



## **WFU THINKS SMALL TO CREATE PRODUCTS, TRIAD JOBS; NANOTECHNOLOGY CENTER TO BE SET UP BY DECEMBER**

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By: Richard Craver

Wake Forest University is delving into the future of technology at its smallest level with the hope that its research will play a large role in creating innovative products and Triad jobs.

Nanotechnology is about improving the quality, strength and endurance of a product by engineering its materials at the atomic level, or nanoworld, as researchers call it. It is helping to produce the next generation of products, such as silicon chips, gigabyte disk drives, medical devices and fabrics.

Wake Forest researchers have been involved with nanotechnology for five years, but its efforts were given a major boost in August with the recruitment of a 15-member team led by David Carroll from Clemson University in South Carolina.

On Tuesday, Wake Forest will open the new home for its Center for Nanotechnology, an off-campus office on Deacon Boulevard that should be fully functional in December.

Local university officials declined to say how much they paid to recruit the scientists and set up the center, but they said that it represented "a high six-figure" investment, generated mostly from federal money.

Carroll, the chairman of Wake Forest's Nanotech Department and an associate physics professor, is leading the group of graduate students and post-doctorate researchers. The university is paying Carroll's salary, and his team is compensated mostly through research grants.

"Wake has been hugely successful in its medical and life- sciences developments," Carroll said. "We're hoping to add another level of success with our efforts and bring in grants that will pay the university back for its investment in us."

Carroll's research team has developed light-emitting diodes that became high-resolution display screens for Nokia cellular phones. It has enhanced medical devices that aid in monitoring implants and organs, as well as ensuring that proper dosages of pharmaceuticals are released into the body.

"Nanotechnology can help plastics perform better at the nanotech level, such as enabling plastic soft-drink bottles to hold the carbonation in the drink longer or a car dashboard that won't melt," Carroll said.

Nanotechnology centers typically require about \$1 million in yearly financing, according to analysts. Most of the Wake Forest center's grants come from the U.S. Department of Defense, the National Science Foundation and industrial partnerships. The foundation said that the

projected spending on nanotechnology initiatives in 2004 by 10 federal agencies would reach \$849 million.

Carroll said he is already discussing the team's ideas with two Triad textile manufacturers, such as using nanotechnology to allow their fabrics to regulate body temperature.

"We can make a manufacturing impact because we can help local manufacturers differentiate their products and enable them to stave off Asian imports," Carroll said.

The reputation of Carroll's team has impressed Wilbur Ross, the new chairman of Burlington Industries Inc.

Ross said that a primary reason why his private-equity firm WL Ross & Co. is purchasing bankrupt Burlington for \$614.1 million is its Nano-Tex affiliate. Nano-Tex's nanotechnology research has already produced stain-repellent fabrics for pants, shirts and footwear.

"We're delighted that a major nanotech center will be located close to Burlington," Ross said. "We're certainly enthusiastic about the possibilities of nanotechnology in the textile industry and we expect to work with the Wake center because they will be producing cutting-edge innovations."

University and community officials say they believe that nanotechnology could play a pivotal role in differentiating Wake Forest and the Triad in a highly competitive biotechnology and life-sciences market. Duke University, the University of North Carolina at Chapel Hill and North Carolina State University also have a focus on nano-technology research.

"We believe our center will be competitive with those universities in the number of grants earned and research articles produced," Carroll said.

The center will complement Wake Forest's strengths in biotechnology, life-sciences and health-sciences research, said Rick Matthews, the chairman of the university's physics department.

"It has the potential to translate not only into well-paying jobs at the center, but also help provide a new avenue for start-ups and spin-offs that can help the Triad through a challenging transition," Matthews said. "The center also will make Wake Forest a more attractive university for biotechnology and technology research."

Angelos Angelou, the founder of consulting firm AngelouEconomics, considers the recruitment of Carroll and his team as a coup. The firm has been conducting a nine-month study of economic prospects in Northwest North Carolina, and Angelou recently suggested that nanotechnology would be a good economic-development tool for this area.

"The fact that the entire program is coming establishes Wake Forest as one of the top 15 to 20 nanotechnology programs in the country," Angelou said.

"Nanotechnology touches on about every industry in terms of product development. It may have fewer than 20,000 people working in the industry now, but it is projected to be a \$1 billion industry by 2015," he said.

Even though Carroll grew up in Winston-Salem, he said he initially was cautious about uprooting his team from Clemson to start a center at Wake Forest.

"I had never considered Wake at first because it was known mostly for its undergraduate expertise in science," Carroll said. "But they proved me wrong in terms of its scientific focus and research, as well as its medical research. There's a commitment to performance and ethics here that really impressed me."

"Once word got out that we were considering a change, we had offers from several other universities. But our staff had a unanimous feeling that Wake Forest was the place for us to be."

Gayle Anderson, the president of the Greater Winston-Salem Chamber of Commerce, said that Wake's nanotechnology center adds to the breadth of life-science experts in the city.

"Particularly important is the level of federal-grant support these researchers have and the fact that they are internationally acclaimed," Anderson said. "This is one more example of why our community is focused on life sciences/biotech as a key growth factor for our future."

Angelou cautioned that nanotechnology is in its embryonic stage. "It is probably five to seven years away from the mass commercialization of products involving nanotechnology in the U.S. market," he said. "But people who work in the field should approach six-figure incomes or higher, and there should be spin-off opportunities from the research."

Carroll said that the Wake center will reach out to the educational community so local residents could benefit from nanotechnology through job-retraining efforts.

"We're here to help," Carroll said.

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