturing	8,645	56,190
NAICS 3254 Pharmaceutical and medicine manufacturing	13,898	342,819
NAICS 334510 Electromedical and electrotherapeutic apparatus manufacturing	2,947	75,264
NAICS 334516 Analytical laboratory instrument manufacturing	2,046	47,485
NAICS 3391 Medical equipment and supplies manufacturing	15,283	334,226
NAICS 54138 Testing laboratories and services	20,220	174,160
NAICS 54171 Research and development in the physical, engineering, and life sciences	33,539	865,869
NAICS 6215 Medical and diagnostic laboratories	27,674	317,416

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages
https://www.bls.gov/cew/downloadable-data-files.htm

National Perspective

The United States remains a global leader in life sciences across pharmaceutical, biotechnology, medical device, and related subsectors. This rapidly advancing industry employs over 2.2 million high-skilled Americans in roles spanning scientific research, technological innovation, clinical advances, and advanced manufacturing. As the sector continues its robust growth trajectory, the specialized workforce powering discoveries and products faces an increasingly competitive labor market for its sought-after knowledge and capabilities.

Recent hiring surveys, job posting analyses, and executive interviews paint a picture of an industry experiencing skill shortages and talent gaps even amidst elevated hiring demand. At the same time, life science job profiles continue rapid evolution alongside emerging technologies, workforce dynamics, and market forces. Examination of employer perspectives and quantitative employment data reveals several key themes on the status and direction of this twenty-first century industry's dynamic workforce challenges and approaches. The TEConomy Partners 2023 Life Sciences Workforce Trends Report, developed in partnership with CSBI, included a survey of and interviews with numerous life science companies. Overall, the industry outlook promises continued fast growth, technological change, and rising competition for specialized talent across a range of skilled positions. Partnerships between industry and academia will grow increasingly crucial to develop and supply these high-demand workers.

A Rapidly Growing, Highly Competitive Industry

The life science industry continues its rapid growth trajectory, significantly outpacing hiring in the broader economy. Over 83% of surveyed companies added jobs over the last two years. Nearly 20% hired over 50 people, with 30% hiring more than 20. This intense competition for skilled talent has fueled rising wages, with over a third of firms increasing pay by 10% or more last year. It has also led companies to embrace new recruiting approaches like social media and expanded talent pipelines.

The industry demand spans scientific research, tech-based, and production roles. Nearly half of life science jobs are highly skilled scientist, engineer, and IT occupations requiring a bachelor's degree or higher. For example, job postings for chemists, biologists, computer engineers, and industrial engineers have grown sharply. Additionally, over 30% of industry jobs are technician and manufacturing positions, needing postsecondary training like certificates and 2-year degrees. In this area, growth is seen for chemical plant operators, packaging machine operators, quality control inspectors, and assemblers. Emerging roles highlight the influence of automation, AI, data science, and other technology. Job ads increasingly seek expertise in these areas as well as specialized skills like cell therapy, clinical trials, regulatory affairs, and good manufacturing practices.

Connections with academia continue as a vital pipeline for talent. More companies now embrace alternative credentials like certificates, badges, and skills demonstrations from community colleges and workforce programs alongside traditional degrees. Growing numbers also offer internship and apprenticeship opportunities.

Navigating the Tension of Remote and Hybrid Work

While most surveyed companies have adopted remote or hybrid policies, reluctance remains, especially in lab and manufacturing settings where on-site work dominates. Employee-led demand rather than corporate preference seems to be the driver of this trend. Employers identify challenges managing culture, collaboration, and innovation as top challenges with these newer arrangements.

Perspectives from Industry in Texas

The emergence of Texas as a rising hub for life science innovation brings immense opportunities but also intense competition for specialized talent. In-depth interviews with 14 life science companies across the state revealed common insights around evolving workforce dynamics, recruitment approaches, lingering talent gaps, and interest in collaborative solutions. Accelerated by COVID-19 disruptions, remote work has become ingrained in employee expectations but still poses balancing challenges for research-based roles. An increasingly stringent economic climate has spurred targeted hiring based on product potential rather than broad talent acquisition. Shortages persist for later career scientists and managers despite a solid academic pipeline. In response, companies are utilizing more creative retention tools while promoting Texas' merits. Additionally, there is openness to cooperate on ecosystem-strengthening initiatives like shared training programs and networking around startups' surplus talent. While no magic bullet, a united front promises progress.

Economic Impacts on Talent

Tighter financial conditions with interest rate hikes have squeezed capital availability across sectors. The compressed investment climate has reduced the funding available for the lengthy, high-risk drug and therapy research, and development cycles required before promising innovations start generating revenue. As a result, companies have cut costs by slimming down candidate product portfolios on experimental fronts and slowing momentum behind certain midstream advancement programs to focus resources on assets with the clearest paths to commercial viability and performance recovery. This increased selectivity on product development requires more targeted hiring based on prioritized pipelines rather than sustaining robust broad talent acquisition across wide exploratory fronts.

Additionally, greater integration of automation, artificial intelligence, machine learning algorithms, and technological convergence with complementary analytical disciplines like bioinformatics is transforming some established job functions while shaping new required capability sets. Data science, genetic analysis programming, quantum chemistry modelling, and cross-disciplinary engineering collaborations are increasingly important. Consequently, life science human capital priorities and realities are shifting amidst a more stringent economic climate and accelerated convergence with adjacent technical fields, requiring leaders to recalibrate talent spotting, upskilling, and retention strategies. While scientific curiosity and a drive for discovery run deep, nearer term funding pressures require efficiency so that prudence paired with creative vision can best nurture society-advancing breakthroughs into the future.

Shortages of Experienced Workers

Both large legacy corporations and small emerging startups consistently highlighted acute shortages of experienced mid-level managers and drug/therapy developers in Texas' life science talent market. The state has built a formidable pipeline cultivating sharp scientific minds through globally ranked academic research institutions centered in Austin, Houston, Dallas, and San Antonio.

This fuels a consistent stream of emerging graduates armed with leading-edge theoretical insights crucial for pushing boundaries. However, Texas has fewer professionals at higher career levels that require proven industry veterans to shepherd ideas through arduous development journeys towards safe, scalable products to improve patient lives.

As a result, Texas-based companies often find themselves needing to recruit nationally to attract specialized functional experts across areas like clinical operations leadership, cell therapy process optimization, quality control systems direction, protein manufacturing troubleshooting, and regulatory navigators guiding medical innovations through complex approval pathways. Building up mid-career opportunity layers both in dynamic startups and within supportive enterprises offering complementary services will continue to be important for retaining Texas' scientific up-and-comers in-state over the long-term while also drawing those with specialized expertise to enrich regional knowledge pools. Stronger connections with community colleges and transparency around laid-off talent could also reveal undiscovered local experience.

Remote Work Expectations

The COVID pandemic necessitated widespread remote work arrangements across most industries during lockdowns. Many office-based companies smoothly adapted through video conferencing, messaging, virtual document collaboration, and cloud data access without productivity declines. However, research-based life science roles requiring onsite laboratory work, controlled environments, specialized equipment operation, in-person team collaboration, and sensitive materials management could not transition to fully remote. As a result, companies have struggled to balance employee preferences for location flexibility that have become established across the economy with critical on-premises business functions still heavily reliant on in-person activities. This tension has required nuanced hybrid policies differentiated by role, granting remote options for individual-focused computer-based work like data analysis while mandating established onsite schedules for manufacturing production staff, clinical sample assessors, project troubleshooting sessions, equipment maintenance technicians, and scientists running laboratory experiments utilizing specialized instruments only available on secured premises.

Tailoring work-from-home variations by department has helped blend flexibilities that boost employees' job-life balance and recruitment competitiveness with mission-critical physical presence to uphold output dependability and IP security. Nonetheless, the growing ubiquity and persistence of broad, flexible work arrangements elsewhere make attracting and retaining talent even more competitive as workers enjoy heightened location autonomy. This puts pressure on managers to embrace empathetic leadership styles that gain buy-in through transparency on balancing organizational needs with employee preferences rather than directive decrees.

It also elevates the cultivation of organizational culture in importance through in-person social connection, teamwork-building activities, and relationship-rooted management to supplement purpose-driven missions centered on advancing impactful innovations. Companies able to project distinctive cultural identities interwoven with flexible policies aligned to unique demands of their scientific functions will sustain engagement and retention advantages amidst the intensifying competition for talent as locational expectations fundamentally evolve across industries.

Recruiting and Retention Responses

To attract and retain talent amid substantially increased competition, companies are employing a variety of enhanced approaches more aggressively and holistically than previously, including:

- Utilizing external recruiters with niche industry connections to fill highly specific roles;
- Offering sizeable hiring bonuses and paying premiums for certain critical positions;
- Revamping paid time-off policies to support sabbaticals and life-enrichment opportunities to pursue personal passions;
- Forming deeper partnerships with regional academic institutions to broaden talent pipelines; and
- Strategically adjusting baseline experience requirements to secure candidates who exhibit outstanding intangibles like intellect, passion, and cultural add.

Additionally, prospective employers in the Texas life science industry are promoting Texas' advantages like lower cost of living, cultural diversity, and growing footprint within the life science industry to potential recruits compared to biotech hubs burdened with extreme housing prices and congestion challenges that diminish quality of life.

Expanding the Life Science and Biotech Workforce

All across Texas, partnerships and collaborations are creating new opportunities for expanding the growth of the workforce for life science and biotech. Texas' life science industry is actively cultivating talented professionals to drive innovation and anchor high-quality jobs across the state. Crucial players like the Texas Economic Development Corporation are showcasing competitive advantages to attract companies, while also championing collaborations between academia and industry to customize training programs meeting employer needs. Innovative partnerships are forming to generate awareness and interest in this field as early as possible in the education pipeline. These partnerships are often hosted by educational institutions but also by innovative companies themselves and they are working across all the skill sets and expertise needed for the industry.

Increasing Bioscience Manufacturing Skills

Bioscience and biotech manufacturing facilities are a significant source of employment in the life science industry. Manufacturing operations are larger and hire greater numbers of individuals across the spectrum of skills including the most in-demand life science professionals, bioscience manufacturing technicians. Manufacturers in Texas such as Lonza, Fuji, and Scorpius have worked successfully with many of Texas' educational institutions to match skilled workers with jobs in Texas.

Reaching Out Early

Many recruitment efforts are designed to target individuals at a younger age and attract them to the industry. Often, young people in high school are not aware of the types of jobs in the industry or the career paths available. Effective planning for a career in bioscience and biotechnology should start as early as high school. One national hiring survey found that, even at the high school level, nearly 17% of companies reported offering internship opportunities, 16% of companies are participating in classroom visits, and 12% are providing mentoring relationships. Other activities cited in executive interviews include company tours and visits, equipment donations to high school laboratories, guidance on industry-relevant curricula, and more.

As noted previously, TEA has created programs and incentives to encourage students into STEM fields to prepare them for a career in life science. Additionally, TEA has recognized the importance of biotech courses within the Texas Essential Knowledge and Skills (TEKS.) TEKS are the state standards for what students should know and be able to do and they establish a standard for subject matter content. In the Career and Technical Education (CTE) programs, TEA has established state standards for three levels of CTE course work to prepare students in the biosciences and biotech fields. The Principles of Biosciences, Biotechnology I, and Biotechnology II course standards prepare high school students in the fundamental skills needed for the industry.

Industry is also working to educate and attract high school students into the life science industry. Located in Dallas' Pegasus Park, BioLabs is the premier co-working space for life science startups. BioLabs is working to change how scientific entrepreneurs do business by building an ecosystem that empowers bio-innovators to grow quickly, while maximizing capital efficiency. To that end, BioLabs is working to generate interest among high school students in the industry with an initiative called LaunchBIO, which is a multidimensional approach toward nurturing life science talent and fueling startups in the region. The nonprofit seeks to connect students to an array of biotech career opportunities, while linking fledgling companies to investor communities, thereby addressing parallel workforce and funding gaps.

Central activities expose youth to working scientists through dynamic industry exposure events at Pegasus Park's BioLabs facility. Students undertake hands-on research tasks, explore entrepreneurship, and can access paid internships, reskilling bootcamps, and other work-based transitions. These direct upskilling pathways are supplemented by broader scientific literacy and awareness building. While new to Texas, LaunchBIO has already engaged over 100 regional youth. Tracking internship conversions and credential attainment will further validate the model. With strong industry participation shaping experiential coursework and work-readiness requirements, LaunchBIO delivers an on-ramp for students to catalyze or contribute to local biotech innovation. The initiative promises to enlarge and diversify talent flows while nurturing emerging companies to fortify the regional cluster.

Another program targeting high school graduates was started by Austin Community College, which includes a four-course biotechnology pathway in Texas high schools, spanning introductory concepts through more advanced skills like quality control and lab research. The courses align with corresponding college courses and lead to an industry-recognized Biotechnician Assistant Credentialing Exam (BACE). Over 20 years, the pathway has grown from a single elective course to a sustainable statewide model, aided by dedicated teacher-leaders.

The program provides rigorous lab training to complement academic coursework. Students develop career-readiness through hands-on use of equipment and workplace protocols. Those completing the pathway can qualify for a Biotech Level 1 certificate from the community college. The third-party BACE also allows graduates to demonstrate their abilities to potential employers. With the BACE now state-approved, program leaders foresee expanding participation from hundreds to thousands of students in coming years.

The high school initiative collaborates closely with higher education and industry partners in Texas to align standards and support strong transitions. With biotech jobs in high demand locally, the community college is expanding opportunities for students to get paid experience in campus research labs and facilities. The program serves as a model for replicating stackable skills-development pathways from secondary through postsecondary education and into regional industry jobs.

Creating Multiple Pathways - Community Colleges

One attractive aspect of a career in life science is that it can start as early as high school graduation and then offers a long and varied career path that can lead to lifelong learning and professional development. For individuals who cannot immediately go to college for a bachelor's degree, the bioscience manufacturing career offers multi-level opportunities and pathways toward many professional opportunities.

Community colleges play a vital role in developing the workforce and preparing students for further academic study. Created specifically to expand access to higher education, the state's 50 community college districts also play an important role by meeting the specific educational and vocational needs of their service areas. Because of the affordability and accessibility of the local institutions, 2022 pre-enrollment data showed that 43% of all Texas postsecondary students are enrolled in a community college, and community colleges issue 93% of all Career and Technical Education degrees.

Over the last decade, many of these institutions have developed programs to specifically serve the biotech and life science industry such as developing specific degree and certification programs for the industry and building incubators to support product development. Much of this growth has occurred under the leadership of InnovATEBIO. Funded through a grant from the National Center for Biotechnology Education, InnovATEBIO is located at Austin Community College and partners with other leading innovation partners across the country to advance the education of highly skilled technicians for the nation's biotechnology workforce. Toward this goal, InnovATEBIO is providing leadership in biotechnology technician education, including support for development, and sharing of best practices and emerging technologies in biotechnology workforce development in community colleges and other education institutions.

An individual seeking to become a bioscience manufacturing technician can work toward an associate's degree or biotech certification through the InnovATEBIO program. Hosting over 90 events attended by over 3,000 people, InnovATEBIO has effectively engaged the biotech community. Specifically, InnovATEBIO has connected with over half of all 2-year colleges offering biotech programs and over three-quarters of 2-year degrees/certificates in the field.

In June 2023, InnovATEBIO convened a national summit, "Envisioning the Next Bioscience Workforce: A Summit on Industry Trends and Needs" at the National Academy of Sciences in Washington, D.C. Read the Report Brief and the Full Report from the Summit.

InnovATEBIO continues to work to develop multiple opportunities for career paths in life science and biotech. In 2023, InnovATEBIO hosted "The Future of the Bioscience Workforce Summit" in Washington D.C. The Summit brought together educators, industry, and government to address state-level biotech workforce needs. Task force discussions explored how academia, industry, and government can work together to develop the human resources needed to capitalize on these emerging technologies over the next five years and state-level teams were created to continue to collaborate to implement the concepts and solutions discussed. The organization continues serving as an "umbrella" bridging key stakeholders to elevate biotechnician training. Ongoing projects focus on emerging technologies; supply chain education; leadership development; advancing diversity; and smoothing student transitions from high school through community college biotech programs.

San Jacinto Community College in Houston is also launching a new biomanufacturing training program in partnership with the National Institute for Bioprocessing Research and Training (NIBRT) to meet urgent regional industry demand. The college will leverage NIBRT's globally recognized bio-manufacturing curriculum for non-credit technical training, while developing its own for-credit associate degree pathway. Initial offerings commence in early 2024, with plans to scale up annual cohorts of graduates across two future campus locations. The program is designed to be hands-on, with a majority of time spent by students utilizing industry-grade equipment. Customizations suit both biopharma and industrial biotech, the latter of which is a growth area for Houston. With robust regional expansion, especially in biologics, industry advisory council partners shaped the curriculum and will provide internships. The college wants to supply work-ready, skilled graduates that will support recruitment and enhance retention for area bio-manufacturing jobs through its credit and non-credit channels, including short-term corporate training.

A growing area of interest for career-seeking individuals is the acquisition of credentials of value and more specifically having those credentials integrated into their formal 2- or 4-year course work. Certifications such as the BACE certification mentioned above offer an individual the opportunity to acquire a functional job skill that could open the door to an entry level position. Companies are also indicating a growing interest and willingness to embrace alternative, often flexible, "stackable" credentials such as certificates, 3rd-party certifications, badges, and others, often in partnership with community colleges and universities and often with a manufacturing and increasing biomanufacturing emphasis. These more flexible approaches to skill building and educational attainment often allow the individual to work and earn a living while acquiring additional skills that will lead to greater opportunities throughout the career path.

In Texas, the Higher Education Coordinating Board has also embraced the development and expansion of the use of credentials of value by integrating these into the goals outlined in *Building a Talent Strong Texas*. As these new types of credentials are more integrated into 2- and 4-year institutions, their success depends on expanding awareness of the programs, allowing for seamless transitions while acquiring a credential and a degree, and the establishment of industry-accepted standards for the skills needed in the workplace.

Increasing Hands-on Training

One challenge for educating the life science and biotechnology workforce is the need for specific and up-to-date training and experience on complex laboratory equipment. As science and technology evolve, so must the training that individuals receive to be ready to be in the workplace. While there are general skills and principles necessary for all manufacturing processes, there are also specific skills required for each process.

Texas A&M University has partnered with Fujifilm Diosynth Biotechnologies and received federal support to establish a dedicated workforce training center for the biopharmaceutical manufacturing industry. Located alongside the commercial facilities, this specialized site contains modern and flexible lab equipment to deliver condensed "bootcamp" programs that cover end-to-end production processes from cell culture through purification and fill/finish.

This training capacity was leveraged during COVID, when Texas A&M rapidly developed a custom onboarding program and trained 400 new hires for Fujifilm over 4 months in 2020. By exposing novices and career transitioners to large-scale equipment and procedures, the program prepares trainees for technical operator roles in vaccine and biologics production. Since inception, over 3,000 students have been trained through similar short certification courses sponsored by industry and government partners.

The National Center for Therapeutics Manufacturing continues enhancing its curriculum in emerging areas like gene and cell therapy manufacturing, with input from companies including Pfizer. The Center advocates for coordinating industry-aligned training nationally and adopting new technologies like virtual reality to vastly scale program reach. She spotlights this real-world workforce development model as proof that, with such ecosystem partnerships, Texas can compete with other life science hubs for high-demand talent.

Leveraging over 20 years of biotech academic programming, Collin County College is moving decisively into rapid skills training to supply talent for North Texas' burgeoning industry. A new accelerated certificate based on employer-validated competencies was launched this fall, with additional cohorts planned. The 6- to 8-week Biotechnology Fast Track program culminates in the BACE credential to affirm graduates' abilities to employers regionwide. Through the Dallas regional grant consortium BioWorks for North Texas, industry partners actively shaped the curriculum. Collin County College will leverage its extensive biotech facilities and expert faculty to scale up cohorts available across the Metroplex. The college is also customizing short course modules from entry-level technicians through advanced specializations like genomics to meet diverse major hiring needs. With announcements like Evolve BioSystems' 300-job expansion, and area leaders prioritizing biotech, Collin County College aims to support further growth in the industry. By translating local jobs data into targeted skills, the college aspires to propel more students into family-sustaining biotech careers that today face talent shortages.

Challenges still exist in developing a larger pool of bioscience manufacturing technicians. Increasing awareness of the industry and differentiating it from traditional health care industry roles in medical labs will be necessary for continuing to recruit new workers into this space. Additionally, stronger connections between life science companies and community colleges, vocational schools, and high school career and technology programs would build more accessible local talent pipelines into the ecosystem. The science and technology themselves create an additional challenge with the rate and speed at which they develop making it difficult to integrate into curriculum in real-time. Texas' life science ecosystem can thrive through cooperation on talent development, capital access, cluster magnification, and showcasing strengths.

Internships and apprenticeships are also important aspects of successful workforce development. Internships are most often secured through an educational institution. These institutions must establish relationships with local employers and parameters for subject matter, monitoring and credits earned. Apprenticeships are often not associated with an institution of higher education and are often difficult for students to identify. Currently in Texas, there are a greater number of internships rather than apprenticeships in life science and biotech.

Expanding Specific Scientific Skills

Identifying specific and high-level scientific skills and other technical expertise is a challenge across all STEM-related industries and competition is fierce. However, in the life science industry, the opportunity to participate in the creation of innovations in medicine that often save lives has been an inspiration for many. That said, industry and educational institutions have been working together to address these shortages.

Located in Houston's Texas Medical Center, the Gulf Coast Consortia (GCC) is one of the largest inter-institutional cooperatives in the world with a focus on building strong collaborative research groups and interdisciplinary training opportunities for PhD students and postdocs. GCC brings together the strengths of its member institutions to build interdisciplinary collaborative research teams and training programs in biological sciences at their intersection with the computational, chemical, mathematical, and physical sciences. GCC provides a unique, cutting-edge training environment and research infrastructure beyond the capability of any single institution. Its mission is to train the next generation of biomedical scientists and to enable scientists to ask and answer questions that cross scientific disciplines to address the challenging biological issues of our time and, ultimately, to apply the resulting expertise and knowledge to the treatment and prevention of disease.

Individual institutions are also partnering with industry in innovative ways to help secure placement of students into industry jobs.

Internships

- 1-3 months, aligning with academic semesters
- Less structured
- General work experience
- College credit
- May or may not be paid

Apprenticeships

- 1-3 years
- Structured training plan focused on specific skills
- Experienced mentor guidance
- Paid position leading to full-time employment
- Acquire industry-recognized credentials

At Rice University, the Professional Science Master Program is part of a national initiative designed for students seeking to gain further scientific core expertise combined with enhanced management and communication skills. The professional science master's degrees impart a level of proficiency beyond academic skills to include the development of the cross-functional skills needed in modern industry. The program maintains substantial partnerships in the region from which it provides the students placement in high level internships designed to provide broader experience and exposure to management skills and experience. Professional master's graduates can move into science and technology careers related to consulting, management, development, design, marketing, and policy. Internship programs represent another core strategy, allowing companies to scout future talent while interns apply classroom learning in real-world settings, aided by mentor guidance. These multifaceted efforts promise to enlarge talent pipelines, accelerate startups, aid cluster growth, and convey preparedness for projected industry demand through partnerships strengthening each stage of the workforce continuum.

Another partnership model involves industry groups who work with the professional schools that produce their experts. One example is the International Society of Pharmaceutical Engineers (ISPE) a nonprofit association serving its members by leading scientific, technical, and regulatory advancement throughout the entire pharmaceutical lifecycle. In Texas, ISPE local chapters work with their related schools preparing pharmaceutical engineers and make connections for internships and other professional networking and development.

Industry groups are also engaged in expanding connections between workers and employers. Spearheaded by BioNTX, the Biotechnology and Healthcare Industry Alliance of North Texas (BHIANT) is an industry-led partnership building a resilient ecosystem by providing employers with a skilled labor force, fostering connectivity across sectors, collectively addressing industry trends, and increasing capital investment in the region. BHIANT facilitates collaboration and works to create pathways to high-paying, quality jobs within the industry through initiatives that support underrepresented groups. BHIANT is working to encourage individuals to consider biotechnology and health care as viable career options and providing them with the tools and connections to make a successful transition into that space.

The University of Texas at Austin has developed a new micro-credential program called Biotech Skill Up to better prepare undergraduate students for careers in the biotech and biomanufacturing industries. The program provides students with supplemental lab technique training and assessments beyond standard biology coursework. By earning digitally-badged micro-credentials, students can demonstrate their practical abilities and mastery of skills needed to qualify for research or industry internships in biotech.

A pilot of Biotech Skill Up was conducted in May 2023 with a small cohort of students. Participants completed knowledge and hands-on assessments across a range of relevant lab methods. Pre- and post-surveys showed students significantly increased their confidence in key skills like pipetting, sterile technique, protein assays, and more. The pilot confirmed strong interest in the program, with many more students hoping to participate than slots available.

Now in an expansion phase, Biotech Skill Up aims to offer more students a pathway to paid internship opportunities, which are critical experiences prior to biotech career entry. While companies and labs are eager to take interns who complete the program, many lack budgets for paid positions. The university is currently fundraising, with each $10,000 raised able to sponsor an additional paid intern placement. Partnerships with industry are vital to building a diverse biotech talent pipeline and serving the state's rapidly growing sector.

Expanding Management and Executive Expertise

In addition to hiring specific manufacturing skills and high-level expertise, life science companies are like any other industry or company and must have experienced managers and executives to navigate the difficult business and product development cycle. The product development cycle for a life science company, with its intensive scientific, data management, clinical, and regulatory requirements, is difficult and lengthy, and requires significant skills for success. Interviews with Texas life science CEOs revealed that multiple strategies are being employed to address the shortage of talent in this space. Some companies take a "grow your own" approach and work internally to develop the skills needed, while others reach out across the country and internationally. One result is the development of a network of consultants and business support providers who have navigated these complex processes.

One such emerging company has taken workforce preparation on with an innovative, in-house approach. Panthera, a CDMO in the Dallas region, will offer both classroom and interactive, hands-on training, including general onboarding programs. All levels of training, ranging from entry-level to advanced will be offered. The target audience will include academic institutions, career changers, and local companies. Panthera will also participate in community-based initiatives with the ultimate goal of attracting talent to the pharmaceutical industry while educating them on sustainable career path options. This is an unmet need in the North Texas area and Panthera is the first to market in addressing this need by providing interactive, hands-on training that emphasizes active participation and practical experience to enhance knowledge and skills followed by competency assessments. It involves engaging learners through interactive activities, simulations, demonstrations, and real-world application of concepts.

Benefits of Interactive, Hands-On Training

- Practical Skill Development
- Active Learning and Engagement
- Realistic Simulations
- Immediate Feedback and Correction
- Team Collaboration and Communication
- Risk-Free Learning Environment
- Regulatory Compliance
- Enhanced Retention and Application

The Greater Houston Partnership (GHP) also serves as a convener and catalyst for strengthening the region's life science talent pipeline through extensive collaboration. Efforts center on analyzing gaps, spearheading solutions, and coalescing disparate activities into a high-functioning ecosystem. Robust industry connectivity informs initiatives spanning school outreach to accelerated training channels. Elsewhere, the GHP fosters partnerships between companies and the area's 32 higher education institutions to customize curriculum and work-based learning programs. Significant scaling is also happening across segments like Current Good Manufacturing Practice (CGMP) technician courses, with coordination maximizing regional coverage and efficiency.

The Dallas Regional Chamber (DRC) is serving as a key connector between life science companies and workforce development resources in the region. This includes aggregating existing programs like the $8.8 million grant from the U.S. Economic Development Administration (EDA) to train biomedical techs as well as launching new initiatives to align industry needs with education providers. The DRC helped support the EDA grant application and continues to participate in planning calls to ensure alignment, while empowering Dallas College to lead the effort.

Additionally, the DRC has estimated that 15-20% of life science companies in their market are large players like McKesson and Kimberly-Clark, while the majority are smaller to mid-sized companies. A key workforce challenge they have identified is retaining academic spin-outs and startups due to a lack of incubator space in which these companies can locate initially after receiving mostly coastal funding. The DRC seeks to promote resources to address gaps like this to grow the number of life science companies that can anchor jobs in the region.

Finally, the Dallas Regional Chamber facilitates connections between industry and workforce development programs in order to align stakeholder needs. This includes channeling industry demand to education and training providers so curriculum can match job requirements. It also involves identifying industry pain points, like the need for more C-suite and experienced advisor talent in the region, which opens up opportunities to promote Dallas as an emerging life science hub able to meet those high-level workforce needs.

SECTION 3. "SURVIVING THE VALLEY OF DEATH"

According to the 2022 report issued by BIO and TEConomy Partners, Texas' bioscience industry had over 7,462 business establishments in 2021 and has continued to grow. The industry has also attracted significant investment in research and development expenditures which exceeded $4.1 billion in 2020, NIH funding of more than $1.5 billion in 2021, and venture capital investments with nearly $4.9 billion from 2018 to 2021. Patents awarded to state inventors have also grown with 5,312 bioscience-related patents awarded to state inventors since 2018. These numbers reflect a story that is happening all across Texas.

In private business labs and in academic research facilities across Texas, discovery research occurs every day. Individuals are testing hypotheses and investigating "hunches", and corporations are testing new applications for existing molecules and devices. Each of these new discoveries needs to be effectively researched and proven effective before it can ever make it to the marketplace. When proven discovery research becomes a viable product, the focus must shift to creating a business that can bring that product into regulatory compliance and to the marketplace. This journey can be difficult, high risk, and expensive. The skills that enable discovery research may not be the same skills needed for the second phase of advancement.

Looking back at the chart on page 12 and reviewing the early-stage research phases of the product development process shows what is commonly referred to as the "valley of death." The early pre-clinical phases of research, while often the most exciting, are also the most fraught with business challenges. Raising capital to fund projects that are not yet proven is a high-risk proposition.

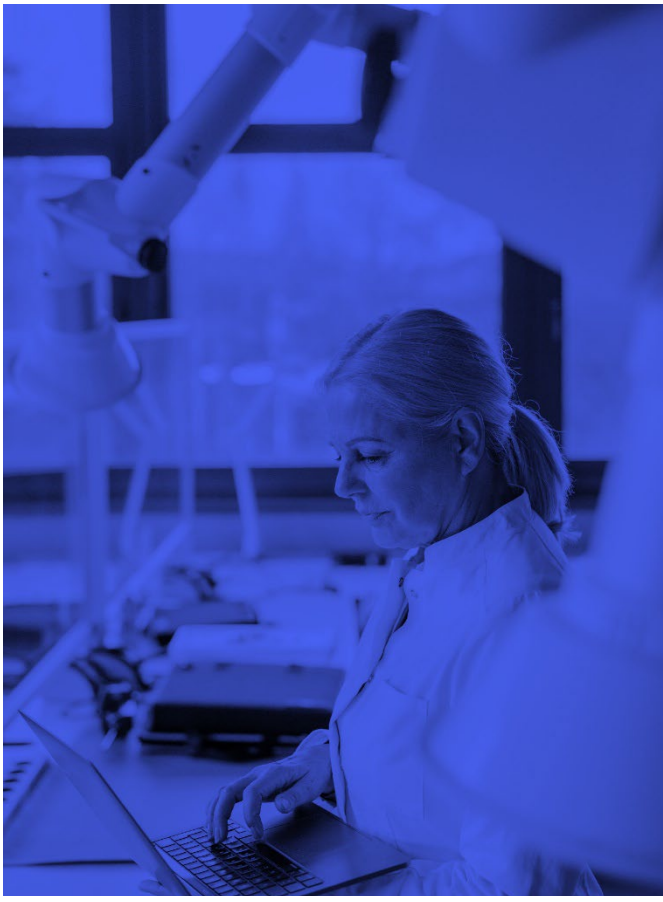
For the industry to continue to thrive, there must be a visible and viable pathway from the research lab to the marketplace. Therefore, business support systems such as incubators, technology transfer programs, facility sharing, venture capital, and commercialization efforts are also key aspects for growing the workforce of this industry. The most successful states that have grown significant life science and biotech industries have made investments, both public and private, that create this commercialization pathway for success, and Texas is no exception. These resources currently exist throughout the state in each region, having developed both privately and at public institutions, growing organically from within each regional ecosystem. Expanding upon these resources and increasing awareness of what these resources are, the benefits they bring, and helping early-stage companies connect with the right partners is fundamental to industry growth.

Texas' world-class research institutions provide a solid foundation for life science innovation and collaboration.

However, to move beyond the research lab, these innovators will need infrastructure and support to survive the gauntlet and make it to the market. Most fundamentally, they will need facility space designed to support the regulatory and manufacturing processes for their product, capital, and access to very specific knowledge that will help them develop the skills and resources they need to move forward. Early-stage companies can find the knowledge and resources to support them in every market in Texas through a combination of public and private organizations, but starting with the Texas Resource Guide is a strong first step.

Key Factors Required to Survive the Valley of Death

- World Class Research Resources
- Commercialization Infrastructure and Support
- Capital – Public and Private
- Mentorship and Knowledge Sharing
- Facilities



Capital – Public and Private

Access to capital is vital for early-stage life science companies to fund research, product development, clinical trials, and other steps along the path to commercialization. In 2021, Texas life science companies attracted nearly $4.9 billion in venture capital investment, the third most nationwide, trailing only California and Massachusetts. Key sources of capital include angel investors, seed funds, venture capital firms, corporate venture groups, and government programs. For example, Houston's Fannin Innovation Studio provides early-stage funding to commercialize technologies from Texas research institutions while Austin-based Ecliptic Capital invests in biotech and digital health. There are also regionally based funds such as the Texas Medical Center Venture Fund, which is the venture capital arm of Texas Medical Center Corporation. While the growth of venture capital in Texas has been steady in the last few years, experts expect that trend to expand as the industry is poised for significant growth in the next few years.

Across Texas there have been several significant life science developments announced and in various stages of development. TMC Helix Park, Levit Green in Houston, the 12-acre Alexandria Center for Advanced Technologies at The Woodlands, Highpoint in Austin, and the Texas Research Quarter in Plano represent billions of dollars of investment and massive expansion of laboratory capacity. As these facilities are built out, they will facilitate the collaborations needed to expand scientific opportunities as well as attract greater and greater investment.

Private funding sources are not the only options for early-stage companies. Many Texas universities also run seed grant programs to advance faculty research toward commercial outcomes. In Texas, CPRIT is a state-funded agency dedicated to supporting and funding life science specifically in oncology research. Federal funding sources include the America's Seed Fund, powered by the U.S. Small Business Administration and funded by federal agencies. These SBIR and STTR programs are highly competitive grants that encourage domestic small businesses under 500 employees to engage in federal research and development with the potential for commercialization.

The University of North Texas Health Science Center at Fort Worth has established a program designed to help support small businesses that are attempting to apply for funding through the SBIR program. Leveraging a Tarrant County grant sponsorship, UNT HSC administers an SBIR Phase 0 program, conferring expert guidance and financial support to elevate businesses' SBIR applications. By participating in evaluative workshops and accessing customized mentoring, proprietors obtain productive critiques that enable them to improve their applications and polish their pitches for potential investors. Additionally, up to $25,000 in programming assistance facilitates essential validation activities like market scoping, prototype crafting, and partner cultivation to reinforce their preliminary assumptions and findings. SBIR Phase 0 promotes lower risk trajectories for potential translation of discoveries from Texas life science innovators by pointing enterprises toward opportunities with greater viability.

Commercialization Infrastructure

Beyond funding, early-stage companies also need support and infrastructure. Academic institutions work to support these innovators by creating offices which focus on facilitating "technology transfer." These offices are often called the Office of Commercialization or the Office of Technology Transfer.

According to the Texas Higher Education Coordinating Board's report *From Insight to Impact, Fostering Innovation Through Texas Higher Education*, **technology transfer**, "sometimes known as technology development, is the process of transferring innovations from academic research into commercial products.

As an example, researchers at a university develop a new technology, which they then submit to the university through invention disclosures. From there, the university evaluates the disclosures and considers protecting the intellectual property (IP) it represents, typically through patents. Once the IP is protected, the university licenses the IP to companies through a licensing agreement with an existing business or with a newly formed startup. This licensing agreement may include one-time licensing fees or a provision for a portion of revenues to come to the university. The companies then develop and market products using the IP and, ideally, are successful in the market, generate revenue, and reinvest a portion of revenue back into research and education at the university."

Many public and private higher education institutions are building infrastructure to support technology transfer. In addition to offices of commercialization, many academic institutions have created business incubators and business accelerators to support early-stage companies to the market. Offices of technology transfer or commercialization often provide high level executive guidance, support, or funding, while incubators and accelerators may provide more in-depth assistance including physical space and mentorship. Each of these programs has different approaches and different levels of support.

There are incubators that operate specifically as a physical facility with lab space for rent which may be limited to researchers at the institution. For incubators and accelerators that are more engaged with the entrepreneur providing mentorship, assistance with intellectual property protection, or product development, there are a variety of financial arrangements used for these collaborations that include everything from traditional equity arrangements to market acquisition payouts. Incubators and accelerators can provide critical infrastructure, resources, and guidance to empower entrepreneurs during the formative stages.

The Star One Incubator within Texas State University's cutting-edge STAR Park convergence space provides startups with access to sophisticated wet lab environments and clean room facilities equipped with precision instruments to progress research and development. Secure infrastructure options enable proprietary innovations while modular collaborative areas foster cross-pollination of ideas between resident ventures. Expert on-site mentors guide enterprises in exploring commercial viability and addressing common obstacles across funding, regulations, scaling manufacturing partnerships, and distribution channel penetration. This hands-on orientation enables each firm to develop a market-aligned roadmap tailored to its situation balancing scientific progress with economic success. By holistically incubating life science and engineering startups, Texas State STAR Park embodies the interwoven innovation ecosystem essential for conceptual leaps to stick commensurate commercial landings.

The Austin Community College (ACC) Bioscience Incubator promotes the translation of discoveries into transformative solutions by aligning infrastructure, industry wisdom, and proximity to Central Texas' thriving entrepreneurial network. Within ACC's state-of-the-art wet lab suites, ventures access tools, from precision automation to sterile environments, supporting viable product research, refinement, and validation. Beyond facilities, the incubator delivers critical business-building mentoring for tackling obstacles commonly derailing early-stage bioscience firms. Residents also plug into the broader Austin startup ecosystem, forging connections to accelerate leadership development, talent acquisition, clinical trial resources, and customer acquisition. By holistically removing barriers, the ACC Bioscience Incubator provides fertile soil for nurturing and harvesting breakthroughs primed to elevate patient outcomes. It represents a launchpad for progressing Central Texas toward the forefront of biosciences innovation.

One of the most highly collaborative business accelerators in Texas is the Gulf Coast Consortia (GCC). Founded in 2001, the GCC is a collaboration between eight prominent and geographically proximate Houston-Galveston area institutions. In November 2023, the GCC received a $4 million grant from the National Institute of Health to create the GCC Research Evaluation and Commercialization Hub (GCC-REACH.)

GCC-REACH, in partnership with its multi-institutional partners, leverages federal funds to facilitate academic entrepreneurs working closely with successful life science experts and experienced biotech executives to develop strategic milestones to rapidly validate the commercial value of their discoveries. Entrepreneurs who balance full-time clinical, teaching, and laboratory duties will be paired with Entrepreneurs in Residence and expert teams who provide mentorship and assistance in completing market analysis, business plans, and technology development strategies. GCC-REACH assists entrepreneurs in strategic planning for management and operations and provides vetted resources and seed funds to achieve value-added commercialization opportunities.

There are also private sector incubators and accelerators. These private models may operate in partnership with academic institutions but may also operate independent of academia, focusing on specific platforms or types of products and often offering a path to the market through a well-established infrastructure and business operation. JLabs Innovation, an international network of incubators sponsored by Johnson & Johnson, offers qualifying life science startups access to flexible lab space, equipment, funding channels, and seasoned advisors to accelerate research and navigate obstacles. Within specialized sites across leading biopharma hubs, emerging ventures receive hands-on support in progressing discoveries toward clinical and market viability. Resident companies benefit from multi-dimensional mentoring, entrepreneurial programming, clinical trial navigation, intellectual property strategies, and facilitated access to early-stage capital. These wrap-around services equip founders with the means to tackle complex translational hurdles inherent in advancing pioneering platforms from their proof-of-concept origins to the point where they might benefit patients. JLabs furnishes essential incubation, community, credibility, and continuity for fragile firms balancing scientific promise against business-building imperatives during ideation's steep ascent toward impact.

Another key business incubator in Texas is BioLabs. Located at the epicenter of life science in Dallas, the Pegasus Park building BioLabs is a traditional business incubator with a broad and innovative approach. BioLabs is a co-working space for life science startups to test, develop, and grow game-changing ideas. Started by entrepreneurs and investors, BioLabs has firsthand experience with the pain points biotech startups face. The goal is to change how scientific entrepreneurs do business by building an ecosystem that empowers bio-innovators to grow quickly, while maximizing capital efficiency.

See Appendix A for a list of the life science focused incubators, accelerators, and support organizations identified during the development of this report.

Life science and biotech companies exist in various sizes and at various levels of maturity, but they all struggle with very similar challenges. Within each region and across the state, there are resources to help with those challenges. Mentorship and collaboration are essential for translating academic research into commercial outcomes that impact society. Texas life science companies can access guidance on overcoming translation hurdles through startup accelerators like Fannin Innovation Studio which offers hands-on support from seasoned industry veterans. Research institutes such as Houston Methodist's Technology Hub also facilitate academic-industry partnerships, providing subject matter expertise from scientists with product development experience. Industry associations including THBI and BioAustinCTX convene wider networking through panels, conferences and working groups that illuminate funding, facilities, and regulatory navigation insights from peer leaders. Many Texas universities have also formed alumni mentor networks while creating roles like the UTEP Associate Vice President for Technology Transfer and Commercialization to promote business partnerships. At student levels, competitions like the Rice Business Plan Competition and University of Houston's Red Labs further foster commercialization-centered training. These multidimensional mentoring avenues provide Texas life science innovators with diverse guidance needed to deliver discoveries from bench side to patient benefit.

For more mature companies, a formal partnership may be more appropriate for the protection of intellectual property, the operation of clinical trials, and the full scaled manufacturing of products. CROs provide outsourced research services to pharmaceutical, biotechnology, and medical device companies. CROs can help companies with a variety of tasks, such as conducting preclinical research, managing clinical trials, and developing regulatory submissions. CDMOs provide outsourced manufacturing and development services to pharmaceutical, biotechnology, and medical device companies. CDMOs can help companies with a variety of tasks, such as manufacturing drugs and medical devices, conducting clinical trials, and managing regulatory submissions.

It is not possible in one report to outline all the services needed to survive the valley of death. The protection of IP is outside the scope of this report, but it is a fundamental aspect of life science success and requires significant expertise to navigate. Additionally, while there are many resources and significant infrastructure for the industry in Texas, there is always work to do, market forces to adapt to, and innovations to uncover. The last section of this report will discuss targeted and strategic efforts to continue the momentum, build stronger connections, and further evolve this important economic sector.

SECTION 4. BUILDING THE INNOVATIONS OF TOMORROW

An ecosystem is defined as a biological community of interacting organisms and their physical environment, and in more common general use as a complex network or interconnected system. This report has provided an updated framework that describes the life science and biotech ecosystem, or rather the system of interacting entities, complex networks and interconnected systems that make up the life science and biotech economic sector in Texas. While not every single company, institution, service company or supporting organization is listed, the report also includes links and resources for further exploration.

Like any ecosystem, this one is always in a state of flux. The constantly changing science and technological advancements like AI, global events, economic forces, market disruptions, and changes in public policy are only a few of the forces to which the ecosystem must constantly evolve to address. And it must evolve with all participants working together to promote the growth of the system.

While burgeoning in certain markets, Texas requires broader, more consistently available life science startup and academic support systems to achieve talent parity with coastal super hubs dominating the biotech industry. More anchor companies committing to Texas would draw more suppliers, partners, spinoffs, and serial entrepreneurs into associated orbits through multiplier network effects. Dense life science districts with mixed-use housing, collaborative incubators, and convening venues facilitate knowledge sharing and cultural identity cultivation that retain talent throughout career phases.

There is an old saying that "all politics is local" and the same can be said for workforce planning. While effective policy is needed at the state level and specific policy goals are outlined below, local and regional partners must also work together strategically to ensure effective outcomes. As outlined throughout this report, there are existing best practice models within local markets that could be expanded or exported to other regions where appropriate. Expanding awareness of career pathways and opportunities is an integral part of building demand for greater programs to teach the skills and expertise necessary for the industry. Then, industry and education institutions must collaborate to ensure the alignment of career paths and educational pathways that decrease barriers like cost and access.

- **Strategic Objective** – Strengthen regional ecosystems, expanding collaboration and partnership to ensure an on-going talent supply that connects easily with available opportunities.

Regional markets working collaboratively can assess job opportunities, create connections with educational institutions and maximize growth of the existing talent pool across Texas. Leading companies can undertake rigorous talent forecasting through pipeline reviews and supply and demand analyses rather than reactive approaches. This data could inform hiring, upskilling, and retention interventions targeted to balance mission-critical capabilities. Companies also increasingly recognize planning as a strategic priority rather than just an HR function. Regions can also explore targeted incentives and attraction tools that encourage business investment, density expansion, and ecosystem integration to grow quality jobs and deepen partnerships which aid talent retention.

- **Strategic Objective** – Create more customized partnerships between industry and academic institutions, as well as between academic institutions to facilitate talent growth and retention.

Savvy companies in each Texas market are already forging connections that allow for direct input to shape curriculum within local education institutions with facilities and work-based learning avenues that provide access to specialized equipment and deliver competencies valued by industry. They balance short-term hiring needs with longer-term cultivation of sustainable regional talent pipelines through such academia collaborations. Expanding these partnerships and duplicating them across educational institutions can create greater synergies throughout the ecosystem.

- **Strategic Objective** – Increase awareness of the biotech career path and the types of career opportunities in the life science and biotech industry for all workforce participants including students still in middle and high school.

- **Strategic Objective** – Strategically share when large scale projects or employment opportunities exist to maximize statewide resources for workforce preparation for those projects.

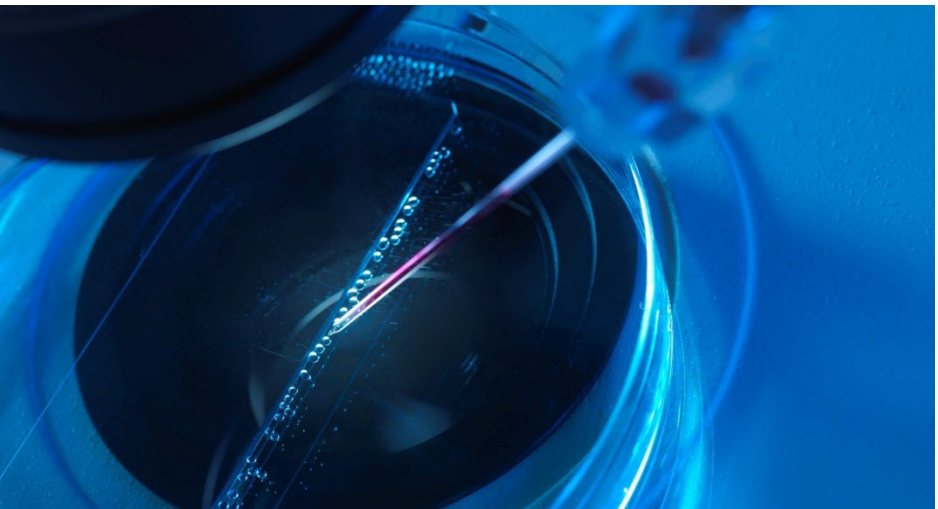
These strategies will act as a rising tide that raises the stature and effectiveness of the whole ecosystem statewide by filling in any gaps within the system. When compared to other more concentrated markets, Texas suffers because the resources are spread throughout the state, every opportunity to build bridges of collaboration across the system works to correct those misperceptions. Convening industry, government, and academic stakeholders within regions to form strategic partnerships that can enhance curriculum alignment, high-quality internship programs, shared training facilities and other collaborative workforce initiatives.

Expand Economic Development Opportunities for the Life Science and Biotech Industry

Building off the significant advancements made in the last legislative session, including the passage of Proposition 5 that will expand research funding to four Texas universities and Proposition 10 which created a property tax exception for biomedical equipment in biomanufacturing facilities, THBI and other industry stakeholders are looking to create more opportunities for this ecosystem.

This includes working to improve the general business environment such as the regulatory requirements, tax structure, and other market dynamics affecting the ecosystem. The Office of the Governor's Economic Development and Tourism Office considers and promotes Texas as a leading biotech state. They tout the state's highly trained workforce, top-tier research institutions and business-friendly climate as strong aspects of this global life science industry leader.

- **Policy Priority** – Maintain a strong focus on the life science and biotech industry with state executive and legislative leaders in Texas.
- **Policy Initiative** – THBI will work with other economic development stakeholders and partners to maintain in current state law the sales and use tax exemption and franchise tax credit that currently support certain research and development activities. These sections of the tax code are set to expire in 2026, and a coalition will be working to ensure that they remain an option for Texas companies.



Another important aspect of economic development is the building and maintenance of a strong workforce. Texas is actively cultivating a robust talent pipeline across the education-to-employment continuum to power the ascent of its thriving yet talent-hungry life science industry. Strategic workforce development efforts are underway, spanning state education and workforce agencies, higher education institutions, and industry pioneers. These partners are advancing expansive STEM exposure in K-12 schools, enriching career pathway infrastructure through universities, scaling rapid skills training offerings from community colleges, and providing work-based learning avenues via internships. Tailored interventions target skill gaps at each stage while extensive collaboration promises to strengthen alignment. Together these initiatives aim to meet soaring industry demand by systematically preparing individuals from all backgrounds to participate in the scientific advances that promise to improve society.

Building off the discussions and work conducted at the National Biotech Summit, the following important policy objectives have been identified and are being explored to create improvements both in state policy and within each academic institution.

- **Policy Priority** – Improve career planning transitions through the education pathway between education institutions, both 2- and 4-year institutions, to increase efficiency and expand opportunities at all levels of the life science and biotech workforce.

- **Policy Priority** – Increase opportunities for and create stronger linkages between internships and apprenticeships that complement degree attainment and skill building.

- **Policy Initiative** – Create a consistent set of standards for biomanufacturing certification across institutions that include expanded opportunities for "hands on" biomanufacturing training.

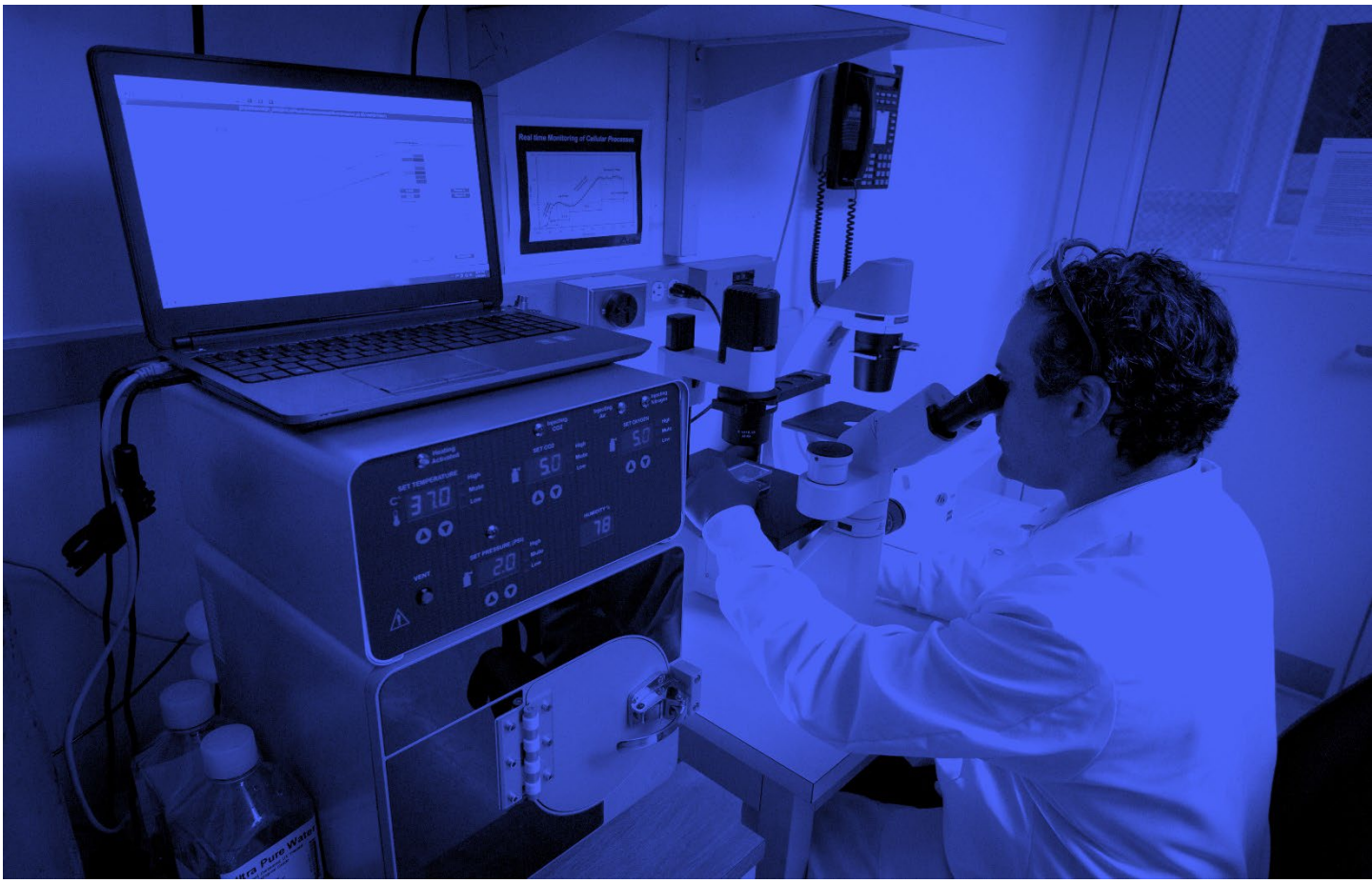
Exploring options to address these important policy questions will help identify solutions that improve education outcomes for individuals on the career path, remove administrative and other barriers hindering educational attainment, and provide industry with more effectively prepared talent.

Policy Priority – Support continued implementation of strategies included in the THECB's strategic plan, *Building a Talent Strong Texas*, particularly related to expanding availability and access to credentials of value, and driving research and innovation as opportunities for economic growth.

The strategic goals and objectives identified by the THECB not only align with the objectives for the life science industry, but they also provide for a deeper exploration of some of the specific issues facing the industry. Below are a few of the key strategies what impact the life science ecosystem:

- Establish and maintain a statewide repository with information on all credentials offered by Texas institutions of higher education and other providers, including non-degree, postsecondary credentials of value.
- Streamline student pathways to credentials of value through course and program redesign, digital tools to help address individual student needs, credit for prior learning, and flexible program options.
- Expand high quality, work-based learning opportunities through partnerships among institutions and employers, including paid internships and apprenticeships.
- Recruit highly distinguished researchers and world-class innovators to Texas universities and provide support for universities to hire high-potential, early-career researchers.
- Strengthen state research funding and programs to align with state priorities for university research and development.
- Establish high-impact university research parks and improve research infrastructure at all research and emerging research universities and develop incubator capabilities in 2- and 4-year colleges to support private-sector partnerships, innovation, and technology commercialization.

These strategies from the THECB are the basis from which strong solutions can grow to address these challenges. These strategies will help identify systemic solutions to embed industry certifications and digital badges within degree programs to enhance skills transparency for employers while expanding affordable training options for incumbent workers upgrading through modular learning pathways. Additionally, these strategies will help develop user-friendly career navigation platforms detailing required education, job families, salary ranges and growth projections to illuminate promising avenues within Texas' life science industry for major exploration and advising.



Enhancing Research and Commercialization Opportunities

Conducting research is fundamental to the advancement of knowledge, discovery, innovation, and creation and is therefore essential to any civilization. Research universities represent some of the most concentrated communities of scholars, facilities, and collective expertise engaged in these activities. In THECB's report *From Insight to Impact, Fostering Innovation Through Texas Higher Education,* Commissioner Keller notes that "[o]ver the past two decades, policy decisions and state investments have laid the groundwork for extraordinary growth" for education research and development infrastructure. One example of that groundwork is the passage of Proposition 5 in 2022, which will put four additional state universities on the path toward advancing their research capacity. Research programs also contribute directly to economic development, clinical, commercial, and business opportunities. Translating that research into successful highly innovative marketplace products that support patients and improve health ensures the ongoing growth and support of that research.

Policy Priority – Support and expand development of research programs in the life science and biotech subject areas in research institutions.

Equally important is creating the infrastructure to move research from the laboratory to the marketplace. In a recent survey of THBI membership, academic institutions expressed concerns with the ability to support expanded research and commercialization activities. Inconsistencies in funding to support research, incubators, cultural and administrative barriers to interdepartmental collaboration, and securing relevant expertise to support these activities were all identified as challenges these institutions face supporting technology transfer activity.

Policy Priority – Support continued implementation of strategies included in THECB's report *From Insight to Impact, Fostering Innovation Through Texas Higher Education*.

The report provides a roadmap for closing gaps in regional ecosystems across the state and maximizing the return on investment in the state's academic research and technology development. The roadmap includes some of these recommendations:

- Ease the translation of academic research at higher education institutions into commercial products to accelerate the process between ideas and market entry.
- Strengthen connections and collaboration between Texas higher education institutions and existing regional innovation ecosystems.
- Build a robust and dynamic talent pipeline to support innovation, particularly in the state's core industries.

The report provides guidance beyond research institutions that can benefit the ecosystem for life science and biotechnology by identifying key lessons for success in technology transfer. Highlighted among these lessons is the importance of continuing to enhance regional collaboration, creativity, and the development of additional statewide support. Additionally, stronger connections between industry and research commercialization efforts can facilitate and enhance the success of these initiatives.

But not all research happens within the research institution and additional support for private sector research is imperative for continued growth. As motioned earlier in this report, the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs encourage small businesses to engage in federal research and development for products with the potential for commercialization. These competitive awards-based programs enable small businesses to explore their technological potential and provide the incentive to profit from its commercialization. By supporting small businesses in research and development, high-tech innovation is stimulated, and the United States gains entrepreneurial spirit as it meets its specific research and development needs. Currently 29 states in the United States have developed programs to support their local small businesses and entrepreneurs by creating programs to provide support and matching funds for SBIR and STTR awards.

- **Policy Initiative** – THBI has developed and will work to create the Texas Technology Innovation Program (HB2466, 88-R.) This program would provide state funding to recipients awarded funds through the SBIR and STTR programs.

THBI has been working to create the Texas Technology Innovation Program that would operate through the Office of the Governor's Economic Development and Tourism Office. Under this program, companies headquartered in Texas that receive grants or contracts under either Phase I or Phase II of the federal Small Business Innovation Research (SBIR) or Small Business Technology Transfer (STTR) programs would be eligible for state grants of matching funds. These grants are not limited to life science and biotechnology; the federal funding comes from 11 different federal agencies, including the National Science Foundation, the Department of Defense, the Department of Health and Human Services, NASA, and others. The SBIR program spends $3.2 billion and STTR spends $450 million by issuing over 5,000 awards annually. The Texas Technology and Innovation Program would add another level of support that would help make Texas' small businesses more competitive and increase their chances of long-term success.

CONCLUSION

Texas is a world class hub of life science discovery and commercialization, anchored by globally admired research institutions and fortified by a collaborative ecosystem nourishing startups towards scaling new innovations. The state's success has bred intense competition for specialized talent even as industry demand escalates. While no quick fix for shortages exists, tailored interventions across academia, government, and employers can enhance alignment, accessibility, and transparency around high-potential career pathways. Policy levers emphasizing work-based learning, modular credentials, and centralized navigation resources merit consideration. Industry best practices in strategic recruitment, culture cultivation, change leadership, and cross-sector coordination also warrant sharing to optimize limited talent. United in purpose, Texas' life science community can unleash abundant human potential through cooperation on nurturing homegrown talent that chooses to plant roots and grow possibilities.

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APPENDIX A

Name	Location	Type
Austin Community College Bioscience Incubator	Austin	Incubator
Austin Technology Incubator at the University of Texas at Austin	Austin	Incubator
BioLabs at Pegasus Park	Dallas	Incubator
Biotechnology Launch Pad	Houston	Accelerator
BioWell	Houston	Accelerator
Bunker Labs	San Antonio	Support Organization
Capital Factory	Austin	Incubator & Accelerator
CoLab at Dell Medical School at The University of Texas at Austin	Austin	Incubator
CUBIO Innovation Center	Houston	Incubator
Dallas Entrepreneur Center (DEC) Network	Dallas	Accelerator
East End Maker Hub	Houston	Support Organization
Emergent Technologies	Austin	Incubator & Accelerator
Enventure Insights	Houston	Support Organization
Fannin Innovation	Houston	Support Organization
Geekdom	San Antonio	Support Organization
Health Wildcatters	Dallas	Accelerator

Name	Location	Type
Ignite Healthcare	Houston	Accelerator
Incube Labs	San Antonio	Incubator
Ion District	Houston	Support Organization
JLABS @ TMC	Houston	Incubator
LaunchSA	San Antonio	Support Organization
LiftFund	San Antonio	Support Organization
Maestro Entrepreneur Center	San Antonio	Accelerator
MassChallange Texas	Austin & Dallas	Accelerator
Medical Center of the Americas Innovation Center	El Paso	Incubator & Accelerator
Rice Alliance for Technology and Entrepreneurship (Rice Alliance)	Houston	Accelerator
Rice Biotechnology Launch Pad	Houston	Accelerator
Rice OwlSpark Tech Startup-Small Business Accelerator	Houston	Accelerator
Rice University Institute for Synthetic Biology (RSBI)	Houston	Accelerator
TechFW ThinkLab Startup Accelerator	Dallas	Accelerator
TechFW SmartStart Tech Incubator	Fort Worth	Incubator
Tech Wildcatters	Dallas	Accelerator
Texas Medical Center Acclerator for Cancer Therapeutics	Houston	Accelerator

Name	Location	Type
Texas Medical Center BioBridges	Houston	Accelerator
Texas Medical Center Biodesign Fellowship	Houston	Support Organization
Texas Medical Center HealthTech Accelerator	Houston	Accelerator
Texas Research & Technology Foundation	San Antonio	Support Organization
Texas State University Future Maker Accelerator	San Marcos	Accelerator
Texas State University STAR One Incubator Program	San Marcos	Incubator
Texas Tech Institute for One Health Innovation (OHI)	Lubbock	Incubator
Therapeutic Innovation Center (THINC) at Baylor College of Medicine	Houston	Support Organization
University of Houston Technology Bridge	Houston	Incubator
University of North Texas Health Science Center at Fort Worth Next Innovation Labs	Fort Worth	Incubator
University of Texas at Austin Jon Brumley Texas Venture Labs (TVL) Accelerator	Austin	Accelerator
University of Texas at Dallas CometX Accelerator	Dallas	Accelerator
University of Texas at Dallas Venture Development Center (VDC)	Dallas	Incubator
The University of Texas at San Antonio Small Business Development Center	San Antonio	Support Organization
UTMB Health Life Science Incubator	Galveston	Incubator
VelocityTX	San Antonio	Incubator & Accelerator

THBI

TEXAS HEALTHCARE & BIOSCIENCE INSTITUTE

807 Brazos Street, Suite 607
Austin, TX 78701

(512) 708-8424
www.thbi.com
info@thbi.com
X: @txhbi
LinkedIn: @txhbi