

Catapulting Arkansas Through Nanotechnology

By Tonya Oaks Smith

For years, Georgia Tech University physics professor Uzi Landman has preached about the capacity for economic change courtesy of nanotechnology.

“There is so much power and benefit to mankind in realizing the potential of nanoscale devices,” Landman said in an interview with an Atlanta business journal. His words reinforce the idea that commercialization will not only bring about more innovation, it will drive investment and greater financial rewards for institutions, businesses, and individuals that support nanoscience.

Nanotechnology is the study of matter at the atomic level. The science makes it possible to build objects that take on dramatically different properties than their larger counterparts. Because of these differences, the time is right for researchers to jump wholeheartedly into the nanotechnology arena. The scientific field cuts across many disciplines, and discoveries can be used in applications from biomedicine to materials science and engineering.



In the UALR Nanotechnology Center, (L-R) Maria Haley, executive director of the Arkansas Economic Development Commission; Dr. Mary Good, dean of the UALR Donaghey College of Information Science and Systems Engineering; Alex Biris, UALR assistant professor of applied science; and Tom Walker, director of the UALR Nanotechnology Center, review plans for the next stage of development of the Center. (Photo by Kelly Quinn)

According to the [Southern Growth Policies Board](#), a non-partisan public policy think tank based in Research Triangle Park, N.C., between 15 and 20 percent of all U.S. nanotechnology research growth now occurs in the 13-state Southern Growth region that includes Arkansas. Every Southern Growth state

publishes articles and dissertations and wins grant funding focused on nanotechnology. The region contains numerous universities named as national and international leaders in the field as well as Oak Ridge National Laboratory in Tennessee, one of the top 25 nanotechnology research institutions.

But as much as Southern states are making leaps and bounds toward growing nanotechnology industry, some areas of weakness are cited. While there is an abundance of intellectual capital and a great quality of life in the region, the Southern Growth region falls behind other areas of the country in relation to its lack of venture capital and national recognition for regional achievements.

Nanotechnology is considered an established research area, but it is often seen as a new frontier those who are most frequently approached for investment capital and backing. Bringing understanding is integral for securing support, and that's why Tom Walker, executive director of the [Arkansas Nanotechnology Center](#) based at UALR, and Dr. Alex Biris, chief operational scientist, have been doing a lot of evangelizing and education of their own.

"The companies springing up all around the country do research into individualized segments of nanoscience," Walker said. "They have created wells of knowledge about certain areas in nanotechnology. It is from these wells of knowledge that competitive advantage can be secured."

Walker brings a wealth of experience on business incubation to the UALR Nanotechnology Center. He previously served with the National Institute of Standards and Technology in the U.S. Department of Commerce and has been credited for building and leading organizations — some national in scope — to nurture and incubate scientific and technological research and move the ideas into the marketplace as commercial enterprises.

As president of the Cardinal Capital Development Fund and director of the Ohio Development Financing Commission, Walker directed more than \$2 billion of private sector investment into firms that achieved an aggregate market value in excess of \$8 billion.

Biris brings his own specialized knowledge and enthusiasm to bear on the UALR Center. A firm believer in the power of small discoveries to change lives, he works with local high school and middle school students to prepare them for futures in nanotechnology research.

The lack of generalized and readily accepted research production — like patents and papers —

places UALR at a unique advantage when it comes to nanotechnology. Larger research facilities have frequently not had the number of patents and refereed papers that will correlate with their share of research funding. The Little Rock-based center has produced more than 20 papers, book chapters, and conference presentations.

“We can compete in this world because it’s so new,” Walker said. “Nanotech companies are popping up around the country, and the technology will eventually affect every industry.”

Despite the number of papers and patents produced, however, success in this scientific field comes down to a few key issues. One of the most important issues is commercialization of research. UALR is currently working with three Fortune 250 companies, responding to their real business needs for solar energy, reaction condition research, and carbon nanotube business applications.

“Through our charter, we are focused on applied scientific projects that will have a significant economic impact for the state and the business that has commissioned that research,” Walker said. “Many nanotechnology centers are theory focused. But at the UALR Center, we have a responsibility to produce business-focused results.”

The process of building a business from the ground up sparked by a unique nanotech development can take up to seven years, Walker added. He and Biris have an ambition of developing three to five companies per year based on nanotech research. The Center has had its first success story with Orlumet LLC, a spin-off company that works on tissue generation research alongside UALR researchers.

“We are searching for companies that want to work with us on industry-specific problems. This focus makes it easier for us to deliver results for our business partners,” Biris said.

Another problem involved in nanotechnology research is lack of collaboration with other centers of excellence in nanotechnology. The Southern Growth Policies Board believes that trips to centers of nanotechnology excellence in the nation like California, New York, and Massachusetts are essential in fostering collaboration.

“Our research suggests that the South can significantly increase its competitive advantage in nanotechnology through regional collaboration among research institutions and with the private sector,” said Scott Doron, director of the Southern Technology Council, in response to the recent Southern Growth region study. “No Southern institution or locale has the critical

mass of nanotechnology assets to go it alone and achieve global leadership. We need a Southern Nanotechnology Network to connect the region's assets and increase research, funding, and new business creation."

The Nanotechnology Center at UALR works to reduce the disconnect between research institutions by partnering with a number of Arkansas colleges and universities, the Oak Ridge National Laboratory, NASA's Kennedy Space Center, Louisiana State University, three universities in France, and one university in Romania. The Affiliated Scientists Program, as it is called, allows institutions of higher learning to share in the rewards of nanotechnology research.

While these partnerships with public entities are important to the success of the UALR Center, the most important positive result is the creation of many businesses and thousands of jobs for Arkansans. The Center works with high schools to increase math and science interest and achievement — all in preparation for the next wave of economic development in the state. A grant proposal to pilot a workforce development initiative with the state's two-year colleges is also being submitted. It focuses on the highly specialized skills technicians will need to work for nanotechnology companies.

"[The National Science Foundation](#) says that nanotechnology has the capacity to make an incredible impact in 12 to 15 years, and the nano-materials market is forecast to grow at 31 percent annually for the next five years," Walker said. "We have the ultimate in flexibility in our research, and we're committed to responding to business needs for directed research and trained workers throughout the state."

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