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REASONS

Thinking big **Texas**

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Construction at the University of Texas Southwestern Medical Center continues unabated as it tries to keep pace with the demand for research space.

Texas will tell you that they have the biggest and best of anything. And increasingly, they're expanding their bragging rights from oil wells and cattle to biomedical research. The Lone Star State already has scientific size on its side. A study by the Institute for Economic Development at the University of Texas (UT) at San Antonio reported this March that the 15 members of the UT system contributed \$12.8 billion to the local economy in 2004. And the system's six health institutions alone provided 111,700 jobs.

But despite the size of its biomedical enterprise, Texas, which ranks third in the nation for university expenditure in the biosciences and is home to one of

the largest medical complexes in the world, has been slow to capitalize on underlying research strengths in biomedicine, biodefence and nanotechnology. That is changing as institutions look more squarely towards technology development, and actively promote research at the interface between the physical and life sciences.

One of the six medical-research institutions, UT Southwestern Medical Center in Dallas has grown from a small wartime medical college to an academic centre with 1,300 faculty members. The original campus couldn't contain this growth, so expansion has been focused on the newer north campus, which recently opened a 14-storey medical-research tower. Building work has started on a six-storey, 18,580-square-metre advanced-imaging centre for animal and human research in neuroscience and cancer. Plans and fund-raising are already under way for a seventh building on that site, says the university's president Kern Wildenthal.

This expansion is providing more scientific job opportunities, says Al Gilman, chairman of pharmacology and one of the medical centre's four Nobel laureates. Gilman expects the university to recruit about 130 research scientists to fill new buildings over the next five years. The medical-research tower will house up to 100 groups, including the entire departments of pharmacology and physiology, one-third of biochemistry, some neurology and developmental biology, and the Alliance for Cellular Signaling. And it will provide space for an expanded

UT SOUTHWESTERN MEDICAL CENTER



Harold C. Simmons Comprehensive Cancer Center.

Gilman also directs the Cecil H. and Ida Green Comprehensive Center for Molecular, Computational and Systems Biology, which will occupy part of the ninth floor. The centre, established in February 2004 with a \$12.8 million grant from the Cecil and Ida Green Foundation and Trust, will help UT Southwestern boost research in biological mathematical modelling. Gilman anticipates appointing half-a-dozen new staff members in systems biology.

With UT Southwestern's recent acquisition of nearby Zale Lipshy and St Paul university hospitals, the medical centre now owns and runs its hospitals. Administrators hope the move will place UT Southwestern among the ranks of the nation's top-tier academic medical centres. It should also broaden the scope of clinical trials and create opportunities to recruit clinical investigators.

In addition, UT Southwestern is beefing up research and clinical programmes in cancer, aiming for a Comprehensive Cancer Center designation from the National Cancer Institute. Its chances should be improved by the recent arrival of colorectal-cancer expert James Willson, who was recruited from Case Western Reserve University in Cleveland, Ohio. And plans are in the works to build a biotechnology incubator facility to nurture the development of start-up companies.



Opportunities: Al Gilman anticipates taking on more staff.

provide 20,700 square metres of new space, including an expanded stem-cell research programme. And, this month, the university broke ground on a new six-floor, 19,400-square-metre replacement research facility for the UT Medical School at Houston, to open in 2007.

Baylor College of Medicine, Houston's private research-intensive medical school, has 1,800 full-time faculty members. With research support of more than \$400 million, of which \$340 million is from federal sources, the college's strengths are in cardiology, cell and gene therapy, genomics and paediatrics. From July, its expanding neuroscience programme will be led by Michael Friedlander of the University of Alabama at Birmingham.

Exciting developments are at the interface between physics, engineering, maths and biology. Rice University, just west of Baylor, is noted for its research programmes in bioengineering and nanotechnology. Rice professors Richard Smalley and Robert Curl shared the 1996 Nobel Prize in Chemistry with Harry Kroto, of the University of Sussex, UK, for their 1985 discovery of fullerenes: a new form of carbon, C₆₀.

Nanotechnology is founded on C₆₀ and carbon nanotubes (cylinders of carbon atoms measuring about a nanometre). More than 20 Rice researchers work in the field, especially at the Center for Nanoscale Science and Technology and the Center for Biological and Environmental Nanotechnology at Rice.

But Rice has no medical school, so Rice chemistry professor Bruce Weisman collaborates with researchers at UT Health Science Center at Houston, spending about a third of his time on biomedical applications of nanotubes. In 2002, he discovered that dozens of semiconducting nanotubes emit their own unique fluorescent signature. He wants to exploit this to develop non-invasive biological imaging agents.

Texas organizations such as the nascent Alliance for NanoHealth are also fostering collaborations between institutions in the medical centre. Going a step further, Rice plans to build a 46,500-square-metre collaborative research centre next to the medical centre.

Galveston, 80 km south of Houston, houses the University of Texas Medical Branch (UTMB). In the wake of the 2001 terrorist attacks and the anthrax letters that followed, UTMB formed a Center for Biodefense and Emerging Infectious Diseases to consolidate research in basic molecular and structural biology, tropical virology and vaccine development. In 2003, it was one of eight institutions chosen by the Department of Health and Human Services to become a Regional Center of Excellence for Biodefense and Emerging Infectious Diseases.

UTMB will also host a national biocontainment laboratory — one of only two large-scale biosafety level four labs to be located on a US university campus (the other will be in Boston). The \$150-million maximum containment facility will open in 2008.

The cost of living in Texas is quite low — and there is no state income tax. The biomedical enterprise in the Lone Star State seems to be thriving, so this is one case where a little Texan bragging may be justified. ■

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Web links

UT Southwestern Medical Center at Dallas

♦ www.utsouthwestern.edu
Texas Medical Center, Houston

♦ www.tmc.edu
UT MD Anderson Cancer Center

♦ www.mdanderson.org
UT Health Science Center at Houston

♦ www.uth.tmc.edu
UT Austin

♦ www.utexas.edu
UT Health Science Center at San Antonio

♦ www.uthscsa.edu
UTMB

♦ www.utmb.edu
UTMB's Center for Biodefense and Emerging Infectious Diseases

♦ www.utmb.edu/CBEID
Baylor College of Medicine

♦ www.bcm.edu
Rice University

♦ www.rice.edu
Rice's Center for Biological and Environmental Nanotechnology

♦ cben.rice.edu
Rice's Center for Nanoscale Science and Technology

♦ cnst.rice.edu
Alliance for NanoHealth

♦ www.nanohealthalliance.org

BIOMEDICINE IN THE BAYOU CITY

But Dallas is not the only Texas city with ambitions of becoming a biotech hub. Houston boasts one of the largest medical complexes in the world. The 324-hectare Texas Medical Center houses more than 40 member institutions, including 13 hospitals and two medical schools, and in excess of 65,300 employees. The University of Texas's MD Anderson Cancer Center is now the top recipient of research grants from the National Cancer Institute — its federal research funds rose from \$63 million in 1998 to \$154 million last year.

The campus size has increased by about 50% over the past five years, and there are more buildings to come. Three new facilities opened in the past few months — an ambulatory clinical building, a cancer prevention building and the George and Cynthia Mitchell Basic Sciences Research Building.

At its 57-hectare south campus, the University of Texas is fostering development of a biomedical research park, spearheaded by MD Anderson president John Mendelsohn. The focal point will be Research Building 2, scheduled to open later this year. This will feature research programmes in gastrointestinal medical oncology and pathology, molecular pathology and molecular therapeutics. Building 1, open for a year, houses labs for immunology and cancer therapies.

Several building projects are also under way at the University of Texas Health Science Center at Houston. The future home of the Brown Foundation Institute of Molecular Medicine for the Prevention of Human Diseases, headed by Nobel laureate Ferid Murad, will