The Texas Biotechnology Industry

2014

TEXAS WIDE OPEN FOR BUSINESS

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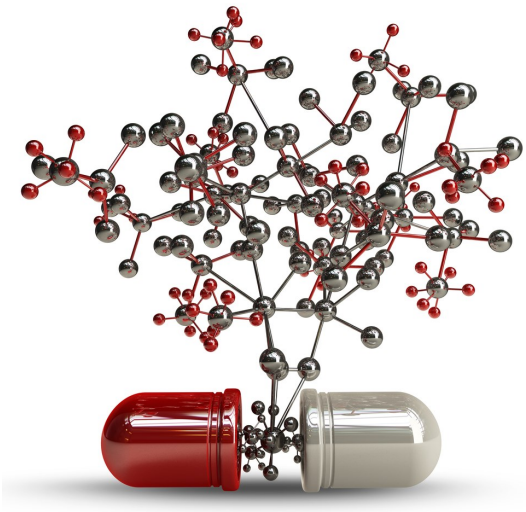

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Fortune 1000 company **NBTY** opens state-of-the-art vitamin manufacturing plant in San Antonio

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Allergan installs new production line at Waco pharmaceutical plant, expands facility and local workforce

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San Antonio-based **HVHC, Inc.,** the nation's largest U.S. optical company, invests $25 million for a new manufacturing and distribution center in San Antonio and expands HQ

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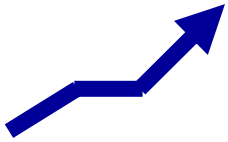
HVHC INC.
A HIGHMARK COMPANY

Texas ranks **#2 for employment of life and physical scientists** nationwide



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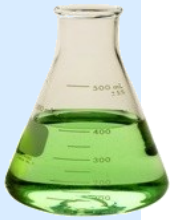
Texas is home to the **nation's largest biodiesel plant** and ranks **#1 for U.S. biodiesel production**



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Texas public institutions award over 66,000 **biotech-related degrees** from 2009 -2013

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Texas A&M partners with **GlaxoSmithKline** to build $91 million flu vaccine manufacturing plant

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GlaxoSmithKline

Germany-based prosthetics firm, **Ottobock**, relocates its North American headquarters to Austin

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ottobock.

Biotechnology in Texas

Biotechnology is technology based on biology which harnesses cellular and molecular processes to develop products that help improve the health of humans and the planet. People have used the biological processes of microorganisms for more than 6,000 years to make and preserve food products. Modern biotech provides breakthrough tools to combat diseases, increase crop yields, and develop cleaner energy sources.

Because of the breadth of biotechnology activities, the field actually encompasses many related industries, from medical, to chemical, to agricultural. Within the North American Industry Classification System (NAICS), the federal standard for classifying businesses, biotechnology spreads across the ten subsectors listed below.

The Biotechnology Industry

As home to over 3,600 biotechnology manufacturing and R&D firms, Texas is one of the leading biotech states in the country. More than 92,000 workers are employed in biotech-related sectors in Texas, and dozens of global biotech companies, such as Novartis, Abbott, and Medtronic, have major operations in the state. A concentration of highly trained biotech workers, multiple top-tier research institutions, and a top-ranked business climate all strengthen the state's status as a biotechnology leader.

Number of biotech workers in Texas:	**92,022**

Irving-based Kimberly Clark and Dallas-based Celanese, both on the 2013 Fortune 1000 list, are among the largest biotech-related companies headquartered in the state.

The total economic impact of the biotechnology industry in Texas in 2009, the latest data available, was estimated at $75 billion, according to the Texas Healthcare & Bioscience Institute, an industry association. Additionally, for every biotechnology job created, another 2.3 jobs were created elsewhere in the Texas economy.

Biotechnology Subsectors

- Research and Development in Biotechnology
- Research and Development in Physical, Engineering, and Life Sciences
- Pharmaceutical and Medicine Manufacturing
- Medical Equipment and Supplies Manufacturing
- Electromedical Apparatus Manufacturing
- Analytical Laboratory Instruments Manufacturing
- Medical and Diagnostic Labs
- Testing Laboratories
- Pesticides, Fertilizer & Other Agricultural Chemical Manufacturing
- Other Basic Organic Chemical Manufacturing

Top Texas-Based Biotechnology Firms

(by Global Revenues)

Kimberly-Clark
Respiratory healthcare products
HQ: Irving
Sales: $12.1 billion

Celanese
EVA polymer-based medical care products
HQ: Irving
Sales: $6.5 billion

KCI
Wound care medical devices
HQ: San Antonio
Sales: $734.9 million

Greatbatch
Medical device technologies
HQ: Frisco
Sales: $663.9 million

Alcon
Ophthalmics devices and medicine
HQ: Fort Worth
Sales: $593 million

Key Texas Biotechnology Rankings

No. 1 nationally for biodiesel production

No. 1 for U.S. agricultural sciences doctorates

No. 2 in life and physical scientists employment nationwide

No. 3 for U.S. biological/biomedical sciences and life science doctorates

No. 3 in U.S. science, engineering, and health doctorate holders

No. 5 for U.S. health sciences doctorates

Texas Attracts Biotechnology Investment from around the World

Selected foreign services companies with biotechnology-related operations in Texas:

Denmark
ALK-Abelló: Round Rock

France
Essilor: Dallas
Virbac: Fort Worth

Germany
Ottobock: Austin

Japan
Fujirebio: Seguin
Hitachi: Dallas
Rigaku: Austin

The Netherlands
Philips: Arlington, Houston
Royal Dutch Shell: Houston

Singapore
Flextronics: Irving

Spain
Grifols: San Marcos, Statewide locations

Switzerland
Galderma: Fort Worth
Lonza: Houston
Novartis: Fort Worth, Houston
Orthofix: Lewisville

United Kingdom
Smith & Nephew: Fort Worth

Top Life Sciences Companies in Texas

Selected firms with corporate management, research, or manufacturing facilities in the state

Sources: D&B, US FDA, company websites

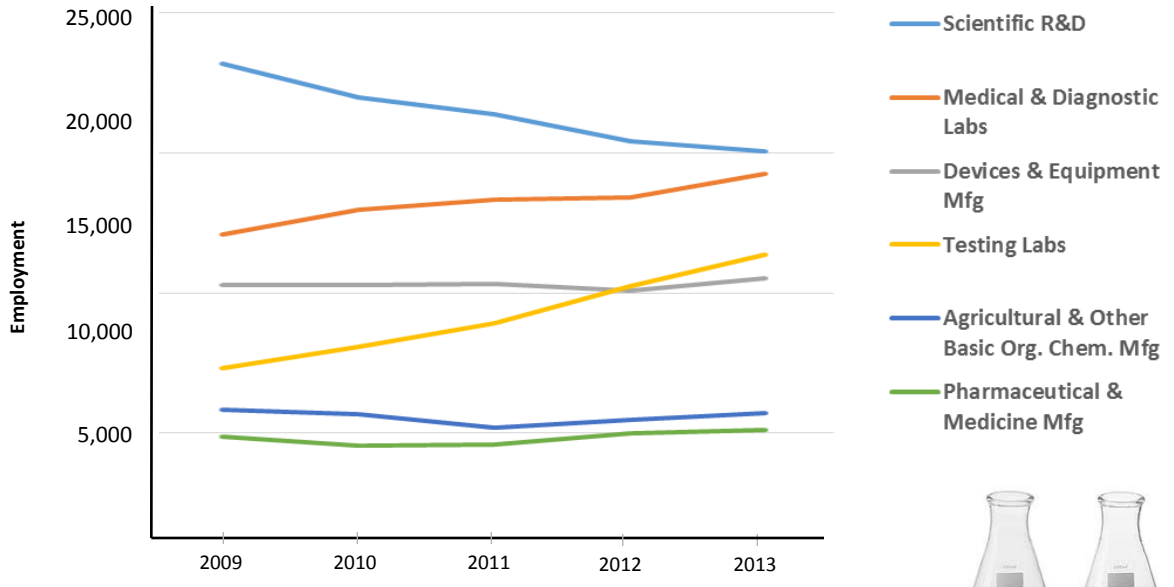
Texas Biotech Workforce

Texas is home to over 3,600 firms involved in biotechnology-related manufacturing, scientific research, and laboratory analysis. These firms employ more than 92,000 workers at an average annual salary of over $69,000. The table on page 5 provides a snapshot of the Texas biotechnology industry as of third quarter (Q3) 2013. The state has seen overall increases in the number of biotechnology firms and employment, as well as a slight decrease in average annual wages since a year prior, in Q3 2012.

Texas is top ranked for the employment of biotech-related scientists and doctorate holders

In 2012, Texas ranked No. 2 nationally for the number of life and physical scientists employed, with 47,770, according to the National Science Foundation (NSF). Additionally, in 2010, Texas ranked No. 3 nationally for employed science, engineering, and health doctorate holders, with 42,400, according to the NSF.

Texas Biotech-Related Employment 5-Year Trends



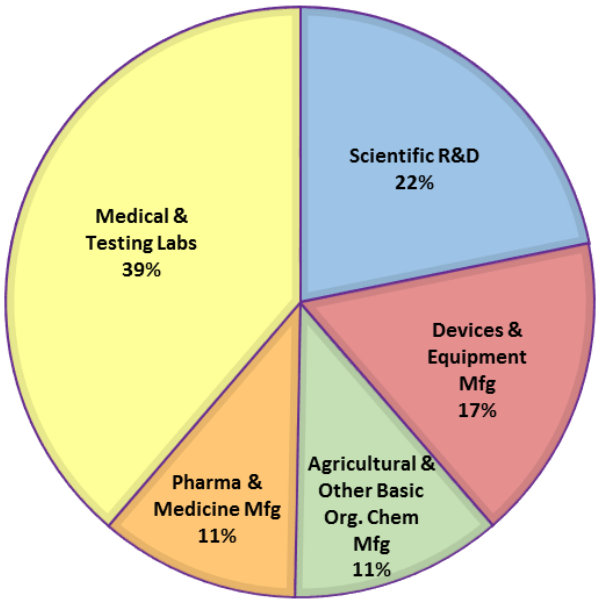
Source: Texas Workforce Commission
Private sector employment only. Data from third quarter of each year.

As shown in the chart to the right, in Q3 2013, 39% of Texas' biotech-related workers were engaged in medical and testing labs (NAICS 6215 and 54138), 22% in scientific R&D (NAICS 541711 and 541712), 17% in devices and equipment manufacturing (NAICS 334510, 334516, and 3391), 11% in agricultural and other basic organic chemical manufacturing (NAICS 32519 and 3253), and 11% in pharmaceutical and medicine manufacturing (NAICS 3254).

From Q3 2009 to Q3 2013, the most recent five years of available data, biotechnology-related employment in Texas increased almost 4% (see graph on previous page). The medical and diagnostic labs and testing labs segments saw continuous employment increases each year during that period, with the testing labs segment experiencing the greatest overall employment increase, growing 24.6% between 2009 and 2013.

Over 60% of Texas biotechnology employment is R&D and testing-related

Texas Biotech Employment
by Sector



Source: Texas Workforce Commission

Biotechnology Employment in Texas
Third Quarter 2013

Sector (Industry Code)	Employees	Firms	Average Annual Wage
Medical and Diagnostic Labs (6215)	19,237	871	$55,016
Testing Laboratories (54138)	16,379	757	$67,236
R&D in Physical, Engineering, and Life Sciences (541712)	15,126	662	$86,320
Medical Equipment and Supplies Manufacturing (3391)	11,929	685	$54,236
Pharmaceutical and Medicine Manufacturing (3254)	10,024	117	$86,164
Other Basic Organic Chemical Manufacturing (32519)	7,567	85	$120,276
R&D in Biotechnology (541711)	4,933	333	$93,444
Pesticides, Fertilizer, and Other Agricultural Chemical Mfg. (3253)	3,144	81	$97,092
Electromedical Apparatus Manufacturing (334510)	2,026	50	$83,824
Analytical Laboratory Instruments Manufacturing (334516)	1,557	30	$76,180
TOTALS	**92,022**	**3,671**	**$69,253**

Source: Texas Workforce Commission

State Government Initiatives

Business Incentives Programs

In 2003, the Texas Legislature created the $295 million Texas Enterprise Fund (TEF), a "deal closing" fund created to attract businesses and new jobs to Texas. The Legislature reauthorized the TEF most recently in 2013. As of January 2013, the TEF has awarded over $98.1 million to biotechnology-related projects. The table on page 7 details these projects and the 11,451 jobs they have committed to create.

In 2005, the Texas Legislature founded the $200 million Texas Emerging Technology Fund (TETF) to promote the commercialization of technological innovations across multiple industries, including biotechnology. The TETF was reauthorized most recently in 2013. To date, the fund has invested approximately $287.9 million into biotechnology-related deals, with about $133.6 million going to commercialize start-up companies and $154.3 million awarded to universities and related consortiums. For a full list of TETF biotech deals, see page 33.

The Texas Emerging Technology Fund has invested $287.5 million in more than 100 biotech deals

Education & Research

In 2005, the Texas Legislature established the Texas Science, Technology, Engineering and Mathematics (T-STEM) Initiative. Modeled on national STEM programs, T-STEM focuses on educating and graduating more Texas students in STEM fields critical for maintaining a skilled, competitive state workforce. In part, T-STEM aims to more closely align high school curricula with admissions requirements for competitive colleges. Under the initiative, over 70 T-STEM Academies have been created, serving 40,000 Texas students across the state. For more details on biotech-related education, see pages 19-27.

$1.3 billion

Amount invested by venture capital firms 2008 to 2013 in 82 biotech and 79 medical device deals in Texas.
(PricewaterhouseCoopers/National Venture Capital Assn. MoneyTree Report, Data: Thomson Reuters)

Stem Cell Regulation

In April 2012, the Texas Medical Board approved new guidelines for the use of experimental stem cell therapies. The guidelines stipulate that the stem cell procedures are done for research only, that they receive approval from a public or private institutional research board, and that patients sign consent forms. Texas joins other states such as California, New York, and Illinois in the enactment of rules governing stem cell research.

Texas A&M Wins 3 year, $150,000 Cognizant STEM Grant

In December 2013, Gov. Rick Perry joined Gordon Coburn, President of Fortune 500 company **Cognizant**, in presenting the company's 3 year, $150,000 STEM grant to **Texas A&M University (TAMU)**. The grant will support the promotion of STEM education programs through TAMU's National Center for Therapeutics Manufacturing (NCTM), which will use the funding to support its **BioFORCE program** to prepare and encourage high school students to become part of the biotechnology workforce.

Cognizant President Gordon Coburn and Gov. Rick Perry

Cognizant, a global business and technology services leader with its world headquarters in New Jersey, also announced plans to move its U.S. headquarters to **College Station, Texas**. The company employs approximately 2,000 in Texas, with plans to hire more.

Texas Enterprise Fund
Biotechnology-Related Awards

Company	City	Description	Jobs	Award (Millions)
Baylor College of Medicine	Houston	Bovine gene-mapping project	N/A	$2.0
Becton, Dickinson & Co.	San Antonio	Global professional services for medical devices	296	$1.56
Cardiovascular Systems	Pearland	Arterial disease medical devices manufacturing facility	100	$0.6
Ferris Manufacturing	Fort Worth	Medical products manufacturing	100	$.45
G-Con, LLC	Bryan	Pharmaceutical manufacturing	408	$3.0
Grifols, Inc.	San Marcos	Plasma testing laboratory & fractionation plant	190	$0.5
Hanger Orthopedic Group	Austin	Headquarters relocation of orthotic and prosthetic patient care services firm	236	$1.5
Medtronic, Inc.	San Antonio	Diabetes division expansion	1,384	$6.0
Scott & White Memorial Hospital	Temple	Cancer Research Institute and other research initiatives	1,485	$7.5
Texas Institute for Genomic Medicine & Lexicon Pharma.	College Station & Houston	Genome mapping and "knockout" mouse cell line library	5,000	$50.0
The University of Texas Health Science Center at Houston, M.D. Anderson, & G.E. Healthcare	Houston	The Center for Advanced Diagnostic Imaging	2,252	$25.0
		TOTAL	**11,451**	**$98.11**

R&D Credit Regulation

In June 2013, Gov. Rick Perry signed into law HB 800, reinstating the **research and development (R&D) tax credit** for Texas companies. Although not permanent, both the sales tax exemption and research credit are extended through 2026 and are expected to be a boost to Texas manufacturing and high-technology industries, including biotechnology. The law went into effect in January 2014.

HB 800 reinstates franchise tax credits for companies conducting qualified research activities (QRAs) within the state. The new law provides Texas companies the option of selecting either a sales tax exemption on property purchased by persons engaged in QRAs or the franchise tax credit, but not both.

Texas Uniform Trade Secret Act

Effective September 1, 2013, Texas became the latest state to enact a version of the Uniform Trade Secrets Act (UTSA), leaving North Carolina, New York, and Massachusetts as the only states without some form of the law. The UTSA provides a legal framework for improved trade secret protection across industries within the United States.

The **Texas Uniform Trade Secret Act (TUTSA)** expands the definition of a trade secret under state law to include financial data and customer lists. TUTSA also reduces the cost of Texas businesses bringing lawsuits to protect their trade secrets, allowing them to recover the cost of attorney fees. Many Texas high tech industries, including biotechnology, will benefit from the TUTSA.

Medical Devices

Many of the biggest players in the medical device industry have corporate facilities in Texas. More than a dozen Fortune 1000 medical device giants alone have manufacturing or management operations in the state, including **Abbott Laboratories**, **Agilent Technologies**, **Baxter International, Becton Dickinson, CareFusion, GE**, **Johnson & Johnson**, **Medtronic**, **St. Jude Medical**, **Stryker**, **Thermo Fisher Scientific, and Zimmer**.

More than a dozen Fortune 1000 medical device giants have major operations in Texas

These companies and many others have developed a large medical device workforce in the state. Over 750 firms employ more than 15,500 workers in this sector, making Texas one of the top 10 states in the nation for the number of medical device workers.

A wide range of medical products are developed and produced in Texas, from surgical sutures and bandages to molecular biology kits and medication delivery systems. While a broad spectrum of medical specializations are served by Texas device companies, the state has developed several unique clusters, including ophthalmology, orthopedics, cardiology, diagnostics, and wound care (see page 10 for details).

In 2011, the total value of Texas medical equipment shipments exceeded $3.2 billion, with manufacturers making total capital investments of over $100 million, according to the U.S. Census Bureau.

Emerging Technology & Venture Capital

Since 2005, the state's Texas Emerging Technology Fund (TETF) has invested approximately $80 million in medical device-related deals. (See the Appendix for listings.) From 2008 to 2013, venture capital firms invested almost $482 million in 79 Texas medical device deals, according to The MoneyTree Report from PricewaterhouseCoopers and the National Venture Capital Association based on data provided by Thomson Reuters.

HVHC Grows in San Antonio

In April 2013, San Antonio-based **HVHC, Inc**., the largest wholly-owned and operated U.S. optical company, announced it was investing $25 million on a new state-of-the-art optical manufacturing plant and distribution center in San Antonio. The 120,000 sq. ft. facility, scheduled to open in early 2014, will create 600 new jobs and manufacture over two million pairs of eyeglasses annually. HVHC also operates a optical manufacturing plant in nearby Schertz, Texas. The company invested $30 million in 2009 to open it, creating about 600 new jobs.

HVHC INC. A HIGHMARK COMPANY

HVHC also announced it would be expanding its San Antonio headquarters in April 2013, creating 150 new jobs in addition to the existing 350. In 2012, HVHC relocated the corporate headquarters of its subsidiaries, national optical retailer **Visionworks (**formerly Eye Care Centers of America) and the New York-based operations of **Davis Vision**, its managed vision care arm, to downtown San Antonio.

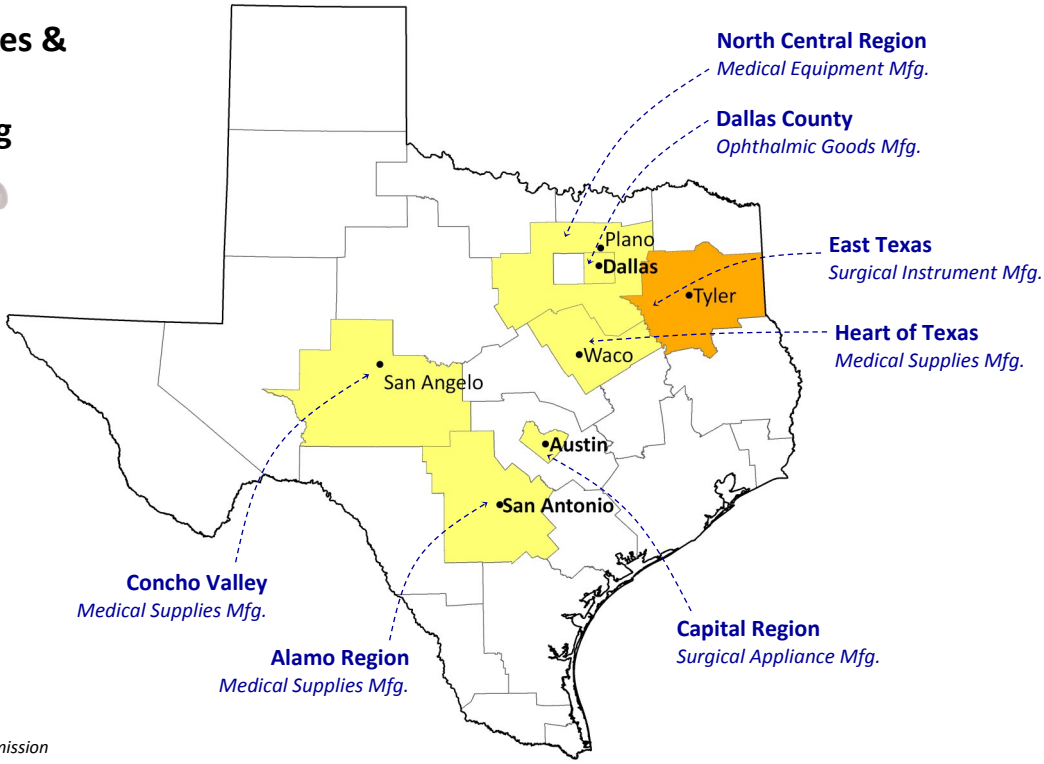
Visionworks

DAVIS VISION EYECARE REFRAMED

Workforce Concentrations

The map below identifies the state's Workforce Development regions with above-average specializations in medical equipment manufacturing. The highlighted regions are not the only areas in Texas where workers in this sector can be found, but rather represent areas with the greatest concentrations relative to the size of the local labor force. This analysis compares the portion of each Texas region's workforce employed in the sector to the portion of the entire U.S. workforce employed in that sector. The comparison provides a ratio that measures how intensively a certain region is specialized in this industry, and ranks it as "moderate," "above average," or "high."

Medical Devices & Supplies Manufacturing



Data: Texas Workforce Commission

Ottobock Healthcare Relocates North American HQ to Austin

In March 2014, German prosthetics company, **Ottobock HealthCare**, announced that it would relocate its North American headquarters from Minneapolis, Minnesota to Austin. The move is expected to bring 110 jobs and $4.6 million in investment to Texas.

Founded in Germany nearly 100 years ago, Ottobock has become one of the world's largest makers of prosthetic devices and related equipment. The company expanded into North America in 1958, creating its U.S. subsidiary, Ottobock Heathcare.

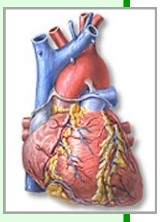
Texas Medical Device Clusters

Orthopedics

Key Products: Spinal, extremity, bone/tissue implants

Key Companies: The Austin region is home to more than 15 spinal and extremity orthopedic firms, originally anchored by the spine division of Fortune 1000 device maker Zimmer. Other orthopedic leaders in the region include **LDR Spine**, **DJO Surgical**, **Hanger Orthopedic**, and **Integra LifeSciences**. Additonally, multiple bone and tissue grafting firms, including **Zimmer Orthobiologics** and **BME,** are located in the Austin-San Antonio corridor. Further north, the Dallas/Fort Worth region is home to the U.S. HQ of Dutch orthopedic firm **OrthoFix**.

Cardiology



Key Products: Catheters, surgical instruments, prosthetic heart valves

Key Companies: The Houston metro area is a hub of cardiology R&D and startups and is the location of established cardiovascular device firms like **Merit Medical Systems, Cardionics, Millar,** and **Cardiovascular Systems**. In the Dallas/Fort Worth region, Allen-based **Atrion Corp.** and Plano-based **Argon Medical Devices** manufacture instruments for cardiovascular surgery. In Austin, prosthetic heart-valve manufacturer **On-X Life Technologies** is part of that metro area's growing cardiology sector.

Diagnostics

Key Products: Cell cultures, laboratory equipment, clinical chemicals

Key Companies: Austin is home to a cluster of cutting edge diagnostics equipment firms, including **Luminex**, **Agilent Technologies**, **Asuragen**, and **Thermo Fisher Scientific**, while the nearby San Antonio's diagnostics cluster is anchored by **Becton Dickinson**'s corporate service center and **Fujirebio Diagnostics**' facility in Seguin. The Houston and Dallas/Fort Worth regions are also home to major diagnostic product makers, including Fortune 500 giants **Thermo Fisher Scientific** in Houston and **Abbott Laboratories** in Irving.

Wound Care

Key Products: Electromedical wound equipment, mattress systems, skin dressings, bandages

Key Companies: San Antonio is home to an established wound care cluster, which includes **KCI** and **Innovative Trauma Care (ITC),** and wound and burn R&D organizations **Rochal Industries** and the **National Trauma Institute (NTI)**. Dallas/Fort Worth's concentration of wound care firms is led by **Smith & Nephew Biotherapeutics (formerly Healthpoint Biotherapeutics)**, a maker of treatments for acute, chronic, and burn-related wounds. Medical supply firms in the region include wound-dressing makers **Strukmyer Medical**, **Winfield Laboratories**, and **Ferris Manufacturing**.

Major Companies

Top 10 Medical Device & Equipment Companies with Texas Operations

By Parent Company Global Revenues

Company Name	Primary Locations	Specialization	Sales (Millions)
GE Medical Systems (General Electric)	El Paso	Cardiology products	$146,045
Ethicon (Johnson & Johnson)	San Angelo	Surgical supplies	$71,312
Alcon Research (Novartis)	Houston	Ophthalmic products	$58,831
Flextronics	Irving, Plano	Contract design & manufacturing	$23,569
Abbott Laboratories	Irving	Diagnostics	$21,848
Medtronic	Fort Worth, San Antonio	Surgical devices & diabetes mgmt.	$16,590
Baxter Healthcare	Austin	Surgical supplies	$15,259
Thermo Fisher Scientific	Austin	Diagnostics	$13,090
Stryker Communications (Stryker)	Flower Mound	Operating room equipment	$9,021
Becton Dickinson & Co.	San Antonio	Diagnostics, drug delivery	$8,054

Representative sample only. Sources: Dun & Bradstreet, company websites

Texas Focuses on Eye Care Products Manufacturing

Texas is home to a large cluster of ophthalmic goods manufacturers that produce eye care devices and medical supplies. The percentage of the Texas workforce employed in the ophthalmic goods sector is above the national average, and these workers are particularly concentrated in the Dallas/Fort Worth region. Leading firms in this cluster are highlighted below.

ALLERGAN — Waco — Lens care products

Atrion — Allen — Contact lens disinfection cases, and ophthalmic balloon catheters

DAC VISION — Garland — Lens processing supplies, such as tints and anti-reflective coats

ESSILOR — Dallas — Contact lenses and lens coatings

HOYA — Lewisville — Eyeglass lenses

HVHC INC. A HIGHMARK COMPANY — San Antonio — Eyeglasses

OCuSOFT — Rosenberg — Optical tools, surgical supplies, and contact lens accessories

TruForm OPTICS — Bedford & San Antonio— Contact lenses

Pharmaceuticals

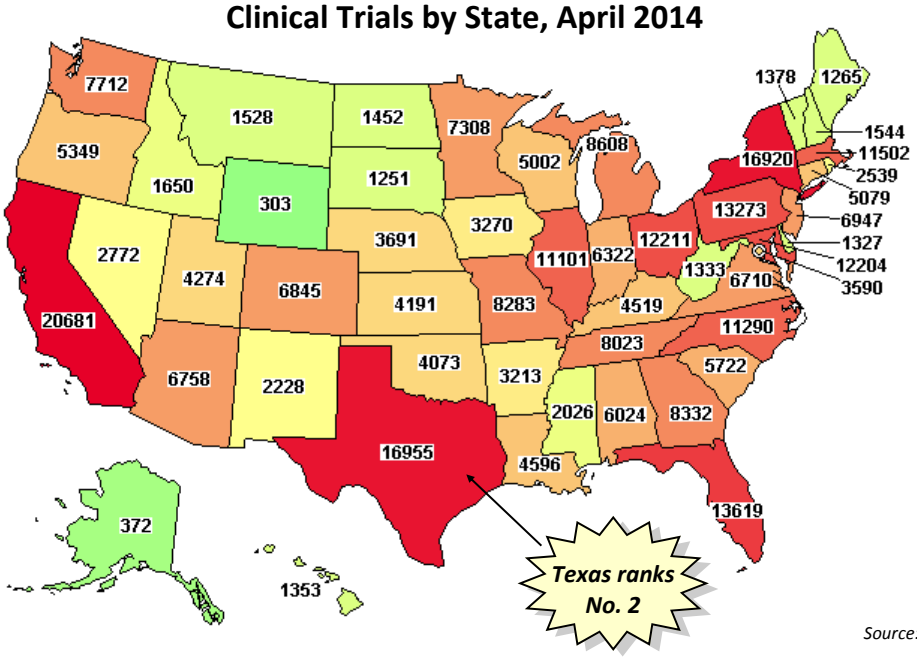
A growing list of global pharma companies have established research and production facilities in Texas, including California-based **Allergan**, Pennsylvania-based **Mylan Instrumental**, and Switzerland's **Lonza**. Additionally, Texas has also fostered the headquarters of homegrown pharmaceutical successes like Fort Worth's ophthalmic leader **Alcon Laboratories** and wound care innovator **Smith & Nephew Biotherapeutics** (formerly Healthpoint Biotherapeutics). These companies and many others have developed a substantial pharmaceutical manufacturing workforce in the state. Approximately 120 firms now employ more than 10,000 workers in the sector, making Texas one of the top 10 states in the nation for number of pharmaceutical manufacturing workers.

In 2011, the total value of Texas pharmaceutical shipments approached $4.8 billion, with manufacturers making total capital investments of over $80 million, according to the U.S. Census Bureau.

Texas pharmaceutical companies employ more than 10,000 skilled workers

Texas is also a leading pharmaceutical research state. In April 2014, Texas ranked second nationally for number of clinical trials, with more than 16,900 studies underway, according to the National Institutes of Health (see map below). In addition, many of the world's leading clinical trial and contract research firms have operations across Texas, including **PPD**, **Covance**, **Quintiles**, **INC Research**, and **Radiant Research**.

Clinical Trials by State, April 2014



Source: NIH ClinicalTrials.gov

Workforce Concentrations

The map below identifies the state's Workforce Development regions with above-average specializations in pharmaceutical manufacturing. The highlighted regions are not the only areas in Texas where workers in this sector can be found, but rather represent areas with the greatest concentrations relative to the size of the local labor force. This analysis compares the portion of each Texas region's workforce employed in the sector to the portion of the entire U.S. workforce employed in that sector. The comparison provides a ratio that measures how intensively a certain region is specialized in this industry, and ranks it as "moderate," "above average," or "high."

Pharmaceutical & Medicine Manufacturing

Data: Texas Workforce Commission

Allergan Celebrates 25 Years in Waco with $10.6 Million Expansion

In February 2014, specialty pharmaceuticals giant **Allergan** announced a $10.6 million expansion investment in its Waco, Texas manufacturing facility. The 22,000 sq. ft. addition will include new manufacturing technology and increased production capacity to support a new eye product line. Allergen is expected to create 20 to 30 new jobs in addition to its then current workforce of approximately 640.

2014 also marks the 25th anniversary of the start of Allergan's Waco, Texas plant's operations. Since beginning operations in 1989, the site has seen significant growth and expansion, including the facility's 2003 expansion to consolidate the company's North American operations, which now include skin care products, and the 2011 announcement of $89.5 million in capital investment.

California-based Allergan is a Fortune 500 company with a diverse array of pharmaceutical, biological, and medical device products.

Major Companies

Top 10 Pharmaceutical Companies with Operations in Texas

by Parent Company Global Revenues

Company Name	Primary Location	Specialization	Sales (Millions)
Alcon (Novartis)	Fort Worth	Ophthalmics	$58,831
Mylan	Sugar Land	Generic Pharmaceuticals	$6,909
Allergan	Waco	Ophthalmics	$6,300
Smith & Nephew Biotherapeutics (Formerly Healthpoint Bioth.)	Fort Worth	Dermatology	$4,351
Lonza Houston (Lonza)	Houston	Viral vectors	$4,294
NBtY	San Antonio	Vitamins	$3,163
Galderma Laboratories	Fort Worth	Dermatology	$1,590
PPD	Austin	Pharmaceutical R&D	$1,156
Virbac Corp.	Fort Worth	Veterinary care	$918
ALK-Abello	Round Rock	Allergies	$415

Representative sample only. Sources: Dun & Bradstreet, company websites

GlaxoSmithKline and Texas A&M Building $91 Million Flu Vaccine Plant in Texas

In March 2013, Gov. Rick Perry announced the U.S. Department of Health & Human Services (DHHS) had approved the establishment of a $91 million influenza vaccine manufacturing facility in Bryan-College Station, Texas. **GlaxoSmithKline (GSK)** and **Texas A&M University (TAMU) System** are partnering to create the state-of-the-art plant, which will anchor the **Texas A&M Center for Innovation in Advanced Development and Manufacturing (CIADM)** and play a major role in securing the country from bio-terrorism and global pandemics. The facility is projected to bring in more than $41 billion in expenditures and add over 6,800 direct and indirect jobs to the state.

Dr. Robin Robertson, DHHS; Gov. Rick Perry; Dr. Brett Giroir, TAMU

The announcement builds on significant investments the state has made to elevate Texas to the forefront of biotech R&D, as well as previous developments, including the June 2012 selection of TAMU to lead one of three national biodefense centers, in partnership with GSK and others. This new plant furthers Texas' position as the "third coast" of the biopharma industry.

Fortune 1000 Company NBTY Manufactures Vitamins in San Antonio

In October 2013, Fortune 1000 company, **NBTY,** opened its state-of-the-art vitamin manufacturing facility in San Antonio, Texas. NBTY's new facility, which will produce vitamins for brands such as Nature's Bounty, Disney, and Sundown Naturals, is its first in Texas. The plant will consolidate the manufacturing of NBTY's gummy vitamins and is expected to create over 100 jobs. NBTY spent approximately $6 million to upgrade and remodel a former candy factory and warehouse.

New York-based NBTY is the nation's leading vertically integrated manufacturer, marketer, distributor and retailer of high-quality vitamins, nutritional supplements, and related products. The company has worldwide operations and employs over 14,000.

Texas-Made Pharmaceutical Products

A wide variety of consumable pharmaceuticals and pharmaceutical products are manufactured in Texas. Below are a few examples of leading products, ranging from Alcon and Allergan's eye care products to Pernix's pediatric products.

Opti-Free lens care

DUOTRAV glaucoma treatments

Refresh and Latisse eye care products

Allclenz and Curasol wound care products

MirVana miRNA isolation kit

Sundown and Disney gummy vitamins

Pediatric pharmaceutical products

Advanced Pharmaceutical Clusters in Texas

Biodefense & Pandemic Preparedness

Biodefense technologies are designed to inoculate citizens against infectious agents that may be used in an attack and to detect biological, chemical, or nuclear attacks. In addition, technologies can make urgently needed treatments easier to administer on the battlefield or during a civilian crisis.

Key Texas Research Centers: The University of Texas Medical Branch (UTMB) **Center for Biodefense and Emerging Infectious Diseases** houses a Biosafety Level-4 lab in Galveston, as does the privately run **Texas Biomedical Research Institute** in San Antonio. Texas A&M's **Center for Innovation in Advanced Development & Manufacturing (CIADM)** in College Station serves as one of three federally designated biodefense centers.

Key Companies: In Austin, **1st Detect** designs products to detect chemical warfare agents and explosives, while **Inview Technology**'s cameras operate the short wave infrared spectra beyond human visibility for applications ranging from military and defense to microscopy and life sciences. Houston-based **Pulmotect**, develops therapies to boost human immune systems against bioterror agents like anthrax that attack the lungs. College Station-based **G-CON** makes self-contained clean room pods that can be used for drug development and biomanufacturing.

Vaccines

Vaccines improve the body's resistance to disease by introducing weakened forms of a disease-causing organism. Researchers are continuing to discover new applications for vaccines, as well as methods to improve production capabilities and delivery systems.

Key Texas Research Centers: Texas A&M's **National Center for Therapeutics Manufacturing (NCTM)** and **CIADM**, two new facilities soon to be national leaders in vaccine development and manufacturing. UT San Antonio's **South Texas Center for Emerging Infectious Diseases**, focused on vaccine development and infectious diseases.

Key Companies: In Houston, TETF awardee **Bellicum Pharmaceuticals** is developing oncological therapies, including a vaccine for prostate cancer, while Austin-based **Astrogenetix** uses biomarkers developed in the microgravity of space to develop vaccines for salmonella. Globally headquartered in Denmark, pharmaceutical company **ALK Abello** has its U.S. headquarters in Round Rock, just north of Austin, and is a leader in the development of allergy vaccinations, which are designed to reduce and potentially eliminate the effects of an allergic reaction.

Personalized Medicine

Personalized medicine uses individual genetic information to prevent disease, choose medicines, and make other decisions about health. Researchers are interested in the use of gene-based tests to match patients with optimal drugs and dosages.

Key Texas Research Centers: **The University of Texas M.D. Anderson Cancer Center**'s **Sheikh Khalifa Bin Zayed Al Nahyan Institute for Personalized Cancer Therapy,** located in Houston, is a leader in the field. The **Texas A&M Institute for Genomic Medicine**, with the world's largest library of mouse knockout embryonic stem cells, is advancing personal medicine at the genomic level.

Key Companies: Austin houses a cluster of personalized medical companies including **Asuragen**, an Ambion spinoff and leader in personalized molecular diagnostics; **Luminex**, which offers a range of diagnostics and research assays throughout the areas of infectious diseases, human genetics, and personalized medicine; and **NanoMedical Systems**, which is developing its implantable Personalized Molecular Drug-delivery System to improve the long-term release of therapeutic agents. Dallas-based **Caris Life Sciences** is a leading provider of pathology technologies and offers customized molecular profiles of patient tumors to facilitate effective treatments. Irving-based **Miraca Life Sciences** specializes in the development and commercialization of the highest quality anatomic pathology services.

Regenerative Medicine

Research institutions are gaining the capability to create personalized organs in the laboratory that match a patient's specific genetic makeup, relieving the pressure of finding a donor.

Key Texas Research Centers: Texas A&M's Health Science Center's **Institute for Regenerative Medicine** is an A&M joint venture with Scott & White Hospital and the Temple Bioscience District that received $5 million in TETF funding. Baylor College of Medicine's **Stem Cells and Regenerative Medicine (STaR) Center** focuses on stem-cell stimulation to regenerate tissues and the use of stem cells to repair damaged tissue. The **Armed Forces Institute of Regenerative Medicine (AFIRM)** at Fort Sam Houston in San Antonio advances therapies for injured veterans and service members.

Key Companies: Austin-based **SpineSmith** designs, develops, and markets implants and biologics for surgical fixation, correction, and tissue regeneration of the spine. SpineSmith subsidiary **Celling Biosciences**, also Austin-based, develops tissue regeneration therapies utilizing adult stem cells, focusing its R&D on the areas of orthopedics, cardiovascular systems, trauma, and diseases. San Antonio area-based **Targazyme (FKA America Stem Cell)** and College Station-based **BLAST Therapeutics** are developing technologies to expand the therapeutic potential of bone marrow-derived stem cells.

Biomedical Research

Research and development (R&D) is the lifeblood of the biotechnology industry. In Texas, the R&D pipeline is supplied in part by the state's vast network of public universities and health-related institutions, which invest heavily in R&D and intellectual property generation. In fiscal year 2013 alone, Texas public institutions of higher education expended over $2.6 billion on medical and life sciences research, accounting for over 60% of all higher education R&D expenditures in the state.

Public investment in biotechnology research is complemented by the state's substantial cluster of private sector R&D activity. Texas is home to over 990 private scientific R&D firms that employ more than 20,000 workers. Many of the largest private biotechnology R&D firms in the world have operations in Texas, including **PPD**, **Covance**, **Quintiles**, **INC Research**, **inVentiv Health Clinical**, and **Radiant Research**. These firms have helped make the state a hub of clinical trials and other breakthrough research.

In 2013, Texas public institutions expended over $2.6 billion on life science R&D

In addition to R&D facilities, Texas has more than 1,600 medical and testing laboratories, which include blood, pathology, imaging, diagnostics, and device testing facilities. These laboratories employ more than 35,600 in Texas. Major laboratory firms in the state include LabCorp's **Esoterix** subsidiary, Becton Dickinson's subsidiary **BD Diagnostics**, and Spanish biological product firm **Grifols**.

Texas is also a leader in cancer research. Major institutions in this field include **MD Anderson Cancer Center** in Houston, **Scott & White Healthcare Cancer Institute** in Temple, and Dallas-based **Texas Oncology** and **Mary Crowley Cancer Research Centers**. Additionally, the **Cancer Prevention and Research Institute of Texas (CPRIT)**, a $3 billion state-funded initiative based in Austin, has been instrumental in expanding Texas cancer research.

Texas in Top Tier for Biotech-Related Doctorates

In 2011, the National Science Foundation ranked Texas among the top tier of U.S. states for number of doctorates awarded in biotech-related fields:

- #3 for **all Doctorates** Awarded
- #1 for **Agricultural Sciences** Doctorates
- #5 for **Health Sciences** Doctorates
- #3 for **Life Sciences** Doctorates
- #3 for **Biological/Biomedical Sciences** Doctorates

Biotech Education in Texas

Number of Biotechnology-Related Degrees Awarded, 2009-2013

All Texas Public Universities, All Degree Levels

Biological and Biomedical Sciences		32,312
Healthcare Professionals and Technicians		21,239
Plant and Agricultural Sciences		8,418
Animal Sciences		4,098
	TOTAL	**66,067**

Source: Texas Higher Education Coordinating Board

Top Ten Texas Institutions for Biomedical R&D

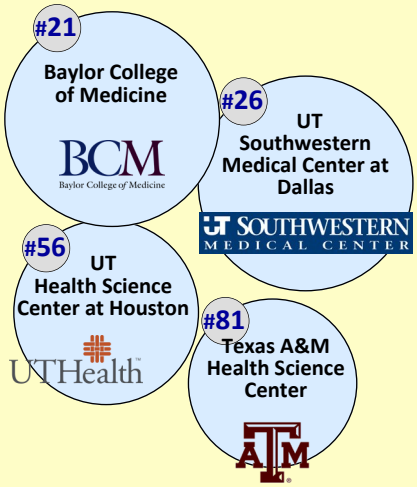
by FY 2013 Expenditures

Institution	Total R&D (Millions)
Univ. of Texas (UT) M.D. Anderson Cancer	$670.5
Baylor College of Medicine-Houston	$481.8
UT Southwestern Medical Ctr. at Dallas	$404.3
UT Health Science Center (HSC) at Houston	$220.1
Texas A&M University	$201.6
UT Health Science Center at San Antonio	$156.4
UT Medical Branch (UTMB) at Galveston	$144.7
The University of Texas at Austin	$80.9
Texas A&M Health Science Center	$75.4
Texas Tech University Health Science Ctr.	$61.0
TOTAL	**$2,496.7**

Source: Texas Higher Education Coordinating Board

Texas Places Four Research Medical Schools in Top 100

In 2014, *U.S. News & World Report* ranked the nation's top 100 research medical schools. Texas landed four schools on the list:

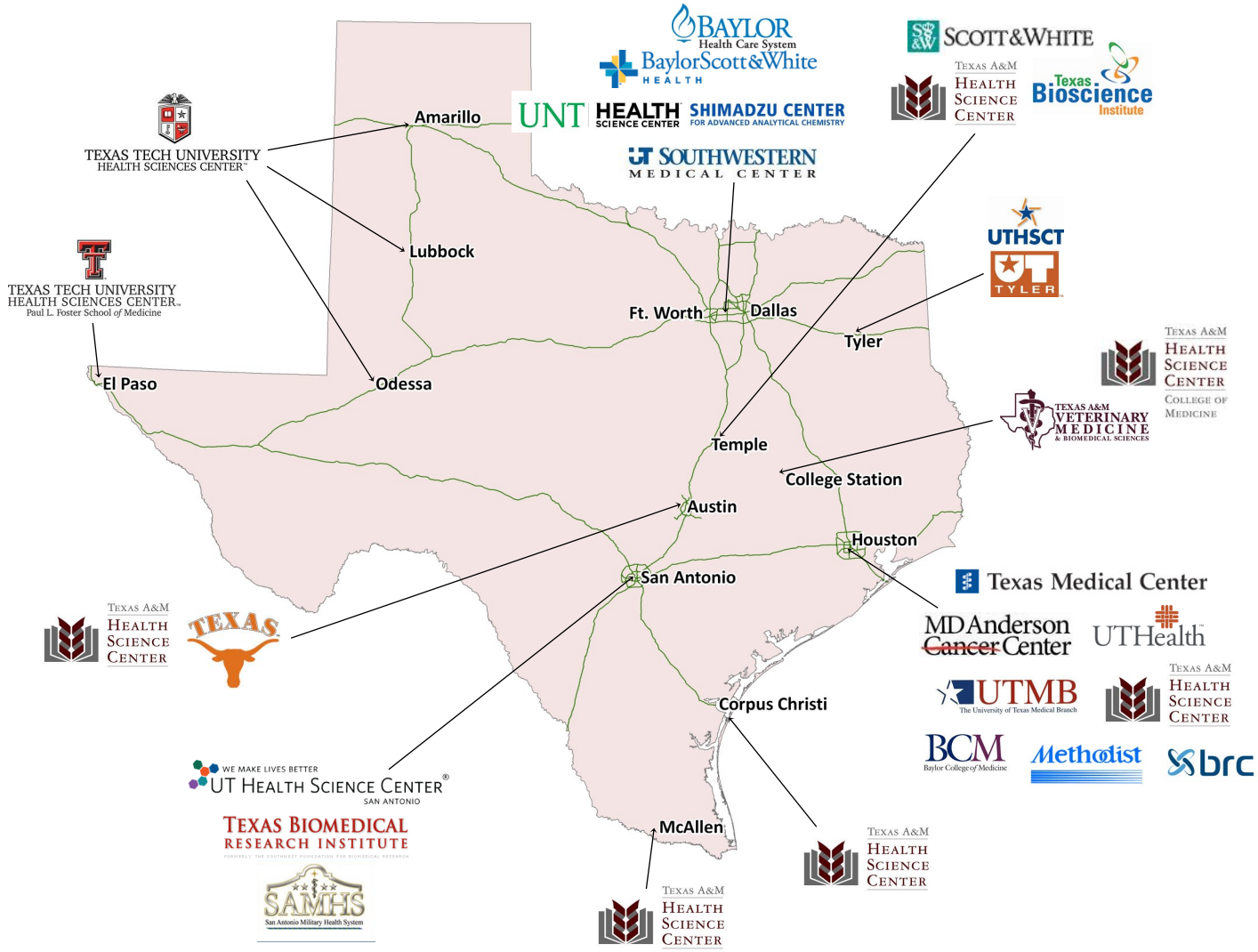


In 2012, the latest data available, the **University of Texas** (UT) ranked No. 2 nationally for the number of pharmaceutical-related patents earned by a university (Class 424—Drug, Bio-Affecting and Body Treating Compositions), behind only the University of California, according to the U.S. Patent and Trademark Office.

Research Centers

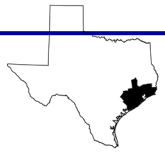
Texas is home to top-ranked biotechnology and medical research institutions, federally designated centers, innovative research collaborations, and some of the world's largest medical complexes. A number of the most ambitious Texas medical center expansions are a result of the U.S. Department of Defense's (DoD) 2005 military base realignments across the nation, which consolidated military medical facilities in San Antonio. A sampling of military, university, and private medical research facilities are profiled regionally on the following pages. The map below provides a broad snapshot of some of the state's major medical-related research centers and nine medical schools.

Texas Medical Schools & Selected Medical Research Centers



Due to space limitations, not all institutions are included.

HOUSTON/GULF COAST



World's Largest Medical Center Keeps Growing in Houston

The **Texas Medical Center (TMC)** in Houston is the world's largest medical center with over 49,000 life science students and 106,000 employees, housed on 1,345 acres.

The TMC has a total budget of $15 billion encompassing its 54 member institutions, comprised of hospitals, schools, and other specialty institutions, include **Baylor College of Medicine**, **UT M.D. Anderson Cancer Center (MDACC)**, **UT Health Science Center**, **the University of Houston (UH)**, **Rice University**, **Texas A&M University Health Science Center**, **The Methodist Hospital**, and **Texas Children's Hospital**.

The TMC plans $7.1 billion in capital investment through 2014, including the $1 billion **Baylor Clinic and Hospital.** In 2013, TMC member MDACC began a $198 million hospital renovation and expansion project that will add 185,000 sq. ft. by 2016.

In 2012, the TMC added four new members: DePelchin's Children's Center; The Menninger Clinic; Sabin Vaccine Institute; and UH Victoria School of Nursing.

UTHealth Ranks 6th Largest Medical School in the Nation

Located in Houston's TMC, the **University of Texas Health Science Center at Houston (UTHealth**) is the largest of the state's nine medical schools and focuses primarily on graduate education and research.

- Has over 10,000 faculty, staff, students, and residents, and educates more healthcare professionals than any other Texas institution
- Conferred more than 1,370 degrees and spent over $220 million for research in FY 2013

BCM Top Ranked for R&D

The **Baylor College of Medicine (BCM) in Houston**, located in Houston's TMC, is the state's only private medical school.

- Had research support of $481 million in FY 2013 and currently trains over 3,000 students, including residents and post-doctoral fellows
- Ranked as one the nation's top 25 medical schools for research by *U.S. News & World Report* in 2014
- Ranked 2nd nationally in federal funding for R&D in the biological sciences at universities by the NSF

UTMB at Galveston Fights Infectious Diseases

The University of Texas Medical Branch (UTMB) at Galveston was established in 1891, making it the oldest of UT Systems' four medical schools. UTMB has developed a strong program in infectious disease research with several facilities devoted to that field.

utmb Health

Working together to work wonders.™

- Has over 2,500 students and 1,000 faculty with total research expenditures of $144.7 million in FY 2013
- Became a member of Houston's Texas Medical Center in 2010
- Serves as one of the nation's 11 federal Regional Centers of Excellence for Biodefense and Emerging Infectious Diseases Research (CBEID), for the Western Region. The **CBEID at UTMB Galveston** was established by the National Institutes of Health (NIH) in 2002. The CBEID serves as the lead institution for participating academic institutions in the Western Region, a five-state area that includes Louisiana, Arkansas, New Mexico, and Oklahoma.
- One of the nation's two National Biocontainment Laboratories is located at UTMB. The **Galveston National Laboratory (GNL)** was established with grants awarded by the NIH's National Institute of Allergy and Infectious Diseases (NIAID). The GNL conducts research to develop therapies, vaccines, and diagnostic tests for naturally occurring emerging diseases such as SARS, West Nile encephalitis, and avian flu, as well as for microbes that might be employed by terrorists.
- In 2003, the UTMB CBEID was awarded a $110 million NIH grant to establish the **Robert E. Shope Laboratory**, a Biosafety Level 4 facility. The lab opened in 2004 and is the first full-sized facility of its kind in the nation to be located on a university campus.

UT System Plans New Medical School in South Texas

In July 2013, Gov. Rick Perry signed Senate Bill 24, merging UT Pan American and UT at Brownsville to create UT Rio Grande Valley and creating a new medical school at UT Rio Grande Valley. In November 2013, the UT Board of Regents approved $196 million in funding for the new **UT Rio Grande Valley medical school.**

The UT Rio Grande Valley medical school is scheduled for completion in 2018. Its facilities will be located in Cameron and Hidalgo counties in South Texas.

The University of Texas Rio Grande Valley

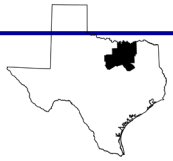
Catholic Health Initiatives Partners with Texas Heart Institute and BCM

In January 2014, **Catholic Health Initiatives (CHI)**, one of the nation's largest health systems, announced a new affiliation with **Texas Heart Institute** which calls for a 10-year investment in the renowned institution to expand education and research into cardiovascular diseases.

That same month, CHI and **Baylor College of Medicine (BCM)** announced that CHI St. Luke's Health (formerly St. Luke's Health System) will partner with BCM in a joint venture for a new hospital on Baylor's McNair Campus in Houston which will replace the current CHI St. Luke's hospital in the TMC by 2018. In addition, CHI and Baylor have signed an agreement to collaborate on educational and research initiatives.

CHI St. Luke's Health · Texas Heart Institute · Baylor College of Medicine

NORTH TEXAS



Southwestern Medical District Expansions

The **Southwestern Medical District (SMD)** in Dallas is a 390-acre medical complex that is home to world-class biomedical research organizations employing nearly 28,000. Member institutions include University Hospital-St. Paul, University Hospital-Zale Lipshy, Children's Medical Center Dallas, and Parkland Health & Hospital System. Planned SMD expansions include a new $1.27 billion **Parkland hospital campus** and a new $800 million state-of-the-art **University Hospital**.

One of the world's top academic medical centers, **the University of Texas Southwestern Medical Center (UTSWMC)**, is also located at SMD. UTSWMC alone employs 12,100 and trains over 4,600 students annually.

- Ranked No. 26 for best U.S. research medical schools in 2014 by *U.S. News & World Report*
- Its Harold C. Simmons Cancer Center is a National Cancer Institute designated cancer center, a distinction held by only the top-tier cancer centers nationwide
- UTSWMC's outstanding faculty has included six Nobel Prize recipients since 1985. In 2013, Dr. Thomas Sudhof won a Nobel award in Medicine for work he began at SWMC and continued at Stanford.

University of North Texas Leads Osteopathic Research

The **Texas College of Osteopathic Medicine (TCOM)** is located at the University of North Texas HSC in Fort Worth. It is the state's only osteopathic medical school.

- Has over 2,146 students and faculty members
- Approximately 65% of TCOM's graduates practice primary care medicine, helping reduce the statewide and nationwide shortage
- Ranked as one of the nation's top 50 medical schools for primary care by *U.S. News & World Report*
- TCOM's Osteopathic Research Center is a national research program that studies the clinical effectiveness of osteopathic manipulative medicine

SOUTH TEXAS

UTHSC at San Antonio Spurs Local Biotech Industry

The **University of Texas Health Science Center (UTHSC) at San Antonio** is one of the UT System's four medical schools.

- Over 4,100 students enrolled on eight campuses in San Antonio, Harlingen, Edinburg, and Laredo
- Managed $156.4 million in annual research related activities in FY 2013
- In February 2014, CPRIT announced a $1.6 million grant to support training programs at the UTHSC's Cancer Therapy & Research Center (CTRC), which is a National Cancer Institute-designated cancer center

Military Medical System Grows in San Antonio

In September 2011, U.S. Air Force and Army officials activated the **San Antonio Military Health System (SAMHS)**, which provides oversight for all military treatment facilities and the healthcare needs of approximately 240,000 DoD beneficiaries in the San Antonio area.

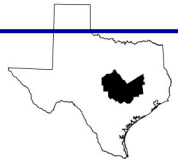
Managing a $1.2 billion budget with 12,000 staff, SAMHS healthcare services are provided by the San Antonio Military Medical Center (SAMMC), a Level 1 trauma center and the DoD's largest inpatient hospital; Wilford Hall Ambulatory Surgical Center (WHASC), the DoD's largest outpatient ambulatory surgery center; a Burn Center; a Cardiac Catheterization Lab; and much more.

San Antonio Thrives as Hub of Private Sector Scientific R&D

Since 1947, San Antonio's **Southwest Research Institute (SwRI)** has provided contract R&D services to industrial and government clients across industries, which today include biotechnology and medicine. SwRI's headquarters facility employs over 2,800 workers and occupies over two million square feet of office and laboratory space across 1,200 acres. SwRI's 2013 revenues exceeded $592 million and, in 2013, the organization dedicated $6.7 million to fund 80 internal research programs, separate from contract client projects.

The **Texas Biomedical Research Institute**, SwRI's sister institution located on an adjacent 200 acre campus, is one of the world's leading independent biomedical research institutions. Texas Biomed has a nearly $55 million annual budget and employs approximately 400 people. The institute is home to the Southwest National Primate Research Center and the world's largest colony of baboons for biomedical research; the nation's only privately owned biosafety level 4 laboratory; and the AT&T Genomics Computing Center, the world's largest computer cluster devoted to human genetic and genomic research.

CENTRAL TEXAS



UT Austin Breaks Ground on Dell Medical School Campus

In April 2014, the **University of Texas at Austin** broke ground on the 515,000 sq. ft., $334 million campus for the **Dell Medical School**. UT Austin's medical school will be part of the City of Austin's new medical district. It is scheduled to admit its first class in 2016.

The UT Board of Regents approved funding for the UT Austin medical school in May 2012. In November 2012, Travis County voters approved property tax increases in support of healthcare initiatives for Central Texas, including $35 million annually for a medical school. The Michael and Susan Dell Foundation pledged $50 million over ten years and earned the right to name the school.

Seton Healthcare, partnering with UT, plans to build a new $295 million teaching hospital on a new medical campus adjacent to the UT Austin's campus, replacing the current building housing the University Medical Center Brackenridge. The hospital is scheduled to open in 2017.

Dell Medical School, Artistic Rendering

UT Austin Biotech Institutions

The University of Texas at Austin (UT Austin) is one of the nation's largest universities and one of Texas' three Tier One research universities. UT Austin has a number of biotechnology-related divisions, institutes, and centers. Selections are highlighted below.

DRUG DYNAMICS INSTITUTE

The DDI was established in 1974 as a multi-disciplinary research center where scientists, educators, businesses and regulatory specialists collaborate in finding solutions to a wide range of biomedical, pharmaceutical, and public health issues.

IRC Imaging Research Center

Opened in 2012, the IRC, previously known as the Neuroscience Imaging Center, received a $3.5 million TETF award in 2007 to establish a center to study cognitive brain functions using Magnetic Resonance Imaging (MRI) technology.

Institute for Cellular & Molecular Biology | icmb

Established in 1993, the ICMB is a multidisciplinary center of excellence for biotechnology whose goal is to promote cell and molecular biology research and education. The Institute conducts fundamental research into the basic processes of living cells and tissues, which is crucial to future advances in medicine and biotechnology.

Biotech Collaborative in Bryan-College Station

In June 2011, the **Texas A&M University System (TAMU)**, in conjunction with **The Research Valley Partnership,** unveiled a master planned center in Bryan-College Station, Texas for education, research, development, commercialization, and the production of biotechnology products and therapies, including pharmaceuticals and vaccines.

Branded as the **BIO Research Valley** and **Biocorridor**, and anchored by TAMU, one of the nation's top research institutions, the Biocorridor intends to become the nation's premier destination for the discovery of new therapies, pre-clinical trials, and manufacturing—all in one location**.** The Biocorridor's interdisciplinary collaborations and research will encompass humans, animals, and plants.

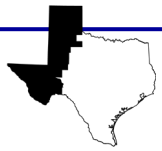
Participating Biocorridor research facilities include the TAMU Health Science Center, the TAMU College of Veterinary Medicine and Biomedical Sciences (CVM), TAMU AgriLife, the Texas Engineering Extension Service, the TAMU Institute for Preclinical Studies (TIPS), TAMU Institute for Genomic Medicine (TIGM), and TAMU's National Center for Therapeutics Manufacturing (NCTM). Companies include G-CON and Caliber Biotherapeutics.

Bioscience Research District in Temple

The city of Temple has built a unique health and bioscience industry cluster around local academic, medical, and research facilities.

- In 2003, the **Temple Health & Bioscience District** (THBD) was created through unique state legislation and the approval of local citizens.
- The THBD's **Scott & White (S&W) Cancer Research Institute** (CRI) opened in 2005, as part of a joint development agreement with S&W and led by renowned cancer researcher Dr. Arthur Frankel.
- The **Texas Bioscience Institute** (TBI) opened in 2006 to prepare students to enter the bioscience and medical industries. The Institute was created with funding from the U. S. Department of Labor, the city of Temple, and S&W.
- In 2007, the expansion of the **TAMU HSC College of Medicine** brought a new campus and four-year medical school to Temple and **Scott & White Memorial Hospital (SWMH).**
- In 2007, the State of Texas announced a **$7.5 million TEF grant to SWMH** to increase critical research initiatives and generate nearly 1,500 jobs during the next decade.
- In 2008, the city of Temple joined THDB and its partners to promote redevelopment plans for a **Temple Medical & Education District (TMED)**.
- In 2009, the State of Texas announced a **$5 million TETF grant** to recruit leading scientist **Dr. Darwin Prockop** as the founding director of **TAMU HSC College of Medicine's Institute for Regenerative Medicine** at **S&W**. The Institute uses adult stem cells to develop new therapies.
- In 2010, the **Temple Bioscience Accelerator** was created to develop new bioscience companies in the region.
- In 2011, the THBD approved funding the **THBD Scholars Research Program,** with cash awards going to outstanding undergraduate students to study and work in THBD facilities. The program began sponsoring students in 2012.

WEST TEXAS



El Paso Home to Texas' Newest Medical School

The **Paul L. Foster School of Medicine** at **Texas Tech University Health Sciences Center** at El Paso (PLFSOM) opened in 2009, making it the state's newest medical school.

- Has over 1,700 faculty and staff members
- Is the only four-year medical school on the U.S./Mexico border and operates a Border Health Research program
- Centers of Excellence in Cancer, Infectious Diseases, and Neurosciences have received funding from CPRIT and the NIH
- Partners include the William Beaumont Army Medical Center (WBAMC) at Fort Bliss

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
Paul L. Foster School of Medicine

TTUHSC Leads Medical Training and Research in West Texas

Texas Tech University Health Sciences Center (TTUHSC), is based in Lubbock with satellite campuses in Abilene, Amarillo, El Paso, Lubbock, Midland, Odessa, and Dallas/Fort Worth.

- TTHUSC system includes two medical schools, two nursing schools, a pharmacy school, a graduate school of biomedical sciences, and a school of allied health sciences
- Managed over $61 million in annual research related activities in FY 2013
- Has trained over 10,000 health professionals to date
- Serves the health care needs of more than 2.5 million people who live throughout a vast 108-county area in West Texas

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER™

EAST TEXAS

World-Class Pulmonary Research in East Texas

The **University of Texas Health Science Center at Tyler (UTHSCT),** which does business as **UTHealth Northeast,** is a world-renowned center of pulmonary and infectious disease treatment and research.

- Managed $11.5 million in annual research related activities in FY 2013
- Has more than 20 outpatient clinics, a hospital, and an emergency care center
- Its graduate medical education programs – with residencies in family medicine and occupational medicine – provide doctors for the Northeast Texas region
- Offers residency programs in family medicine and occupational medicine, as well as master's degree programs in biotechnology and environmental science
- Is the program sponsor of a residency program in internal medicine at Good Shepherd Medical Center in Longview
- Partner to the Heartland National TB Center, which is located at the Texas Center for Infectious Disease in San Antonio and is one of the nation's four regional training and medical consultation centers for tuberculosis

UTHEALTH NORTHEAST

Animal & Agricultural Biotech

Animal biotechnology focuses on the genetic improvement of domesticated animal species, including cloning, selective breeding, artificial insemination, and genetic engineering. Crop biotechnology research is centered on increasing yields by making plants stronger and more resistant to pests and environmental stresses, as well as by developing biopesticides, herbicides, and other crop protections.

Texas is the nation's No. 1 cotton producer and 85% of the state's cotton crop is genetically modified.

-U.S. Dept. of Agriculture

Texas is a natural choice for agricultural biotechnology business as the nation's leading producer of cattle and cotton and the No. 3 overall producer of agricultural products, behind California and Iowa. The Lone Star State is also home to world-class agricultural education and research facilities, particularly through the Texas A&M and Texas Tech University Systems, as well as established agricultural feedstock and chemicals manufacturing industries concentrated in the Texas Panhandle and Gulf Coast regions. In 2013, over 3,100—or approximately one out of every 9 U.S. agricultural feedstock and chemicals industry employees—worked in Texas.

Leading Texas Research Centers

Texas has been at the forefront of animal and agricultural research for over 100 years. For decades, Texas A&M University has led the nation in graduating more students in animal and agricultural-related fields than any U.S. institution. Below are profiles of some of the state's leading public research centers for agricultural and animal sciences.

Texas A&M AgriLife Research

Established in 1887, AgriLife Research is the state's premiere R&D agency in agriculture, natural resources, and the life sciences. It has a 13 statewide regional centers and 1,700 employees, of which over 500 are doctoral-level researchers.

Texas Tech Univ., Animal & Food Sciences Dept., Burnett Center for Beef Cattle Research

Since 1984, Burnett Center scientists have contributed extensively to human knowledge of beef cattle feeding and management. Major research areas include animal growth and composition, beef cattle nutrition, and the environmental sustainability of cattle production.

Texas A&M, College of Veterinary Medicine and Biomedical Sciences

Operating over 90 years, the college focuses a number of disciplines including infectious diseases, toxicology and environmental health science, cardiovascular sciences, neurosciences, and reproductive biology. The college is one of only 31 colleges of veterinary medicine in the U.S. and Canada.

Texas A&M, Dept. of Soil & Crop Sciences

The department is one of the largest such facilities in the world and has a global reputation. It works to develop technologies to sustain environmentally sound and economically profitable production systems, as well as to promote the wise use and management of soil, plant, and water resources.

Agribusiness Industry Leaders Invest in Texas Cotton R&D

Because Texas is the nation's largest producer of cotton, the state is a natural location for the R&D operations of Fortune 500 agribusiness firm **Monsanto**. In fact, the Missouri-based company has nine locations in Texas, including a research farm outside of Lubbock and testing centers in Haskell and near Corpus Christi.

In December 2010, Monsanto opened its newest Texas facility, the $10.5 million **Texas Cotton Breeding and Technology Center,** in Lubbock. Monsanto's new "research megasite" exemplifies its commitment to the Texas cotton industry and to developing varieties adapted to the region, which produces more cotton than any other state.

Monsanto's Cotton Breeding & Tech. Center

"Cotton is big in Texas," said Ted Crosbie, Vice President for Global Plant Breeding at Monsanto. "That's why we built this megasite in Lubbock. This will be our main cotton breeding center."

Monsanto, however, is not the only global agricultural biotech firm in Texas. Since 1998, German conglomerate **Bayer** has operated its **CropScience** division's global cotton headquarters in Lubbock. The site focuses on providing cotton growers with products to meet global demand for cotton fiber. The company maintains a state-of-the-art R&D lab, two breeding stations, a seed processing plant, a seed warehousing facility, and supports two of its global cotton seed brands, Stoneville and FiberMax, in Lubbock.

Monsanto and Bayer CropScience have developed cotton R&D partnerships with Texas universities, including two of the state's leading research institutions, **Texas Tech University (TTU)** and **Texas A&M University**. Monsanto offers technology internships to TTU students and has donated cotton genetic materials for R&D and breeding purposes to TAMU AgriLife Research. Bayer CropScience and TTU have been working together to develop new cotton technology. (See collaboration details below.)

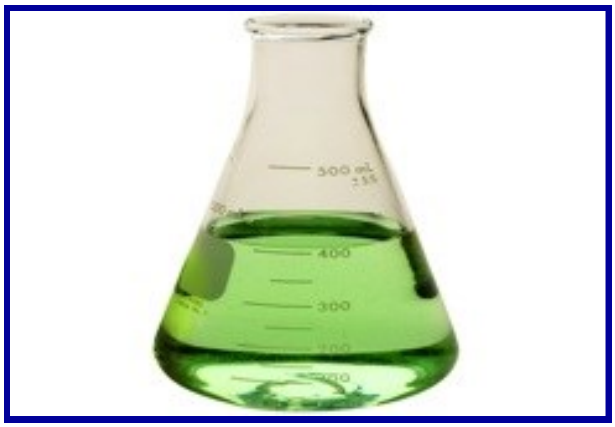
Texas Tech Leads in Cotton Agricultural Genomics R&D

In February 2006, the Texas Emerging Technology Fund (TETF) announced a $1.9 million investment in **Texas Tech University (TTU)** to help support a new cotton genomics center. The TETF award played a key role in TTU's recruitment of **Dr. Thea Wilkins**, one of the world's premier cotton geneticists. Dr. Wilkins generated millions of dollars in research funding from the NSF, the U.S. Department of Energy, and the USDA during her tenure at TTU.

Bayer CropScience has substantially funded or supported cotton research at TTU over the years. In August 2009, TTU and **Bayer CropScience** signed an exclusive licensing agreement for new cotton technology. In May 2010, Bayer contributed $7.5 million to TTU's Dept. of Plant and Soil Science (DPSS) to support new research initiatives and facilities development. In January 2014, TTU announced a $19.3 million contribution from Bayer to support new cotton research and other projects at TTU's DPSS.

Since 1998, Bayer's total contributions to TTU have totaled over $27 million. With leveraged state matching funds, that comes to nearly $55 million, making Bayer one of TTU's largest corporate donors.

Environmental Tech & Biofuels



Environmental biotechnology and biofuels are transforming many industrial processes to better conserve and sustain natural resources, ensure food and water safety, utilize crop residues for feed stocks and energy sources, and assist mature industries such as food processing, public water systems, and petrochemicals to become more competitive. Biofuels and biomass are playing an increasingly important role in Texas' and the nation's energy mix. Renewable biofuels, including ethanol and biodiesel, can be created from nonfood biomass such as algae, lumber scrap, switchgrass, animal waste, and agricultural residues like corn husks.

Texas ranks No. 1 nationally for biodiesel production

As the nation's No. 3 agricultural production state and home to a large forest and cattle industry, Texas is rich in biomass resources. The U.S. Department of Energy (DOE) ranks Texas No. 10 in the nation for biomass potential, including crop and forest residues, methane emissions, and potential energy crop farming.

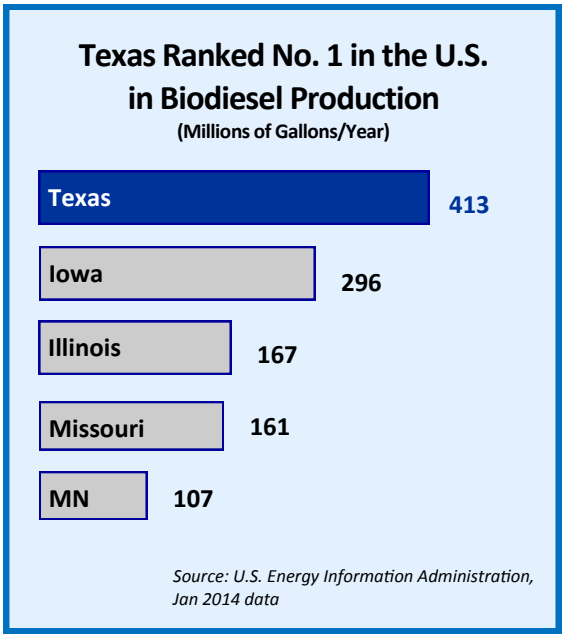
Building on the state's strong agricultural and forestry production base, Texas researchers and businesses are investing in new renewable energy technologies to maintain the state's position as the nation's energy capital. Research in Texas ranges from exploring new methods to convert nonfood stock materials to investigating ways to turn algae into biofuels.

In FY 2013, Texas institutions of higher education spent over $242.6 million on environmental sciences R&D, according to the Texas Higher Education Coordinating Board. Additionally, the Texas Emerging Technology Fund (TETF) has invested over $23 million to date into environmental and biofuels-related projects. (See Appendix for a complete listing.)

Biofuels in Texas

Ethanol and biodiesel are alternative fuels defined by their feedstock. **Biodiesel** is produced from vegetable or animal oils that are processed into an alcohol ester, while **ethanol** is produced from corn, sugar cane, or non-crop plant materials, which are fermented and turned into alcohol. Since Gov. Rick Perry laid out plans for a statewide bioenergy initiative in 2007, Texas has focused on developing alternative fuels from woody grasses and other plants, rather than food crops like corn.

Texas is the largest biodiesel producing state, with 413 million gallons of production capacity from ten refineries, according to the latest data from the U.S. Energy Information Administration. The majority of these biofuel manufacturing facilities are located in



the Houston, Southeast Texas, Dallas/Fort Worth, and West Texas Panhandle regions.

While the Midwestern corn belt accounts for most of the nation's ethanol production, four ethanol plants with a total of 365 million gallons per year capacity have been built in the Texas Panhandle. Texas ranks No. 11 nationally for ethanol production capacity; however, the state's massive agricultural and forestry assets represent potential feedstock sources for next-generation biofuels.

Texas is home to the nation's largest biodiesel plant

Cellulosic ethanol is produced using a method similar to the corn-based ethanol process, with an additional step added to convert cellulose-rich plant material into starches and sugars. The feedstock for cellulosic ethanol can be almost any plant material, which allows the industry to focus on non-food feedstock. Agricultural and forestry waste are prime candidates, such as corn stalks and cobs, cotton gin trash, and lumber residue.

Current cellulosic biofuels research focuses on purpose -grown energy crops that can flourish on low value land, in semiarid climates, and using brackish water. For example, **Texas A&M University** researchers are studying potential feedstocks suitable for arid climates, such as switchgrass, a fast-growing native grass that can be cultivated on marginal land. They are also investigating crop residues, sorghum, and genetically modified sugarcane that can be grown outside the tropics.

Algae biofuels utilize algae as a feedstock. Algae cells are oil-rich and can rapidly grow in either closed tanks or open ponds. The fast-growing characteristics of microalgae make this evolving technology very promising in terms of land use. Algae-derived biofuels are also attractive because microalgae are capable of thriving with brackish water and marginal land, inexpensive resources which don't compete with food crops.

Texas A&M AgriLife Wins DOE Grant for Algae Research

In October 2013, the U.S. Department of Energy awarded $8 million over four years to the Regional Algae Feedstock Testbed (RAFT) partnership, which includes Texas A&M's **Texas AgriLife Research (TALR)**. RAFT participants will research how algae can be grown year-around outdoors in different climates for use in biofuels.

The TETF awarded $4 million to TALR in 2007, as a component of the national $49 million Algae Biofuels Consortium. In addition to studying algae-based biofuels, TALR is also researching biomass production and nutraceuticals.

Texas AgriLife Research—Pecos, Texas Algae production facilities

Texas is Home to the Nation's Largest Biodiesel Plant

Houston-based **Renewable Biofuels, Inc.** operates North America's largest biodiesel plant, the **RBF Port Neches Biodiesel Facility** in Port Neches, Texas.

Opened in 2008, the plant has a total refining capacity of 180 million gallons per year. Its feedstock includes vegetable oils, animal fats, and grease.

RBF Port Neches facility

Texas and U.S. Biofuels Regulation

In 2011, the Texas Commission on Environmental Quality (TCEQ) enacted new state guidelines in the Texas Tax Code allowing biodiesel to be blended at any ratio into any compliant fuel. Former limitations, such as requirements to use more additives within the biodiesel and producers having to report blending requirements, ended. Texas biodiesel producers are now exempt from paying the excise tax when biodiesel or ethanol is blended with conventional diesel. The TCEQ also authorizes state bioenergy facilities.

The biofuels industry has received federal subsidies for R&D, production, and fuel taxes for many years. As of early 2014, only federal biofuel research-related subsidies continue. A $1.00 per gallon federal tax credit for biodiesel blending, first established in 2005, was allowed to expire in December 2013. At the time this report was published, there were efforts underway to reinstate federal biofuel subsidies and the renewables industry was pushing for an increase in the biofuel mandate under the Environmental Protection Agency's (EPA) Renewable Fuel Standard (RFS) program.

Houston's Shell Technology Center Focuses on Biomass-Sourced Biofuels

In January 2013, **Royal Dutch Shell** relaunched its Shell Technology Center in Houston, Texas (STCH). The facility underwent extensive modernization and expansion to become one of the largest industrial technology centers in the world.

Staffed by 2,000 Shell scientists and engineers, the STCH is focused on finding solutions for current and future energy challenges. A **Shell biofuels plant** is located at the Center, allowing staff scientists to study ways to replace gasoline with biofuels made from waste and inedible crops.

Leading Texas Research Centers

Texas is focused on creating biofuels using non-food crops and agricultural byproducts, instead of using edible crops. Building on the state's strong agricultural and forestry production base, Texas researchers and businesses are investing in new renewable biofuels and biomass technologies to maintain the state's position as the nation's energy capital.

The **Southwest Research Institute** (SwRI) in San Antonio is one of the oldest and largest independent applied R&D organizations in the nation. SwRI investigates a wide range of engineering challenges, including biodiesel fuel production and testing (include algae). SwRI also operates the **International Alternative Fuel Technology Center (IAFTC),** assisting clients with many types of non-conventional fuel types, including biodiesel. The institute's full-service facilities include chemical analysis, fuel blending, lab-scale production, and emissions testing.

In 2010, **Joule Unlimited** built a 5-acre biofuels pilot plant in Leander, Texas, which serves as Joule's R&D facility as it continues to work toward commercialization. The Massachusetts-based company has developed a closed-loop process using sunlight, carbon dioxide, non-potable water, and a microorganism catalyst, similar to algae, to create ethanol and diesel.

UT-Austin is home to one of the world's largest collections of algae, the **Culture Collection of Algae (UTEX)**. It has more than 3,000 strains and supplies them to scientists and businesses around the world for research and development purposes. **UT-Austin** researchers are conducting multidisciplinary algae biofuel research in consultation with over 35 international companies on extracting bio-oils from algae to produce fuel.

Appendix: Texas Emerging Technology Fund—Biotech Awards

Company/ Entity	City	Industry Segment	Project Description	Funding (in Millions)
1st Detect	Houston	Medical Devices - Biodefense	Portable chemical detector for security and medical diagnostics	$1.8
Admittance Technologies	Austin	Medical Devices	Development of a monitoring device that can monitor heart disease and detect heart failure	$1.96
Aegeria Medical Devices (FKA Speer Medical Devices)	San Antonio	Medical Devices	Non-invasive continuous vital sign monitor for pre-hospital use	$2.5
Targazyme (FKA America Stem Cell)	San Antonio	Biopharmaceuticals	Bone marrow stem cell transplant enzyme technology for cancer and other disease treatment	$1.25
Animal Innovations	Amarillo	Veterinary Medical Technology	Animal injection technology	$1
Apaxis Medical (FKA SEMMT)	Houston	Medical Devices	Left ventricular assist device (LVAD) implantation	$.6
AuricX Pharmaceuticals	Houston	Pharmaceuticals	Develop and commercialize a drug compound to treat antibiotic resistant infections, like MRSA	$1
Azaya Therapeutics	San Antonio	Biomedicine - Nanohealth	Azaya Liposome Encapsulated Radiation Therapy (ALERT) for cancer treatment	$1.045
Bellicum Pharmaceuticals	Houston	Biomedicine –Bio-Pharmaceuticals	Cancer vaccine	$1.45
Bio2 Medical	San Antonio	Medical Devices	Temporary inferior vena cava filter catheter	$1
Blue Box Health	Houston	Medical Devices	Technology for home-health chronic disease management	$.25
Botaneco (FKA AdviTech)	Formerly San Antonio	Medical Devices	Vision products to combat spatial disorientation, vertigo & motion sickness	$2.5
CardioSpectra	San Antonio	Medical Devices	Fiber-optic cardiac catheter	$1.35
Castle Biosciences	Friendship	Biomedicine – Medical Devices	Biomarker-based cancer detection system	$1
Chipotle Business Group	Arlington	Environmental Health	Water safety testing	$1
Corhythm	San Antonio	Medical Devices	Implantable treatment for atrial fibrilliation	$3.1
CorInnova	College Station	Medical Devices	Heart therapy device	$.5
Cormedics	Houston	Medical Devices	Heart therapy device	$.75
CryoPen	Corpus Christi	Medical Devices	Cryosurgical device freezes unwanted tissue	$2
DentLight	Richardson	Medical Devices	Dental medical devices	$.25
DEP Shape Memory Therapeutics	College Station	Medical Devices	Cerebrovascular aneurism treatment	$1
Diabetica Solutions (FKA Xilas Medical)	San Antonio	Medical Devices	Diabetic foot products	$1
DNATriX	Houston	Biopharmaceuticals	Genetically-modified virus for cancer therapy	$.5
Endothelix	Houston	Medical Devices	Cardiovascular test	$1
Ensysce Biosciences	Houston	Biomedicine - Nanohealth	Carbon nanotube/siRNA cancer therapeutics	$1.5

Company/ Entity	City	Industry Segment	Project Description	Funding (in Millions)
Environmental Quality Management Associates (FKA EQMA)	Waco	Biofuels	CAFOs (Concentrated Animal Feeding Operations) feedstock to ethanol	$.25
FE3 Medical	San Antonio	Medical Devices	Trans-dermal drug patch to deliver iron for treating iron-deficiency anemia	$2.8
Genprex Inc. (FKA Convergen LifeSciences)	Austin	Nanohealth – Bio-Pharmaceuticals	Targeted nanomolecular cancer therapies	$4.5
Gradalis	Dallas	Bio-Pharmaceuticals	Cancer therapeutics	$1.75
Halsa Pharmaceuticals	Houston	Pharmaceuticals	Clinical obesity drug development	$1
HydroLogic Industries	**El Paso**	**Environmental Health**	**Water purification system**	**$.34**
InView Technology	Austin	Food Safety - Biodefense	High-performance cameras that operate outside the visual range (infrared, ultraviolet, and terahertz)	$1.5
Laser Tissue Welding	Humble	Medical Devices	Surgical therapy	$.16
LaserGen Inc.	Houston	Biomedicine	DNA sequencing technology	$1
Leonardo BioSystems	Houston	Biomedicine-Nanohealth – Medical Devices	siRNA cancer therapeutics	$2.5
MacuCLEAR	Plano	Pharmaceuticals	Optical therapeutics	$1.7
MicroTransponder	Dallas	Medical Devices - Nanohealth	Neurostimulation Pain Management	$1.38
MicroZAP	Lubbock	Food Safety	Microwave food sterilization technology	$1.5
Minimus Spine	**Austin**	**Medical Devices**	**Non-surgical lumbar disc herniation technology**	**$1.75**
Mirna Therapeutics	Austin	Bio-Pharmaceuticals	MicroRNA therapeutics – cancer treatment	$5
Molecular LogiX	The Woodlands	Biomedicine – Bio-Pharmaceuticals	Genetically engineered therapeutic cancer treatment	$.79
Monebo	Austin	Medical Devices	Heart health assessment	$.5
Mystic Pharmaceuticals	Cedar Park	Pharmaceuticals-Medical Devices	Specialty pharmaceuticals & ophthalmic and intranasal drug delivery systems	$1.56
Nano3D Biosciences	Houston	Nanohealth - Medical Devices	3-dimensional in vitro cell culturing	$1
NanoMedical Systems Inc.	Austin	Medical Devices - Nanohealth	Personalized nanochannel drug delivery systems	$3.5
NanoSpectra Biosciences	Houston	Medical Devices - Nanohealth	Oncologic imaging detection using nanoparticles	$1.25
National Trauma Institute (NTI)	San Antonio	Health Sciences – Health Information Technology	Civilian and military trauma research	$3.8
Net.Orange	Irving	Health Information Technology	Heath care information management software	$1.9
Neuro Resource Group	Plano	Medical Devices	Commercialization of InterX products technology for post-operative acute pain management	$1.5

TEXAS EMERGING TECHNOLOGY FUND

Company/ Entity	City	Industry Segment	Project Description	Funding (in Millions)
Neurolink	San Antonio	Medical Devices	Brain implant system to monitor brain activity and directly deliver drugs to treat brain seizures	$3.2
Noninvasix	Galveston	Medical Devices	Hemoglobin monitor	$.25
Oncolix	Houston	Pharmaceuticals	Development of a non-chemotherapy drug for treatment of ovarian cancer	$2.4
OnTrack Imaging	Flower Mound	Veterinary Medical Technology— Medical Devices	Ultrasound imaging system for horses	$.25
Ortho Kinematics	Austin	Medical Services	Spine function testing	$1.5
OrthoAccel	Houston	Medical Devices	Orthodontics	$.75
Palmaz Scientific	Dallas	Medical Devices	SESAME stent	$3
Patton Surgical	Austin	Medical Devices	Abdominal-based laparoscopic surgery	$3
Photon8	Brownsville	Biofuels	Algae-based biodiesel fuel	$1
PLx Pharma	Houston	Pharmaceuticals	Non-steroidal Anti-Inflammatory Drugs (NSAIDs)	$2
Procyrion	Houston	Medical Devices	Developing the first catheter-deployed circulatory assist device intended for long-term use	$1.5
Pronucleotein Biotechnologies	San Antonio	Environmental Health	Food and water safety testing products using DNA aptamer sequences to detect pathogens	$1
Pulmotect	Houston	Biomedicine - Biodefense	Stimulated Innate Resistance (StIR) against inhaled pathogens	$1
Quantum Logic Devices	Georgetown	Nanohealth – Medical Devices	Nanoelectronics medical diagnostic technology	$.6
RadioMedix	Houston	Pharmaceuticals	Manufacturing radiopharmaceuticals to diagnose and treat diseases, including cancer, through positron emission tomography (PET)	$2.8
Receptor Logic	Austin	Biomedicine	T-cell mimic receptors antibodies technology to treat cancer and other diseases	$2
Resonant Sensors	Arlington	Medical Devices - Nanohealth	Optical biochemical sensors	$.6
Salient Pharmaceuticals	Houston	Pharmaceuticals	Treatment of cancer-related gastrointestinal side effects caused by disease, chemotherapy, or radia-tion	$2
Savara Pharmaceuticals	Austin	Pharmaceuticals - Nanohealth	Pulmonary therapeutics for cancer and other conditions	$1.9
ScanTech Sciences	Houston	Environmental Health	Food sterilization technology	$2
Seno Medical Instruments	San Antonio	Medical Devices	Laser optical for cancer scanning	$2
SeprOx	The Woodlands	Medical Devices	Pure oxygen technology device	$.75
Smart Imaging Technologies	Houston	Environmental Health - Nanohealth	Automated water-borne pathogen detection system	$1

Company/ Entity	City	Industry Segment	Project Description	Funding (in Millions)
Smartfield	Lubbock	Agricultural Technology	Real-time irrigation row crop sensor	$.75
Stellarray	Austin	Medical Devices – Nanohealth – Environmental Health	Medical products sterilization & medical imaging	$.75
Sunrise Ridge Algae	Houston	Biofuels	Algae feedstock for bioenergy	$.25
Telemedicine Up Close (DBA DxUpClose)	**Frisco**	**Medical Devices**	**Low cost bacterial diagnostic kit**	**$1.5**
Terapio	Austin	Biopharmaceuticals	Biotherapeutics for radiation countermeasures	$1.7
Terrabon	Bryan, Houston	Biofuels	Conversion of non-food biomass into biofuels	$2.75
Texas A&M System / Texas Agriculture Experiment Station	Pecos	Biofuels	Algae Biofuels Consortium	$4.025
Texas A&M System	College Station	Biomedicine – Pharmaceuticals	National Center for Therapeutics Manufacturing (NCTM)	$50
Texas A&M System	College Station	Biofuels	Texas BioEnergy Alliance	$3.4
Texas A&M System	College Station	Medical Devices - Biomedicine	Texas Institute for Preclinical Studies (TIPS)	$6.3
Texas A&M System	College Station	Biodefense – Pharmaceuticals	TAMU Center for Innovation in Advanced Development and Manufacturing (CIADM)	$40
Texas A&M Health Science Center (HSC)	Temple	Regenerative Medicine - Biomedicine	Institute of Regenerative Medicine (IRM) – joint venture with Scott and White and Temple Bioscience District	$5.25
Texas A&M University College of Veterinary Medicine and Biomedical Sciences & Texas Heart Institute (THI)	**Houston & College Station**	**Regenerative Medicine**	**Center for Cell & Organ Biotechnology (CCOB), Biotechnology – led by Dr. Doris Taylor, director of THI's Regenerative Medicine Research and adult stem cell field expert**	**$3**
Texas State University	San Marcos	Health Sciences – Medical Devices	Center for Multifunctional Materials	$4.2
Texas Tech University	Lubbock	Agricultural Biotechnology	Agricultural genomics R&D (recruited Dr. Wilkins)	$2
Thrombovision	Houston	Medical Devices	Platelet measuring device	$1.5
University of Houston	Houston	Biomedicine - Pharmaceuticals	Center for Nuclear Receptors and Cell Signaling (recruited Dr. Jan-Ake Gustafsson)	$5.77
University of North Texas HSC	Fort Worth	Health Information Technology - Biodefense	Center for Commercialization of Fluorescence Technology	$2.38
University of Texas at Austin	Austin	Health Sciences – Medical Devices	Imaging Research Center (FKA Neuroscience Imaging Center)	$3.67

TEXAS EMERGING TECHNOLOGY FUND

Company/ Entity	City	Industry Segment	Project Description	Funding (in Millions)
University of Texas HSC	Houston	Biomedicine - Nanohealth	Biomedical nanotechnology R&D now DBA Alliance for NanoHealth (ANH) (recruited Dr. Mauro Ferrari, now ANH President)	$2.65
University of Texas HSC	Houston	Health Sciences	Center for Translational Injury Research (CeTIR)	$4.2
University of Texas HSC	Houston	Health Sciences	Children's Regenerative Medicine	$3.15
University of Texas HSC	San Antonio	Health Sciences – Medical Devices	Comprehensive Facility for Animal Imaging Research (CFAIR) – drug and medical device testing	$4.1
University of Texas HSC	Houston	Pharmaceuticals	Texas Therapeutics Institute – a consortium of UTHSC Houston, MD Anderson, and UT Austin	$6.3
University of Texas at Tyler	Tyler	Environmental Health	Texas Allergy, Indoor Environment and Energy (TxAIRE) Institute	$3.93
Vapogenix	Houston	Pharmaceuticals	Development of a novel, non-opioid analgesics for pain management	$2
ViroXis	San Antonio	Bio-Pharmaceuticals	Botanically-based therapies for dermal conditions	$2.5
Visualase	Houston	Medical Devices	Image-guided laser technology for cancer therapy	$.75
Vital Art and Science (VAS)	Richardson	Medical Devices	Home-based device to monitor retinal function (vision) for patients with macular degeneration and diabetic retinopathy	$1
VUV Analytics	Austin	Medical Devices	Development of a molecular spectroscopy product operating at the nanoscale	$1
Xeris Pharmaceuticals	Austin	Pharmaceuticals	Development of patient-friendly injectables for indications in diabetes, epilepsy, and immunology	$1.9
ZS Pharma	Fort Worth	Pharmaceuticals	Oral sorbent to remove toxins in the treatment of kidney and liver disease	$2
TOTAL	---	---	---	**$287.91 M**

Bolded items are new addition in this edition of the Biotech Report

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