

FEATURE ARTICLE

Triad Region Welcomes the Nano-Effect

The closest most people will get to understanding nanotechnology is reading an article like this one. Others may acquire a more commercial appreciation as touted in current marketing and advertising campaigns for energy-efficient hybrid automobiles and infomercials for the fluorescent, translucent green food containers that claim to keep produce fresh for up to 50 days, courtesy of nanotechnology. But the science is much more involved than that.

At its core, nanotechnology is scientific and engineering know-how to control the arrangement of atoms and molecules, enabling novel applications with customized properties. *In other words... nanotechnology allows scientists to reconfigure basic materials to do cool, new stuff.* In terms of how to envision the infinitely small components of nanotechnology, consider that a nanometer is one billion times shorter than one meter. In nanotechnology, structures are less than 100 nanometers, and the measure of 100 nanometers is about 1,000 times smaller than the width of a human hair.

Although the technology of nanoscience and nanoengineering isn't visible to the human eye, its financial implication is quite tangible. The projected economic impact of nanotechnology on the global economy is \$3.1 trillion by 2015 (Lux Research). The new Joint School of Nanoscience and Nanoengineering (JSNN), located at the South Campus of Gateway University Research Park in Greensboro, N.C., collaborating with local and regional businesses is an important part of the Triad region's strategy to bring economic growth to the area.

The JSNN is a collaborative project between North Carolina Agricultural and Technical State University (NCA&T) and The University of North Carolina at Greensboro (UNCG). JSNN's mission is to train students to conduct basic and applied research in nanoscience and nanoengineering, and to work closely with the Piedmont Triad community to help enhance opportunities for economic growth through its outreach and engagement activities.

The JSNN has four areas of focus: 1) Nanobiology – study of the use of biological materials and processes in applications such as drug delivery or self-assembly; 2) Nanometrology – science of measurement of “nano” structures; 3) Nanocomposite materials – materials science involving the fabrication and incorporation of nanofibers and nanoparticles into other materials systems to enhance properties; and 4) Bioelectronics – interface of electronics with biology (e.g. infusion pumps for diabetics). Initially, the JSNN will offer two degrees of study: Professional Master of Science and Ph.D. in Nanoscience.

Gateway University Research Park is also a joint collaboration between NCA&T and UNCG and serves as a bridge to successful commercial application for the scientific research being performed at Greensboro's two high research universities. University officials expect that over the next 20 years, Gateway University Research Park will contribute \$250 million to the economy of the region.

Nanotechnology is not an "end product." Instead, the technology is used to rearrange atomic and molecular structures to improve systems, materials, and devices for various industry applications. So far, nanotechnology shows promise in the following areas:

- Medicine (e.g. drug discovery and delivery particularly in cancer treatments)
- Defense (e.g. composite materials for naval applications)
- "Green" Applications (e.g. building construction materials that clean the air)
- Renewable Energy (e.g. solar energy advancements and improved photovoltaic cells)
- Textiles (e.g. surgical garments with embedded silver nano-particles that help prevent infection due to antibacterial properties)

John Merrill, executive director of Gateway University Research Park said, "The Nanoscience and Nanoengineering industries are a direct pathway to the future of major technological breakthroughs in the areas of nanobiology, nanometrology, nanocomposite materials and bioelectronics. Gateway University Research Park is once again making history by positioning the Triad region for growth in these arenas."

Gateway University Research Park is a 501(c)3 not-for-profit entity created to manage and operate the joint collaboration between North Carolina A&T State University and The University of North Carolina at Greensboro for the purposes of research and economic development within the Triad. Gateway University Research Park will attract, establish and/or retain businesses and organizations driven by the discovery of new knowledge and technologies. For more information, visit www.GatewayURP.com.

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