NEWS ANALYSIS

Texas Nanotech Circles the Wagons

By Emily Sopensky, Contributing Editor

Universities in the Lone Star State join forces to seek funding and share resources

1 September 2002—Smallness costs. "Nanotechnology is instrument-driven science, and instrumentation is expensive and hard to get," says Jordan Konisky, vice provost for research and graduate studies at Rice University (Houston, Texas). Recognizing that the investment required to take a leadership position in nanotechnology may be more than one institution can bear, four Texas universities recently formed a partnership called SPRING (Strategic Partnership for Research in Nanotechnology) to seek U.S. government R&D dollars and exploit the resources they have more efficiently.

Aptly named the Lone Star State, Texas is relatively isolated, being thousands of kilometers from both the East and West Coasts, which harbor concentrations of cross-pollinating nanotechnology research. By collaborating, the institutions intend to compete better than they could separately against heavyweights like the Massachusetts Institute of Technology, the University of California at Berkeley, and Cornell University. Such collaborations are a growing trend, noted Phillip J. Bond, U.S. Department of Commerce Under Secretary for Technology, at a 23-May conference in Houston sponsored by the U.S. National Nanotechnology Initiative. The initiative is the umbrella program coordinating nanotechnology research for 10 government agencies.

SPRING pairs Rice—a small (about 4400 students), highly prestigious, well-endowed private university with three of the 15 University of Texas (UT) campuses: Arlington, Dallas, and the flagship at Austin, which has the largest student population (50 000) of any U.S. public university. The UT system is well endowed but only at the beginning stages of building the infrastructure to support the stars, or soon-to-be stars, in the fledgling field.

Among the huge investments needed to work at the nanoscale are the US $250 000 magnetometer just acquired by UT Dallas and the $2.6 million electron-beam lithography system

purchased by UT Austin. Juan Sanchez, vice president for research at UT Austin and SPRING's chair, believes the group can help promote collaboration among academic and industrial scientists collaborate by distributing the use of "instrumentation in such a way that it enhances the core, and provides intellectual synergy." He expects most equipment-sharing to occur remotely, especially for electron microscopy.

SPRING's members are spread across four cities that are separated by as much as a five-hour drive apart. So officials envision most experiments being run from their networked computers, just as they are now, with equipment located in the next room. "A technician is usually in attendance to monitor any equipment problems," explains Sanchez.

Apart from sharing physical assets, the collaboration will share its human and intellectual capital, a substantial asset considering that two Nobel Laureates are part of the equation in SPRING. Richard Smalley, who discovered fullerenes and now heads a leading lab in the development of carbon nanotubes, is a professor at Rice. Alan MacDiarmid, a professor of chemistry and physics at UT Dallas, shared the 2000 prize in chemistry with two other scientists for discovering that plastics can be made electrically conductive.

Each university will lend its particular strength to push along research projects. UT Dallas, for example, is focusing on nanoscale materials with help from Rice University's expertise in manufacturing carbon nanotubes as the two collaborate on spinning nanotubes into pure carbon thread. Meanwhile, UT Arlington is investigating those threads for use in thermal electrochemical energy harvesting, artificial muscles, and energy storage on electronic circuit boards.

Sanchez expects the four universities to act in concert when seeking federal R&D funds. Government grants are important at this stage of nanotechnology R&D, especially in fundamental research, where any anticipated return on investment—the private sector's lure—is speculative and longer term.

Feeding the nanotechnology frenzy globally, governments worldwide tripled their investments in the field between 1997 and 2001, and are expected to fund almost $2.2 billion in 2002. About 25 percent of these funds are from the United States [see "U.S. Nanotech Funding Heads for $1 Billion Horizon"].

In the past decade, the physical sciences, the basis for most nanotechnology, have been losing out to biomedical sciences in the U.S. R&D funding strategy. So, with more universities interested in funds slated for nanotechnology, it is inevitable that the competition is heating up. Believing that getting the U.S. Congress more involved can help their project, SPRING officials visited some of the Texas congressional delegation in Washington, D.C., "to keep them informed," according to Sanchez. Congressional involvement has proved worthwhile in the past in Texas, which comes in eighth in the United States on *The Chronicle of Higher Education's* ranking of states receiving "pork barrel" funds for higher education.