The Texas Life Sciences Landscape:
Innovating for Today and Tomorrow

2019

THBI
TEXAS HEALTHCARE & BIOSCIENCE INSTITUTE

TEXAS INSIGHT
HEALTHCARE INTELLIGENCE

About the Texas Healthcare and Bioscience Institute

Texas Healthcare & Bioscience Institute (THBI) is the Texas public policy voice for the healthcare and bioscience industry. Our membership consists of biopharmaceutical companies, research institutions, medical device companies, economic development entities and service companies providing unparalleled networking and synergy to effectively address the public policy needs of Texas' growing life sciences community.

About Texas Insight

Texas Insight (TXI) is the leader in strategic research, analysis, and reporting for the Texas Health and Human Services community. Our team of researchers and experts help individuals, associations, and businesses understand significant public policy issues through reports on topics including public health, advisory council meetings, Medicaid, and the Health and Human Services Commission. Texas Insight provides timely reporting of healthcare issues and events as they occur within the legislative and regulatory branches of Texas state government. Our focus is the HHSC and its component agencies as well as the relevant executive council meetings, advisory committees, work groups, rate hearings, and monthly budget updates on the status of appropriated dollars within each health and human services department. Texas Insight's staff has decades of research experience in health and human services as well as in state and federal government. Additionally, we provide technical analysis on budget and fiscal policy within the state government.

About the Author

Stephen Palmer, PhD, is an independent consultant in Austin, Texas and the Principal with Waterloo Research and Consulting. Prior to consulting, Dr. Palmer served in a number of policy development and public administration roles in Texas state government including working for the Health and Human Services Commission, Office of the Governor, and Senate Health and Human Services Committee. Dr. Palmer received a Bachelor's degree in physics and philosophy from Rice University and a Master's in Public Affairs and PhD in Public Policy from the LBJ School of Public Affairs at the University of Texas.

Introduction

The Texas Healthcare & Bioscience Institute (THBI) is pleased to present an overview of the Texas Life Sciences Industry. No longer an emerging cluster within the Texas business landscape, the industry continues to demonstrate solid growth. The impact of this growth is being recognized nationally and on a global basis.

Texas is making big strides in providing world-class research. The outstanding research being conducted by our public and private institutions continues to be the underlying driver of company and job creation. State-funded programs, such as the Cancer Prevention and Research Institute of Texas (CPRIT), contribute not only economically, but also in recruiting world-renowned researchers to our state.

Texans benefit economically from the products created by the life sciences industry. The life sciences industry contributes over $3 billion paid in state and federal taxes annually. Economic output is $61.5 billion, with employees earning an average salary of $110,000.

THBI is committed to innovation that makes a difference in our lives.

Patients worldwide are the beneficiaries today and tomorrow.

Tom Kowalski
President & CEO

David Margrave
Chairman

Texas Healthcare & Bioscience Institute Board of Directors

THBI would like to thank the following organizations for their contributions to fund this report, The Texas Life Sciences Landscape: Innovating for Today and Tomorrow.

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Introduction

The life sciences industry in Texas includes thousands of private firms employing tens of thousands of workers, dozens of world-class research universities and institutions with an increasing expertise in commercialization and technology transfer, a burgeoning life sciences investment ecosystem, significant state support programs, a growing network of economic development organizations focused on the life sciences, and the largest medical complex in the world. Definitions vary, but for the purposes of this report, companies are considered to be in the life sciences industry if they develop products relating to the diagnosis and treatment of disease and injury, or perform research intended to lead to such products. Biotechnology, pharmaceutical and medical device companies are some of the main types of entities that comprise the Texas Life Sciences Industry.

While the life sciences industry in Texas is robust, there are still major opportunities to advance and make it even stronger and more competitive with major life sciences hubs like Boston and San Francisco. Regional initiatives have been established in all of Texas' major urban areas focused on establishing life sciences clusters, which have been shown to drive significant economic development. The life sciences industry promises to grow in its vibrancy in the coming decades and Texas is poised to become, as State Comptroller Glenn Hegar and others have suggested, the "Third Coast" for the life sciences, but there are some discrete steps that will need to be taken to get there.

Economic Development in the Life Sciences

There are two major pathways for growing the life sciences industry in Texas: (1) encourage growth and site selection in Texas from existing firms and (2) encourage the establishment of new firms. Along each of these pathways, firms will continue research and development efforts and will need to deal with the challenging product development process in the life sciences. Promoting the establishment and growth of regional industry clusters has emerged as a best practice in supporting the growth of the life sciences industry.

ATTRACTING EXISTING FIRMS

When established firms, both those with a presence in Texas and those not yet in Texas, make decisions about expanding or locating new facilities, they take into account a number of factors including workforce, real estate costs, transportation infrastructure, business climate, and public incentives. In order to improve the likelihood that Texas will be chosen by firms looking to expand or re-locate, public policies and industry actions should be taken to ensure an adequate and educated workforce, keep real estate costs low, maintain required infrastructure, support a strong business climate, and provide incentives.

ESTABLISHING NEW FIRMS

Research universities and institutions in the state are making new discoveries in the life sciences all the time, some of which likely have commercial potential. To encourage the establishment of new life sciences firms in Texas, discoveries and investment need to be aligned with entrepreneurs through university commercialization efforts, public incentives, and private partnerships.

PRODUCT DEVELOPMENT IN THE LIFE SCIENCES

While research universities in Texas are constantly forging ahead with new discoveries, developing commercially viable products and taking them to market is difficult. First, the intellectual property must be solidified through patents or other protections. Then, the discovery must be assessed to determine if it is better commercialized through licensing to an existing company or establishing a new firm. In some cases, the commercial potential of a discovery will be sufficiently self-evident that a company will be willing to license it prior to any product development. At other times, it will be necessary to develop a proof of concept or minimally viable product in order to prove that it is possible, requiring work within the university or the establishment of a new firm to do the product development. Finally, many life sciences products will require regulatory approval, which will often require clinical trials and other regulatory steps to provide evidence of safety and efficacy.

THE BIOTECHNOLOGY ECOSYSTEM: BY THE NUMBERS[1]

- 70% of innovative clinical programs are being led by small companies, which rely heavily on venture capitalists, angel investors or partnerships with larger pharmaceutical companies to provide the enormous amounts of private capital required to fund these challenging and incredibly risky endeavors.
- 90% of clinical programs ultimately fail to lead to an FDA approval; in fact, the success rate of clinical trials can be even less, particularly in areas like Alzheimer's and cancer.
- 92% of biopharmaceutical companies are unprofitable at any given time.
- 10–15 years is the average time it takes to secure FDA approval of a new medicine, from initial discovery of a potential new molecule or approach, through pre-clinical and clinical programs, through the FDA regulatory and approval processes.
- $2.6 billion is the average cost to develop and secure approval of a new medicine, taking into account all the trial and error and research failures along the way, and the cost of capital; this figure has skyrocketed in recent years, doubling since just 2003.
- 36th is where the biopharmaceutical industry ranks among domestic industries in terms of return on equity, despite the popular media narrative of excessive drug industry profits.
- 89% of prescriptions in the US are for lower-cost generic copies of once-branded pharmaceuticals.

THE ROLE OF INDUSTRY CLUSTERS

Within the academic and professional fields of economic development, industry clusters are recognized as an aspirational goal in order to support specific industries. Initially described and popularized by Michael Porter in the early 1990s, an industry cluster is a geographic concentration of interconnected businesses, suppliers, and associated institutions in a specific industry. According to Porter, clusters are considered to improve the competitiveness of the region by increasing the productivity of the companies in the cluster, driving innovation in the industry, and stimulating the emergence of new businesses in the industry.[2] Clusters achieve these outcomes by being able to draw on a large appropriately-skilled workforce, partnering on common projects, sharing ideas, and benefiting from economies of scale among suppliers. In Texas, as in many other parts of the country, industry representatives and local economic development professionals have established regional economic development organizations focused on the life sciences. They have established central hubs for networking, exchanging ideas, and building on the entrepreneurial spirit within the cluster.

[1] Biotechnology Innovation Organization (2018)
[2] Porter, M.E. (1990)

HEALTH PROFESSIONALS, SCIENTISTS AND ENTREPRENEURS:

Welcome to Central Texas' biotech corridor. Come take a tour of the Temple Health and Bioscience District (THBD) and learn how your ideas can grow from concept to commercialization. THBD is a not-for-profit biotech and life sciences incubator, which consists of 5,000 sq. ft. of office and wet lab space. 3D printing, prototyping, mentorship, seed funding and access to key collaborators are just some of the opportunities awaiting you.

WE FOSTER INNOVATION AND BIOSCIENCE IN CENTRAL TEXAS.

WE NURTURE STARTUPS FROM CONCEPT TO COMMERCIALIZATION.

LEARN HOW WE CAN HELP YOU GROW TODAY.

TEMPLE Health & Bioscience DISTRICT

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The Current Life Sciences Industry in Texas

With different ways of defining the life sciences industry, estimates of its total size in Texas vary. The Pharmaceutical Research and Manufacturers of America (PhRMA), a national trade group for pharmaceutical manufacturers, estimates that the pharmaceutical sector alone (a subset of the life sciences industry) directly and indirectly supports over 228,000 jobs in Texas.[3] The following table shows the number of individuals employed in Texas in several key life sciences occupations, along with the number of firms within which they are employed.

SELECT LIFE SCIENCES EMPLOYMENT IN TEXAS, SECOND QUARTER 2018[4]

Sector (NAICS code)	Employment	Firms
Medical and diagnostics lab (6215)	24,091	1,048
Physical, engineering, and biological research (54171; includes clinical trials)	20,803	1,133
Testing laboratories (54138)	18,887	814
Medical equipment and supplies manufacturing (3391)	12,563	678
Pharmaceutical and medicine manufacturing (3254)	12,485	180
Other basic organic chemical manufacturing (32519)	8,132	100
Electro-medical apparatus manufacturing (334510)	2,326	71
Analytical laboratory instrument manufacturing (334516)	1,593	38

Texas leads the nation in terms of the number of employees working in several life sciences occupations, as shown in the table below. This is particularly notable since Texas has substantially fewer residents than California, the most populous state.

Select State Rankings for Life Sciences Employment in Texas, 2017

Occupation	National Ranking
Medical and clinical lab technologists	1
Chemical engineers	1
Ophthalmic medical technicians	1
Veterinary technologists and technicians	1

[3] PhRMA (2017)
[4] *Ibid.*

Research and analysis conducted by TEConomy for the industry trade group Biotechnology Innovation Organization (BIO) paints a similar picture, as shown in the table below.[5]

BIOSCIENCE PERFORMANCE METRICS

Summary of State Performance in Selected Bioscience-Related Metrics

Metric	Texas	United States	Quintile
Bioscience Industry, 2016			
Bioscience Industry Employment	89,746	1,743,639	I
Bioscience Industry Location Quotient	0.63	n/a	IV
Bioscience Industry Establishments	5,578	85,702	I
Academic Bioscience RED Expenditures, FY 2016			
Bioscience R&D ($ thousands)	$3,276,218	$41,972,205	I
Bioscience Share of Total R&D	66%	62%	II
Bioscience R&D Per Capita	$117	$130	III
NIH Funding, FY 2017			
Funding ($ thousands)	$1,160,645	$26,150,485	I
Funding Per Capita	$41	$80	III
Bioscience Venture Capital Investments, 2014-17 ($ millions)	$1,591.28	$66,168.62	I
Bioscience and Related Patents, 2014-17	4,704	102,862	I

State ranking figures for bioscience performance metrics are calculated as quintiles, where I = top quintile, III = middle quintile, and V = bottom quintile.

[5] TEConomy/BIO (2018b)

PHARMACEUTICAL COMPANIES

Numerous pharmaceutical companies have significant operations in Texas, including manufacturing, research and development, and corporate headquarters. The Texas Biotechnology Company Directory, most recently published in 2017 by the Office of the Governor's Economic Development and Tourism division, lists numerous companies in the pharmaceutical sector, a small sampling of which is shown in the following table.[6]

Company	Specialization	Location
Alcon (Novartis)	Ophthalmics – R&D and mfg.	Fort Worth
Allergan	Ophthalmics – Mfg.	Waco
Azaya Therapeutics	Oncology	San Antonio
Edgemont Pharmaceuticals	Neurology	Austin
Insys Therapeutics	Oncology	Round Rock
Lonza Houston	Viral-based therapeutics	Houston
Mylan Institutional	Generic and specialty	Sugar Land
Peloton Therapeutics	Oncology	Dallas
Smith and Nephew Biotherapeutics	Dermatology and wound care	Fort Worth
StemBioSys	Stem cell therapies	San Antonio

"The biopharmaceutical sector is the foundation of one of Texas' most dynamic innovation and business ecosystems. Not only does the industry invest heavily in the research and development of new treatments and cures, it also generates high quality jobs, powers economic output and exports for the U.S. economy and sustains a very large-scale supply chain."

— We Work for Health

[6] Office of the Texas Governor (2017)

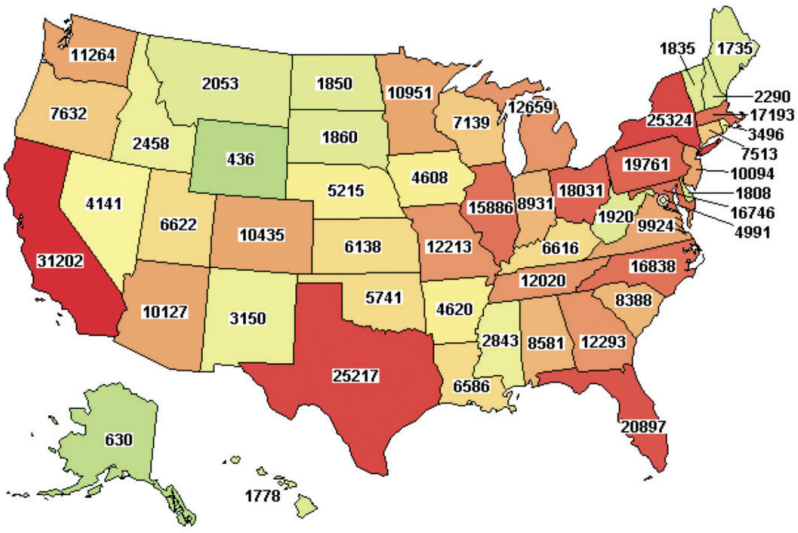
MEDICAL DEVICE COMPANIES

Texas is also home to many medical device companies, some of which perform manufacturing or research and development in the state, while others have established their corporate headquarters here. The Texas Biotechnology Company Directory lists companies in the medical devices and equipment category, a small sampling of which is shown in the following table.[7]

Company	Specialization	Location
Abbott Laboratories	Diagnostics, immunoassays	Irving
Apollo Endosurgery	Surgery	Austin
Celanese	General medical care	Irving
Fisher Healthcare	Diagnostics	Houston
GE Medical Systems	Cardiology	El Paso
Kimberly-Clark	Respiratory (disposables)	Irving
Medtronic Powered Surgical Solutions	Surgery	Fort Worth
Philips Respironics	Respiratory	Houston
St. Jude Medical Neuromodulation	Neurology – surgery	Austin
Zimmer Orthobiologics	Orthopedics – bone and tissue	Austin

CLINICAL TRIALS

Texas has the third most clinical trials of any state after only California and New York State, with more than 25,000 occurring as of the winter of 2018. Clinical trials provide both clinical and economic value to the state. When more clinical trials are underway in Texas, more Texans have access to experimental therapies. Clinical trials also have a significant economic impact on the state.



[7] *Ibid.*
[8] U.S. National Library of Medicine (2018)

VENTURE CAPITAL

As reported by TEConomy for BIO, Texas had the sixth most venture capital funding of any state during the period 2014-2017 with about $1.6 billion.[9]

TOTAL BIOSCIENCE VENTURE CAPITAL INVESTMENT, 2014-17

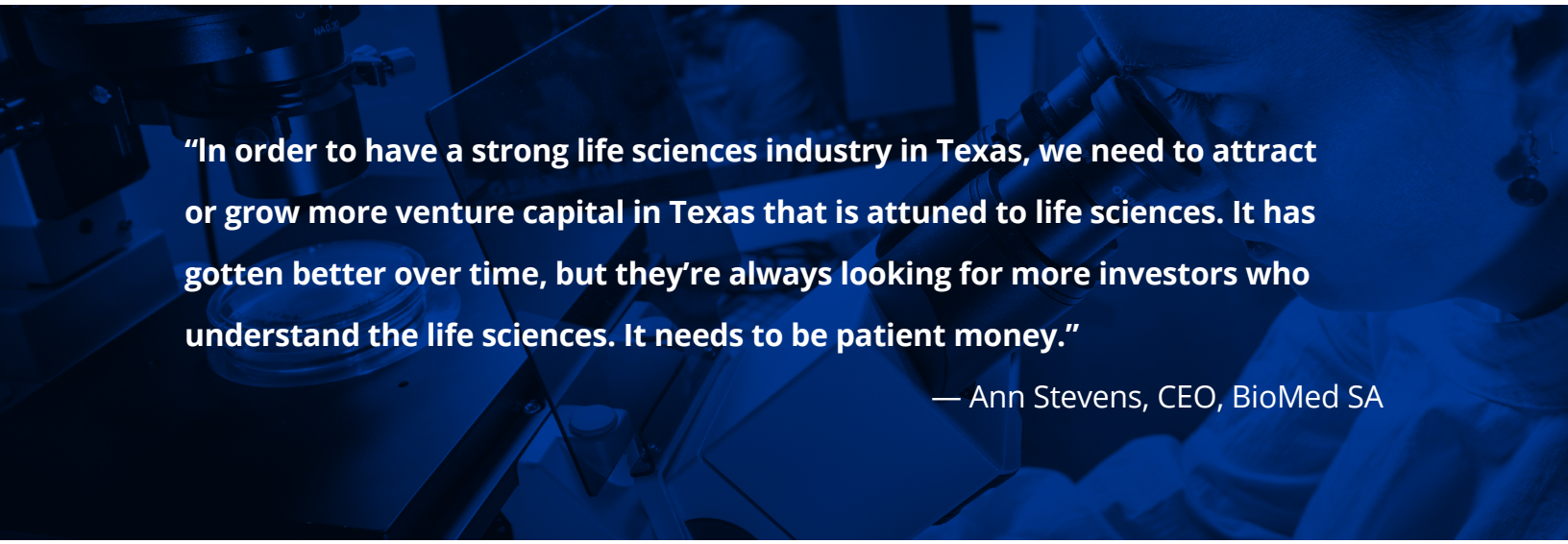
Leading States	Total ($ Millions)
California	$28,582
Massachusetts	$15,270
New York	$2,158
Washington	$1,993
Pennsylvania	$1,778
Texas	$1,591
Illinois	$1,586
North Carolina	$1,368
Colorado	$1,180
Minnesota	$1,132

GRANT FUNDING

The TEConomy report also noted that Texas is seventh in the country in National Institutes of Health (NIH) grant funding, with about $1.2 billion in 2017.[10]

TOTAL NIH FUNDING, 2017

Leading States NIH Funding	Total Funding ($ Thousands)
California	$3,946,355
Massachusetts	$2,716,744
New York	$2,386,045
Pennsylvania	$1,672,905
Maryland	$1,611,923
North Carolina	$1,245,779
Texas	$1,160,645
Washington	$998,184
Illinois	$805,535
Ohio	$754,319

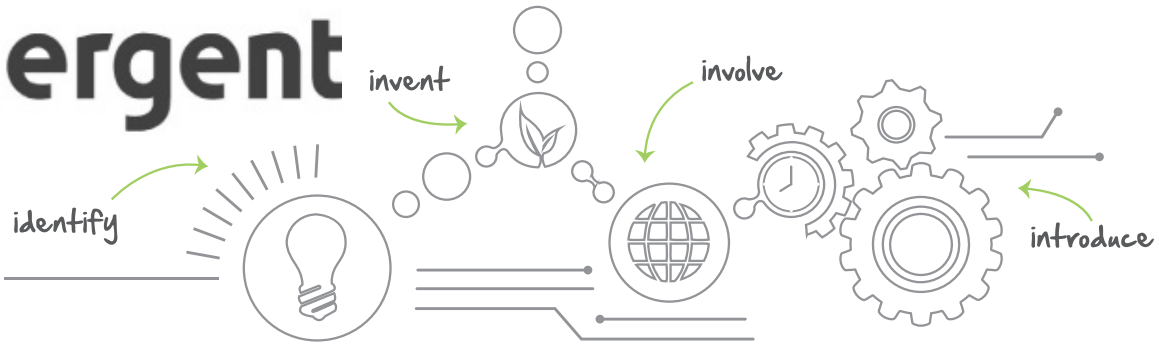


"In order to have a strong life sciences industry in Texas, we need to attract or grow more venture capital in Texas that is attuned to life sciences. It has gotten better over time, but they're always looking for more investors who understand the life sciences. It needs to be patient money."

— Ann Stevens, CEO, BioMed SA

[9] TEConomy/BIO (2018a)
[10] *Ibid.*

emergent



Austin, TX based Emergent Technologies, Inc. is an innovation solutions and technology commercialization leader that utilizes a non-traditional, collaborative-driven model to discover, develop and deploy early stage technology platforms to meet real market needs.

Emergent has refined a model of selecting differentiated, breakthrough technology and partnering with companies in need of these solutions to help protect and grow their core businesses. This model, or engine, takes novel ideas and works with industry to identify, invent, involve and introduce innovative technology for real world solutions.

The Emergent infrastructure delivers:

RISK MANAGEMENT Partnering provides a source for alternative funding that increases technology value while reducing its commercialization risk.

CAPITAL EFFICIENCY The Emergent centralized management team drastically reduces the high overhead typically associated with technology ventures.

AN UNLIMITED PIPELINE Emergent's contact capital includes thousands of key industry leaders. These relationships and an innovative, outcome-focused engine create the conditions for endless opportunity.

EMERGENT TECHNOLOGIES PORTFOLIO COMPANY PURE MHC - A CASE STUDY

pureMHC

Emergent Technologies company Pure MHC, LLC (puremhc.com) is a platform technology company with expertise in disease specifiic target identification and validation as well as immunotherapeutic drug development for cancer, allergy, infectious and autoimmune diseases. Pure MHC identifies and leverages the same disease targets for drug discovery that the immune system naturally uses to identify foreign or aberrant protein targets in cancerous, infected, or unhealthy cells.

Building on innovation licensed from the University of Oklahoma and under the management and leadership of Emergent Technologies, Pure MHC developed technology to identify novel, tumor-associated peptides that provide a selective pathway for targeted cancer therapies. Utilizing the Emergent partnering model, the team launched an initiative to draw in companies interested in advancing their immuno-oncology programs by utilizing the Pure MHC technology platform.

On January 9, 2017, Pure MHC entered a research and license agreement with biopharmaceutical company AbbVie (NYSE:ABBV) to discover and validate peptide targets for use with T-cell receptor therapeutics in several types of cancers. This collaboration was formed to identify a library of peptide targets for further research across multiple tumor types and to advance AbbVie's ongoing development of next-generation immuno-oncology therapies. This continuing partnership leverages Pure MHC's 15+ years of peptide target discovery with AbbVie's deep clinical expertise to utilize these targets in new and improved therapies for the treatment of cancer.

ACCESS THE EMERGENT INNOVATION ENGINE

For over 25 years, Emergent has successfully executed its capital efficient, partner driven, deal focused model to build value in and fund early stage innovation. We can do the same for your technology.

www.emergenttechnologies.com

THE EMERGENCE OF DIGITAL HEALTH AND THE CONVERGENCE OF INDUSTRIES

Over the last decade, new categories of health-related electronic tools have been emerging in the form of mobile apps to support the diagnosis and treatment of injury and disease. In some cases, these are apps that do things like remind patients to take their medications or remind expectant mothers to schedule their prenatal care. In other cases, the apps might provide treatment directly, particularly for behavioral health conditions such as anxiety or depression where an app might guide the patient through a meditation exercise or structure cognitive behavioral therapy. With the emergence of these digital health tools, some traditional players in the life sciences space are beginning to develop apps of their own and there is starting to be a convergence of the digital health and life sciences industries in some cases.



CLINICAL TRANSLATION MANAGEMENT

A GRADUATE DEGREE IN BIOTECH COMMERCIALIZATION

Master of Clinical Translation Management

The Master in Clinical Translation Management (MCTM) program is a nationally ranked professional graduate degree in biotech commercialization. Learn how to turn basic discoveries that occur in laboratories to usable drugs, medical devices or clinical processes. In this program, you will gain a solid understanding of the biotechnology industry as well as the business and regulatory savviness needed to assess a product's commercial potential and navigate the path of clinical translation.

The program can be completed in one year either online or in-person. An MCTM degree is designed to help you:

- **Integrate the fundamental concepts of science and business, and apply that knowledge to the biotech industry**
- **Evaluate and act on opportunities that arise in the biotech field**
- **Identify and address the critical issues facing biotech organizations**

Start the Application Process Today

Information on the program and requirements can be found at stthom.edu/MCTM. You may also call 713-525-3526 or email mctm@stthom.edu.

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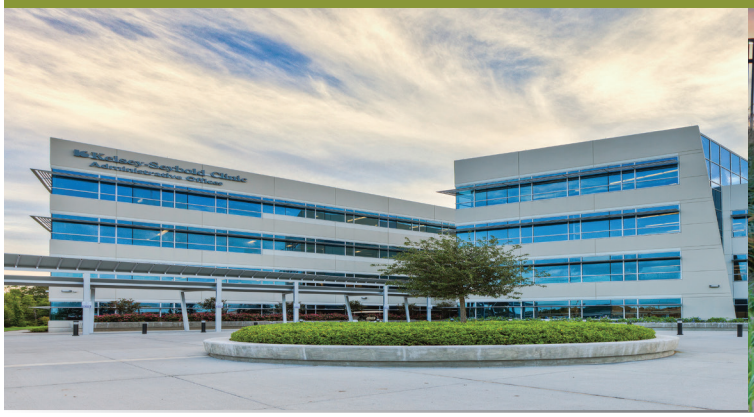
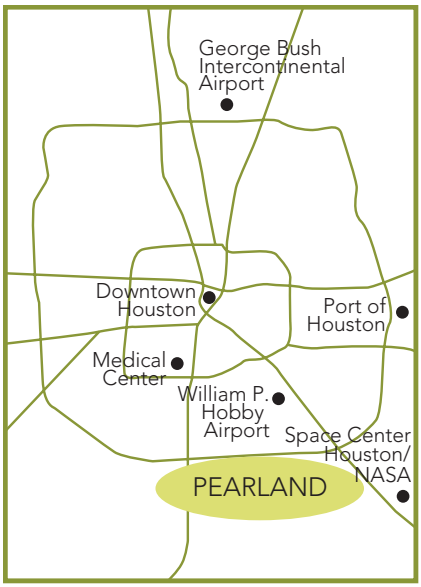


IS WAITING. With one of the most highly-educated and diverse communities in the Houston region, outstanding schools, and great quality of life, it's no wonder that more Texas Medical Center employees call Pearland home than any other area than Houston.

With its exceptional business growth and access to such a high-caliber workforce, Pearland is fast becoming the next major life science employment center in the Houston region. We are committed to helping your business grow and succeed. And with notable life science and health care employers such as Lonza, Kelsey Seybold, Merit Medical and Base Pair Biotechnologies calling Pearland home, there's no better place to set-up shop than Pearland, Texas.



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Economic Development Efforts in the Life Sciences in Texas

Organized efforts have been underway at both the state and local levels to promote the life sciences industry in Texas.

STATE-LEVEL EFFORTS

Texas has a number of characteristics that help to support the establishment and growth of life sciences companies, including a strong business climate, state incentive programs, dozens of research universities, and the largest medical center in the world.

STRONG BUSINESS CLIMATE

Texas has one of the strongest economies in the country. In the year leading up to September 2018, Texas added almost 385,000 net new jobs, leading the nation in job creation.[11] If you rank the U.S. states among the countries of the world in GDP, Texas comes in at number 11.[12] In addition, the state is known for its business-friendly economic and legal climates, geographically central location, excellent transportation infrastructure, and affordable real estate, not to mention the absence of a state income tax.

The following table lists a sampling of the awards that Texas has received recently for its business climate.

Award	Grantor
2018 Best State for Business for the 14th straight year[13]	Chief Executive Magazine
2017 Governor's Cup Winner for the 6th straight year[14]	Site Selection Magazine
2018 Top State for Business[15]	CNBC
2016 State of the Year[16]	Business Facilities Magazine
2016 Silver Shovel Award Winner[17]	Area Development Magazine

[11] Texas Workforce Commission (2018b)
[12] Author's calculation based on U.S. Department of Commerce (2018) and International Monetary Fund (2018)
[13] Chief Executive (2018)
[14] Site Selection (2018)
[15] CNBC (2018)
[16] Business Facilities (2017)
[17] Area Development (2016)

STATE FUNDING PROGRAMS

Texas has several different funding programs for attracting firms, and promoting research and commercialization.

Texas Enterprise Fund

The Texas Enterprise Fund (TEF), administered by the Office of the Governor, provides "deal closing" incentive funds to attract businesses and new jobs to Texas. Since 2004, the TEF has awarded $118 million to life science-related companies, which have committed to create 13,706 jobs in Texas.[18]

Governor's University Research Initiative

Established in 2015, the Governor's University Research Initiative (GURI) was allocated $40 million to attract and recruit top researchers to Texas' higher education institutions.

Product Development & Small Business Incubator Loan Program (PDSBI)

The Program offers long-term, asset-backed loans to near-bankable businesses developing and/or commercializing new or improved products, small businesses, non-profits, and small business incubators and accelerators, with preference given to entities in the areas of semiconductors, nanotechnology, biotechnology, biomedicine, and other emerging technologies.

New Nobel Prize Winner

In 2018, Jim Allison, PhD, chair of Immunology and executive director of the immunotherapy platform at The University of Texas MD Anderson Cancer Center, was awarded the 2018 Nobel Prize in Physiology or Medicine for launching an effective new way to attack cancer by treating the immune system rather than the tumor. "By stimulating the ability of our immune system to attack tumor cells, this year's Nobel Prize laureates have established an entirely new principle for cancer therapy," the Nobel Assembly of Karolinska Institute in Stockholm noted in announcing the award to Allison and Tasuku Honjo, MD, PhD, of Kyoto University in Japan.

The prize recognizes Allison's basic science discoveries on the biology of T cells, the adaptive immune system's soldiers, and his invention of immune checkpoint blockade to treat cancer. Allison's crucial insight was to block a protein on T cells that acts as a brake on their activation, freeing the T cells to attack cancer. He developed an antibody to block the checkpoint protein CTLA-4 and demonstrated the success of the approach in experimental models. His work led to development of the first immune checkpoint inhibitor drug.[19]

[18] Office of the Texas Governor (2017)
[19] MD Anderson Cancer Center (2018)
[20] Cancer Prevention and Research Institute of Texas (2019)

Cancer Prevention and Research Institute of Texas (CPRIT)

In 2007, the legislature authorized the issuance of $3 billion in bonds over 10 years to fund grants to Texas organizations and institutions for cancer-related academic research and product development research, and for the delivery of cancer prevention programs and services. CPRIT has awarded 1,321 grants totaling more than $2.17 billion. CPRIT's funding has had numerous direct and indirect impacts on life sciences research and commercialization across the state including:[20]

1. Attract, Create and Expand Research Capabilities in Higher Education
    - 166 stellar researchers and their labs recruited to Texas institutions
    - 3 NCI comprehensive cancer centers – previously only The University of Texas MD Anderson Cancer Center
    - $977 million in direct follow-on funding to CPRIT academic grantees
    - 43 core facilities to provide access to cutting-edge shared technology through capital instrumentation and technical expertise
2. Attract, Create and Expand the Capabilities of Private Entities and Create High-Quality New Jobs
    - 30 biotech companies started, expanded, or brought to Texas
    - CPRIT awards increase VC biotech investment in Texas by 11 percent
    - $1.75 billion (greater than 4 to 1) direct follow-on funding to CPRIT companies
    - $1.38 billion in 2018 total expenditures
    - $58 million annual state and local tax collections
    - Over 10,100 permanent jobs created in 2018
3. Expedite Innovation in Research and Enhance the Potential of Breakthroughs in Prevention and Cures
    - 13,418 patients in 109 clinical trials or studies
    - 14,250 cancer precursors and
    - 3,492 cancers detected
    - Nationally recognized teams and centers in immunotherapy and childhood cancers
    - Over 4,900 published or pending findings and 246 patent applications

"When you look at Texas, compared to the east and west coasts, our lower cost of doing business is a major factor in why businesses are choosing to locate here.

Our business-friendly environment and streamlined permitting reduces the time from planning to ground up construction, which was really important to Lonza when it built its cell and gene therapy facility in Pearland. Our growing talent base and the ability to provide state and local customized incentives provides us with another unique advantage."

— Brian Malone,
Vice President, Pearland EDC

[18] Office of the Texas Governor (2017)
[19] MD Anderson Cancer Center (2018)
[20] Cancer Prevention and Research Institute of Texas (2019)

RESEARCH UNIVERSITIES

With 75 universities and 11 health-related institutions, Texas has a significant institutional capacity for performing research in the life sciences. Texas research universities spent over $3 billion on bioscience research and development in 2016, third highest among the states. In 2017, more than half of all research spending by Texas universities and health-related institutions was in the life sciences, with almost $1.7 billion in the medical sciences and over $1.2 billion in biological and other life sciences. In 2017, Texas universities and health-related institutions expended over $1 billion on cancer research alone. While the single largest source of funds for research and development by universities and health-related institutions is the federal government, almost 20% comes from state and local sources.

TEXAS HEALTHCARE AND BIOSCIENCE INSTITUTE

The Texas Healthcare and Bioscience Institute (THBI; the organization that commissioned this report) is a 501(c)(6) membership organization focused on improving the life sciences ecosystem in Texas. The mission of THBI is to research, develop, and advocate policies and actions that promote biomedical science, biotechnology, agriculture, and medical device innovation in Texas. THBI serves as a trusted voice on issues impacting the life sciences industry.

"They're starting to get a pretty good awareness within the legislature for the need to attract and maintain life sciences here in Texas. Having a core group of companies to maintain that awareness is very important."

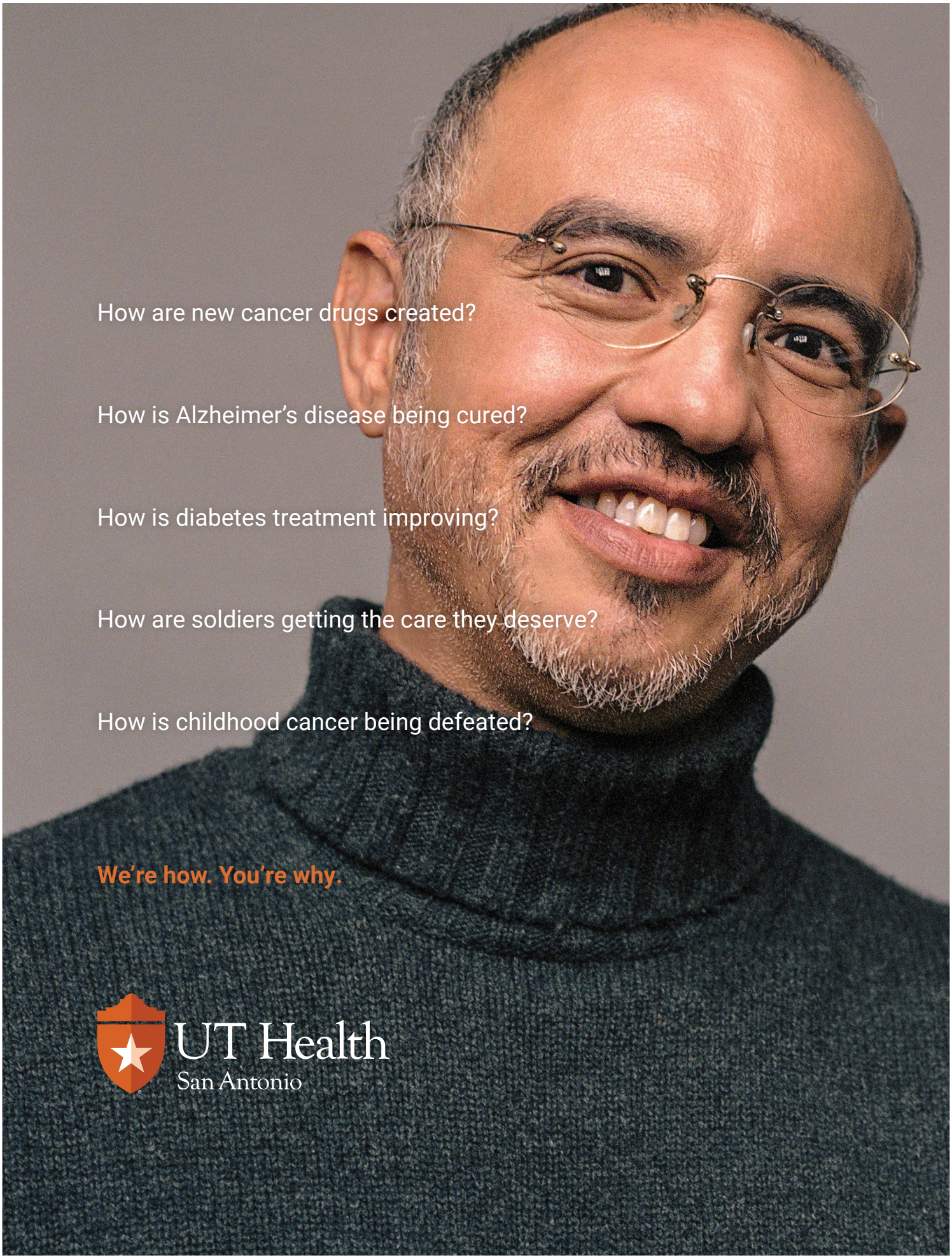
— Ed Rudnic, CEO, DisperSol Technologies

"The tech transfer policies adopted by public universities in Texas could be friendlier to partnerships. We need to identify models of more progressive and efficient tech transfer that have proven successful and try to implement them here."

— Jeff Fuchsberg, Director of Innovation Projects, Medical Center of the Americas Foundation

"Texas is already recognized as a leader and a model for other states and the rest of the country in multiple life science areas. THBI has played a key role in this process and we are proud to have worked side by side with other life science champions throughout the State to reach this point."

— David Margrave, Chairman, Texas Healthcare and Bioscience Institute


How are new cancer drugs created?
How is Alzheimer's disease being cured?
How is diabetes treatment improving?
How are soldiers getting the care they deserve?
How is childhood cancer being defeated?
We're how. You're why.
UT Health
San Antonio

WE ARE CONVENING INNOVATORS TO CREATE NEW MODELS OF HEALTH AND ECONOMIC GROWTH FOR ALL.

Austin is the crucible for innovations in community well-being, with the perfect balance of opportunities to test, refine, validate, and scale bold new ideas.

Capital City Innovation is the non-profit that is providing vision, strategic direction, advocacy, and synergy among the organizations and individuals creating, growing, and sustaining Austin's Innovation District and ecosystem.

Our partners include Central Health, Downtown Austin Alliance, UT Austin, Opportunity Austin, and Seton/Ascension Texas.

CAPITALCITY INNOVATION

REGIONAL EFFORTS

In addition, Texas also has significant regional efforts to promote the life sciences, primarily focused in the large urban areas of the state.

"One of the things that surprised me to learn about the Austin region is that there is a significant life sciences presence here already, but it's diffuse. Dell Medical School is starting to coalesce some of these capabilities, and in a way that leverages Austin's other, well-known strengths in data analytics, logistics, startups, and hardware. It is this rare confluence of engineering, computer science, and biology/health that positions Austin to excel in the future of the life science industry."

— Christopher Laing,
Executive Director,
Capital City Innovation

AUSTIN

Regional Life Sciences Economic Development Organization

BioAustin

BioAustin is a nonprofit corporation whose goal is to make Central Texas the best place in the world to start and grow a life sciences company. Their mission is to foster a vibrant and prosperous life sciences community in Central Texas where companies expand and flourish, start-ups germinate and grow, and entrepreneurs are inspired and empowered.

Example of Regional Excellence in the Life Sciences

DELL MEDICAL SCHOOL

The Dell Medical School opened to an inaugural class of 50 students in the summer of 2016 as the first medical school to be built at a Tier One American university in more than half a century and is led by Dean Clay Johnston, whose vision is to create a new model for academic medicine that accelerates innovation to improve health and reduce inefficiencies in health care. The medical school is named after the Michael & Susan Dell Foundation, which has pledged $50 million over ten years to the school.

In 2017, Merck announced that it would open a state-of-the-art office in the heart of Austin. Located within the new medical school campus at the University of Texas (UT), their environment fosters collaboration and creativity in a relaxed atmosphere and supports their goal to have technology help drive Merck's overall business outcomes. Digital technologies such as mobile apps, artificial intelligence networks and big data analysis are having a profound impact on health care, including pharmacology. With its core business as a pharmaceutical company, the office is part of a revamped strategy which involves establishing offices around the world where workers can collaborate on technology projects.

DALLAS-FORT WORTH

Regional Life Sciences Economic Development Organization

bionorthTX

bionorthTX was created to accelerate the growth of the diverse and balanced life sciences ecosystem in North Texas. bionorthTX helps companies connect with industry leaders, ground-breaking technologies, the investment community, nationally-ranked colleges and universities, a wealth of consultants, a varied population for clinical research and an experienced pool of scientists, technicians and resources. bionorthTX bridges these stakeholder relationships to enable new partnerships and support commercialization at a faster rate than what these entities could do on their own in such a large region.

Example of Regional Excellence in the Life Sciences

HOMEGROWN NOBEL LAUREATES

The North Texas region has produced multiple Nobel laureates in the life sciences. In 2015, Dr. Aziz Sancar became the first University of Texas at Dallas alum to win a Nobel Prize for detailing how cells continuously monitor and repair damaged DNA on a molecular level. Four other Nobel laureates in the life sciences continue to reside in the region. Dr. Michael Brown and Dr. Joseph Goldstein, both with UT Southwestern, were awarded the 1985 Nobel Prize in Physiology or Medicine for their discoveries concerning the regulation of cholesterol metabolism. Johann Deisenhofer, also at UT Southwestern, was awarded the Nobel Prize in Chemistry in 1988 for the determination of the three-dimensional structure of a photosynthetic reaction center. Dr. Bruce Beutler, also with UT Southwestern, won the 2011 Nobel Prize in Physiology or Medicine for discoveries concerning the activation of innate immunity.

EL PASO

Regional Life Sciences Economic Development Organization

BIO EL PASO/JUAREZ

BIO El Paso/Juarez is a bi-national, membership-based organization, whose purpose is to create a forum for members to accelerate the formation, expansion and attraction of biomedical enterprise in West Texas, South New Mexico and Northern Chihuahua, Mexico, leading to enhanced industry performance and growth of biomedical employment. Its mission is to convene industry, government, non-profit, and education institutions to improve the region's global competitiveness and quality of healthcare. In addition, it provides a platform for enhancing the El Paso/Juarez biomedical ecosystem and accelerating the formation, expansion, retention, and attraction of biomedical enterprise in the region.

Example of Regional Excellence in the Life Sciences

MEDICAL CENTER OF THE AMERICAS

The purpose of the Medical Center of the Americas Foundation is to develop a hub of innovation for the Paso del Norte region's health care and biomedical industries, from delivering health care education and training for the region's workforce to commercializing biomedical research and innovations. The Medical Center of the Americas Foundation legally formed in 2006, but its origins trace back to the late 1990s, when El Paso business, civic and government leaders moved forward on a plan to transform the region's economy, which was primarily comprised of low-wage, low-skill jobs. The MCA Foundation recently completed construction of the Cardwell Collaborative, a three-story, 60 thousand square-foot biomedical research and technology commercialization building, which is also the home to the MCA Foundation headquarters.

MEDICAL CENTER OF THE AMERICAS FOUNDATION

Accelerating Innovation, Improving Health, and Building Prosperity In El Paso, Texas

Cardwell Collaborative Facilities

The MCA Innovation Center operates in the Cardwell Collaborative building, a 60,000 square foot, $28 million "tech park." The LEED Silver building features 20,000 square feet of biomedical and tech incubator space in one location that brings private startup companies and university personnel together under one roof to collaborate.

Lab Space (Wet/Dry)

Flexible leasing options include open benches as well as private wet-lab and dry-labs.

Dry Lab Equipment

- 3D Printers
- Digital Oscilloscope
- Digital Multimeter
- 1200° Furnace
- Soldering Station
- Raspberry Pi Kits

Wet Lab Equipment

- Safety Cabinet-Biological Class II (A2)
- Fume Hood

- Steam Sterilizer
- Centrifuge
- CO_2 Incubators
- Cryostorage Freezer
- Ultra-Low Freezer
- Ultrapure Water system

Safety

Centralized EHS services and training available.

Office & Meeting Space

- Memberships
- Dedicated Open Office
- Private Office
- Conference Rooms

mcamericas.org

MCA

Biomedical innovation is taking off in El Paso, driven by a major hub of activity at the Medical Center of the Americas (MCA). The 440-acre MCA campus is anchored by the MCA Foundation's Cardwell Collaborative biomedical incubator, Texas Tech University Health Sciences Center El Paso, University Medical Center of El Paso, and El Paso Children's Hospital.

MCA Innovation Center

Launched in 2017 to spur life sciences venture creation, the MCA offers a 10-month long program that provides mentoring, access to laboratory space, business development assistance, intellectual property and regulatory support, proof-of-concept funding and access to investors.

$750,000 2018 US EDA i6 Challenge Winner

mcamerics.org/innovation

MCA Clinical Trial Consortium

(CTC) is a forum comprised of over 30+ key industry stakeholders from El Paso, Texas, Southern New Mexico and Cd. Juárez, México, that is committed to expanding and accelerating the region's infrastructure and competitiveness in clinical research and innovation. The CTC provides the following resources:

- Patient education
- Principal Investigators recruiting
- Assistance strengthening local sites
- Outside clinical research organization recruiting
- Educational opportunities and community outreach

mcamericas.org/clinical-trials

BIO El Paso-Juárez

The El Paso-Juárez borderplex is a major hub of activity for major medical device manufacturers from across the globe. Our region boasts:

- 30+ Class I, II, and II medical device manufacturers
- A robust bi-national supply chain
- Medical device product development / support
- Prime border & trade location leading to cost savings and efficiency
- Highly automated and FDA compliant production lines

BIO El Paso-Juarez is a binational membership-based group representing this industry.

bioelpasojuarez.org

HOUSTON

THE THIRD COAST FOR LIFE SCIENCES

MORE THAN 1,760

life sciences companies | cutting edge hospitals

health facilities | research institutions

Home to the largest medical complex in the world, the Texas Medical Center, Houston is at the forefront of advancing life sciences. The region is one of the top destinations in the U.S. for clinical health care and medical research.

10 MILLION
patient visits annually

MORE THAN 360,000 PROFESSIONALS
in health care, biotech and related fields.

NEARLY 4,200
active clinical trials in the Houston region

or 14% of all trials in the U.S.

OVER $654 MILLION
in NIH funding in 2017

GREATER HOUSTON PARTNERSHIP
Making Houston Greater.

To learn more about Houston's life sciences industry, visit Houston.org/LifeSciences

HOUSTON

Regional Life Sciences Economic Development Organization

BioHouston

BioHouston, Inc. is a non-profit corporation founded by Houston area academic/research institutions. They lead a broad effort to establish the Houston region as a vigorous global competitor in life sciences and biotechnology commercialization. Their mission is to create an environment that will stimulate technology transfer and research commercialization, thereby generating economic wealth for the Houston region and making it a global competitor in life science commercialization.

Example of Regional Excellence in the Life Sciences

TEXAS MEDICAL CENTER

The Texas Medical Center (TMC), located in Houston, is the largest collection of hospitals and health care facilities in the world. The TMC has over 100 thousand employees across 54 institutions. With its eight different academic and research institutions and 21 different hospitals, TMC is visited by over 160,000 each day and more than 7.2 million each year, including over 18,000 international patients.

In addition to having a high volume of hospitals, the TMC also has some of the best hospitals in the world including MD Anderson Cancer Center, the top cancer hospital in the world and Texas Children's Hospital, the number four children's hospital in the nation.

In 2016, Johnson and Johnson opened the latest location of JLabs, its life sciences incubator, in the Texas Medical Center. JLabs @ TMC has over 34,000 square feet of common, wet lab, and office space and will serve as one part of a larger strategy to commercialize the over $1 billion in annual research that happens in the TMC. The JLABS @ TMC portfolio spans the breadth of life sciences with companies focused on oncology, therapeutics, pharma and medical devices.

"Houston has the proximity and accessibility to numerous assets in life sciences that position it as a major global player. In addition to being home to the world's largest medical center, Texas Medical Center (TMC), Houston is one of the top destinations in the U.S. for clinical health care and medical research. As Houston continues to diversify its economy, life sciences is a natural area for strong growth."

— Susan Davenport, Senior Vice President of Economic Development, Greater Houston Partnership

"Our Master's in Clinical Translational Management at the University of St. Thomas - Houston is one of the best biotech commercialization programs in the nation. This multidisciplinary graduate program teaches students how to translate health-changing research discovery from the laboratory to its use in medical practice."

— Dr. Beena George, Dean, Cameron School of Business, University of St. Thomas

SAN ANTONIO

Regional Life Sciences Economic Development Organization

BioMedSA

BioMedSA is a non-profit organization in San Antonio focused on economic development in the life sciences. Since its founding in 2005, BioMedSA has helped to bring together research universities, health care organizations, military health, and private corporations in San Antonio to support the commercialization of new discoveries. At the request of the San Antonio City Council, BioMedSA took the lead on a community action plan for the industry through which they identified five disease areas in which they believe San Antonio has unique assets, or national or world class expertise – diabetes, infectious disease, cancer, trauma, and wound care. In addition, the action plan has three goals:

1. Help San Antonio attract biotech companies;
2. Retain and grow the existing homegrown industry;
3. Foster the entrepreneurial development of new companies.

Example of Regional Excellence in the Life Sciences

SOUTHWEST RESEARCH INSTITUTE

Southwest Research Institute (SwRI), headquartered in San Antonio, Texas, is one of the oldest and largest independent, nonprofit, applied research and development (R&D) organizations in the United States. Their biomedical researchers support the healthcare industry from biomaterials and pharmaceutical development to food safety and microencapsulation. In addition, they provide product design and development, modeling and analysis, testing and evaluation, manufacturing assistance, and failure analysis.

BRYAN/COLLEGE STATION

Regional Life Sciences Economic Development Organization

BRAZOS VALLEY ECONOMIC DEVELOPMENT CORPORATION

The Brazos Valley is located in the center of the "Texas Triangle" formed by the Houston, Dallas and San Antonio, providing easy access to the major markets of Texas, the nation and the world. The Brazos Valley Economic Development Corporation is a public-private 501(c)(6) non-profit organization serving Brazos County, the Cities of College Station and Bryan, Texas A&M University and private sector investors.

Examples of Regional Excellence in the Life Sciences

The region's bio sector is thriving in part because of the strong links between industry and academia at Texas A&M. The Brazos Valley is home to Fujifilm Diosynth Biotechnologies, an industry-leading Biologics Contract Development and Manufacturing Organization focused on the development and manufacturing of recombinant proteins, vaccines, monoclonal antibodies, among other large molecules, viral products and medical countermeasures expressed in a wide array of microbial, mammalian, and host/virus systems. iBio is a leader in developing plant-based biopharmaceuticals, and provides a range of product and process development, analytical, and manufacturing services at its large-scale development and manufacturing facility. G-CON Manufacturing designs, produces and installs prefabricated cleanroom PODs, encompassing a variety of different dimensions and purposes, from laboratory environments to personalized medicine and production process platforms.

"The Brazos Valley provides numerous strategic advantages for the bio industry, including our connectivity to the state and far beyond, and the research and talent pipeline with Texas A&M University."

— Matt Prochaska, President/CEO, Brazos Valley Economic Development Corporation

"San Antonio's collaborative culture and nurturing of bioscience is essential to growing a leading research institute and was critical in my decision to join Texas Biomed and bring my research team from Ohio to San Antonio in 2017."

— Larry Schlesinger, M.D.,
President and CEO,
Texas Biomedical Research Institute

SAN ANTONIO: WHERE INNOVATION IS BORN

San Antonio is on a mission. We're driving innovation to solve some of the world's most complex health challenges. Our rapidly growing healthcare and bioscience industry has unique biomedical assets and the collaborative culture needed to effectively explore solutions to cancer, diabetes, infectious diseases, neurological disorders and trauma. As a result, San Antonio is now recognized as a City of Science and Health. With an annual economic impact of over $40 billion, San Antonio's healthcare and bioscience sector is actively working to turn a collaborative culture into an economic engine, fueling regional growth and becoming a resource to the world.

To learn more about this vibrant industry, contact: President Ann Stevens of BioMed SA at astevens@biomedsa.org or 210.468.1829.

biomedsa.org

BioMed SA
SAN ANTONIO

BioMed SA is a non-profit, membership-based organization, supported in part by the City of San Antonio

LUBBOCK ECONOMIC DEVELOPMENT ALLIANCE™

LUBBOCK'S GREATEST STRENGTH IS ITS EDUCATED, DIVERSE AND SKILLED WORKFORCE.

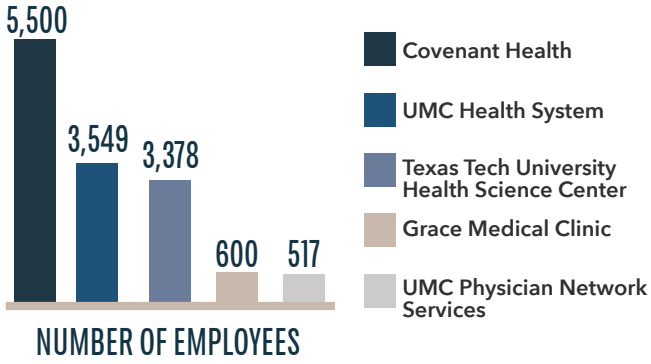
ECONOMIC CENTER of a 26-County Region

MSA POPULATION 320,692

REGIONAL POPULATION 643,888

(Source: 2016 Nielsen Report MSA (Lubbock, Lynn, Crosbyton)

MAJOR HEALTH SYSTEMS



NUMBER OF EMPLOYEES

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER

Five Schools. One Mission. Texas Tech University Health Sciences Center operates five schools and five satellite campuses across West Texas, as well as multiple online programs. Their flagship campus resides proudly in **Lubbock, TX.**

- **TTUHSC School of Medicine**
- **School of Nursing**
- **School of Health Professions**
- **School of Pharmacy**
- **Graduate School of BioMedical Sciences**

TTUHSC has trained more than **25,000** health care professionals who are serving patients and driving medical discovery in tangible, life-changing ways both for the **2.75 million** people in their immediate service area and around the world.

For more information, please contact the Recruitment and Innovation Team at

Lubbock Economic Development Alliance | 1500 Broadway, 6th Floor | Wells Fargo Center | Lubbock, Texas 79401 | 800.687.5330 | LubbockEDA.org

Opportunities for Further Growth

While the life sciences industry in Texas is already robust, it has not yet reached its potential. There remain opportunities for further growth.

ATTRACT INVESTORS TO TEXAS

New Texas life sciences companies are often able to attract investment for growth from venture capital firms, but VC firms often prefer to have their portfolio companies in close geographic proximity because it makes it easier to monitor them and be involved in their governance and operations. For this reason, it is not unusual for VC firms to encourage or require their portfolio companies to move to be closer to the VC firm. With most VC firms with a life sciences focus located in California and Massachusetts, Texas is at a disadvantage when it comes to keeping VC-backed life sciences companies in the state long enough to begin contributing to the economy in a meaningful way. Encouraging more VC firms to open offices in Texas, and working with family offices and angel networks based in Texas could make it more likely that new life sciences companies that start in Texas will stay in Texas.

"Temple Health and Bioscience District provides health related startup companies with affordable office and wet lab space as well as seed funding (on a case by case basis). In addition, equipment, mentoring and whatever else the startup company needs to develop their technologies for commercialization is available through Temple Health and Bioscience District."

— Tami Annable, Executive Director, Temple Health and Bioscience District

SUPPORT UNIVERSITY-TO-MARKET PIPELINE

The research universities in Texas are a steady source of new intellectual property that can potentially be commercialized, but commercializing discoveries has not been the traditional expertise of universities. In addition, universities have faculty, staff, and students that have significant skills and knowledge that can potentially be tapped by industry. In order to maximize the potential of the research universities in Texas to contribute to the Texas economy, university commercialization and technology transfer offices should be supported; and incubators, accelerators, and industry mentoring programs should be established.

"Allowing patents to count toward tenure is a fairly recent development. Adding other types of commercialization activities and supporting research faculty with industry mentors and incubators would create more incentives for translating life sciences discoveries into commercial products."

— Quentin Smith, Vice President of Research, Texas Tech University Health Science Center

"We are developing a business plan for a Science Accelerator to be launched in the Spring 2019 to assist our faculty and researchers interested in starting new companies around novel research idea. The Accelerator will leverage resources from UT System and other partners and provide entrepreneurship mentoring to the growing community of startups at UT Health San Antonio."

— Dr. Andrea Giuffrida, Vice President for Research, UT Health San Antonio

SUPPORT STATE FUNDING

When firms are making decisions about where to grow or locate a new office or facility, they take into account a number of factors. In cases where multiple locations might suit the needs of a firm, incentives become very important. The Texas Enterprise Fund has helped to "close the deal" on multiple site selection and expansion projects that have led to meaningful increases in jobs in Texas. The Cancer Prevention and Research Institute of Texas (CPRIT) helps to ensure that life sciences firms in Texas have access to investment funding without requiring that they move out of Texas. However, when such programs do not receive strong political support, their long-term viability comes into doubt and such uncertainty may be considered a negative factor by firms considering growing or locating in Texas. Some regions in Texas have such a strong lead in certain industries that economic development incentives are not necessary. For the life sciences, however, in most of the state, incentives make a difference.

The Perryman Group recently estimated that CPRIT programs annually contributed over $12 billion in economic output and supported over 100,000 jobs when considering both direct and indirect economic impacts. They further estimated that failing to continue the funding for another 10 years would lead to economic losses of almost $150 billion in gross product and more than 1 million person-years of employment.

SUPPORT STRONG BUSINESS CLIMATE

One of the most significant factors in Texas' favor when it comes to economic development is its favorable business climate. With no personal income tax, a predictable legal environment, good transportation infrastructure, relatively low property costs, and a strong workforce, Texas is a very attractive place to start or grow a business. Every effort should be made to maintain the strong business climate in Texas.

Policy Alignment

The policy recommendations identified in this study are closely aligned and highly consistent with the legislative priorities identified by THBI for the 86th Texas Legislative Session, which include the following:

ACCESS TO INNOVATION

- It is critical that all patients fighting diseases have access to needed treatments and cures that allow patients to live longer, healthier and more productive lives.
- THBI is committed to safeguarding and preserving timely patient access to new medicines while maintaining the integrity of those who utilize the latest innovations in creating these products.
- Preserve and foster Texas' investments to continue to grow a productive infrastructure.

ENCOURAGE RESEARCH & DEVELOPMENT AND INCENTIVES

- Encourage Research and Development and the incentives Texas companies need to compete in the drug and medical device innovative process.
- The Texas Life Sciences Industry supports private-public collaborations that will allow Texas to compete globally and also supports efforts to build and sustain a highly skilled technology workforce in the state.
- Support policies to keep Texas' life science entrepreneurs and small businesses healthy and flourishing.

APPROPRIATE FUNDING FOR HIGHER EDUCATION/RESEARCH

- Encourage the Texas Legislature to support a consistent and transparent mechanism to fund research at our Texas Institutions of Higher Education.
- Encourage the Texas Legislature to meaningfully fund research to ensure national competitiveness and to improve the ability for our Texas Institutions of Higher Education to continue a robust technology transfer system and product development process.
- Support the Governor's University Research Initiative Grant Program (GURI) as Texas continues to recruit the best and brightest in the world to Texas

CPRIT

- Cancer Prevention & Research Institute of Texas (CPRIT) continues to foster cancer research and prevention in Texas as well as fund product development. THBI supports the funding and agency reauthorization for CPRIT for another 10 years.

Remind your elected officials...

IF IT DOESN'T EXTEND LIVES ...

IF IT DOESN'T PROMOTE CURES ...

IT'S NOT GOOD POLICY.

JOIN US

www.bio.org/goodpolicy

Conclusion

Texas has a strong and growing life sciences industry, but there are opportunities to grow it bigger and stronger still. The Texas Life Sciences Industry has dozens of major pharmaceutical and medical device companies, all supported by a strong business climate, private investment, and public funding programs. The broader Texas Life Sciences Ecosystem also includes numerous major research universities and thousands of clinical trials. Additional work can be done to grow the life sciences industry in Texas including attracting more investors to Texas, supporting the university-to-market pipeline, and continuing to support state funding and a strong business climate.

References

Area Development (2016). Gold and Silver Shovel Awards. Available: Online. Accessed: December 5, 2018. Retrieved from: http://www.areadevelopment.com/Gold-Shovel-Econdev-Awards/Q2-2016/top-economic-development-job-creation-states-22751a3.shtml

Biotechnology Innovation Organization (2018). The Biotechnology Ecosystem: By the Numbers. Available: Online. Accessed: January 20, 2019. Retrieved from: https://www.bio.org/sites/default/files/docs/toolkit/IGP19.pdf

Business Facilities (2017). State of the Year. Available: Online. Accessed: December 5, 2018. Retrieved from: https://businessfacilities.com/2017/01/texas-named-2016-state-of-the-year/

Cancer Prevention and Research Institute of Texas (2019). Real Momentum, Real Results. Received by email from CPRIT staff.

Chief Executive (2018). Best and Worst States for Business. Available: Online. Accessed: December 5, 2018. Retrieved from: https://chiefexecutive.net/2018-best-worst-states-business/

CNBC (2018). Top States for Business. Available: Online. Accessed: December 5, 2018. Retrieved from: https://www.cnbc.com/2018/06/29/texas-rebounds-to-become-americas-top-state-for-business-in-2018.html

International Monetary Fund (2018). World Economic Outlook. Gross Domestic Product by Country. Available: Online. Accessed: December 5, 2018. Retrieved from: https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD/CAN

MD Anderson Cancer Center (2018). "MD Anderson immunologist Jim Allison awarded Nobel Prize". Available: Online. Accessed: December 5, 2018. Retrieved from: https://www.mdanderson.org/newsroom/md-anderson-immunologist-jim-allison-awarded-nobel-prize.h00-159228090.html

Office of the Texas Governor (2017). Texas Biotechnology Company Directory. Available: Online. Accessed: January 8, 2019. Retrieved from: https://businessintexas.com/sites/default/files/07/14/17/biotechdirectory.pdf

Office of the Texas Governor (2017). Texas Biotechnology and Life Sciences. Available: Online. Accessed: December 5, 2018. Retrieved from: https://businessintexas.com/sites/default/files/07/14/17/biotechreport.pdf

PhRMA (2017). Biopharmaceutical Sector Impact on Texas' Economy. Available: Online. Accessed: January 8, 2019. Retrieved from: http://phrma-docs.phrma.org/files/dmfile/PhRMA_GB_StateFactsheet_Texas.pdf

Porter, M.E. (1990). The Competitive Advantage of Nations. New York: The Free Press.

Site Selection (2018). Governor's Cup Awards. Available: Online. Accessed: December 5, 2018. Retrieved from: https://siteselection.com/press/releases/180305_GOV_CUP.html

TEConomy/BIO (2018a). Investment, Innovation, and Job Creation in a Growing U.S. Bioscience Industry. Available: Online. Accessed: January 8, 2019. Retrieved from: https://www.bio.org/sites/default/files/TEConomy_BIO_2018_Report.pdf

TEConomy/BIO (2018b). Investment, Innovation, and Job Creation in a Growing U.S. Bioscience Industry – Texas. Available: Online. Accessed: January 8, 2019. Retrieved from: https://www.bio.org/sites/default/files/TX-BIO2018.pdf

Texas Higher Education Coordinating Board (2018). Research Expenditures Summary September 1, 2016-August 31, 2017. Available: Online. Accessed: January 8, 2019. Retrieved from: http://www.thecb.state.tx.us/reports/PDF/11036.PDF?CFID=91423229&CFTOKEN=56826132

Texas Higher Education Coordinating Board (2019). Texas Higher Education Data. Available: Online. Accessed: January 8, 2018. Retrieved from: http://www.txhighereddata.org/Interactive/Institutions.cfm

Texas Workforce Commission (2018a). Quarterly Census of Employment and Wages. Available: Online. Accessed: December 5, 2018. Retrieved from: https://tracer2.com/cgi/dataAnalysis/AreaSelection.asp?tableName=Industry

Texas Workforce Commission (2018b). Texas Labor Market Review, December 2018. Available: Online. Accessed: January 8, 2019. Retrieved from: https://tracer2.com/admin/uploadedPublications/2138_TLMR-Current_Edition.pdf

U.S. Department of Commerce (2018). Bureau of Economic Analysis. Gross Domestic Product by State. Available: Online. Accessed: December 5, 2018. Retrieved from: https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1

U.S. National Library of Medicine (2018). Map of All Studies on ClinicalTrials.gov. Available: Online. Accessed: January 17, 2019. Retrieved from: https://clinicaltrials.gov/ct2/search/map

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Policy: Texas House, Senate, and the Sunset Advisory Commission
Major legislation pertaining to the Senate Health and Human Services Committee, The House Public Health Committee, and the House Human Services Committee.

Regulatory: Health and Human Services Commission and component agencies
Executive and advisory committees, rate setting, HHSC budgets and spending, formulary and preferred drug list deliberations, Medicaid managed care, the HHS Transition, and opioid and substance abuse.

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