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Assessing the risk of nanoparticles; University of South Carolina endowed chair search begins for new center

From invisible specks of silver embedded in carpet and socks to carbon nanotubes used in construction of golf clubs and tennis rackets, nanoparticles in manufacturing are popping up everywhere.

Despite their commonplace use, little is known about the effects these tiny particles might have on the environment, and that has the federal Environmental Protection Agency and the Food and Drug Administration concerned. The launch of the University of South Carolina's Center for Nanoenvironmental Research and Risk Assessment couldn't have come at a better time.

"Some companies use a lot of nano-sized substances for their products and also produce lots of nanoscale waste that will end up in landfills or wastewater streams," said Dr. Tom Chandler, interim dean of the university's Arnold School of Public Health. "It is much more ethical and economically feasible to assess the potential risk for harm to health and the environment by nanomaterials and prevent it, than to try to correct any harm after it has occurred."

The Center for Nanoenvironmental Research and Risk Assessment is endowed with \$3 million by the state's Centers of Economic Excellence program. Most of the matching funds for the center are planned to come from two sources: \$1 million from Arnold School of Public Health benefactor Norman J. Arnold as part of his \$10 million endowment gift to the school and \$200,000 from Michael Bolick, president and CEO of Selah Technologies, a Pendleton, S.C., firm that manufactures nanomaterials used in medical diagnostics.

A national search has begun for an endowed chair scientist to lead the center. The scientist will be housed in the Arnold School's Public Health Research Center and will be recruited along with two junior-level faculty to complement the existing strengths in nanoenvironmental risk assessment at the University of South Carolina.

“Nanoenvironmental research is one of seven scientific themes of the university’s NanoCenter, which seeded this initiative two years ago and provided an initial platform to integrate and grow existing efforts across the University,” said Dr. Tom Vogt, director of the Nanocenter.

Vogt, Chandler and Dr. Tara Sabo-Attwood in the Arnold School’s department of environmental health sciences bring strong research backgrounds to nanoenvironmental studies.

“An endowed chair will bring his or her own expertise as well as the ability to coordinate everyone’s efforts in larger interdisciplinary research initiatives,” said Dr. Lee Ferguson, an environmental chemistry professor in the department of chemistry and biochemistry.

Ferguson and Chandler have been conducting extensive studies on the effects of carbon nanotubes in marine environments and have shown that the nanotubes have an enhanced ability to absorb toxic chemicals. What that might mean for the health of the environment is not yet clear but points to a need for better monitoring and analysis.

“The global cost to industry for clean-up of chemicals that were originally thought to be harmless and benign, such as PCBs, has now approached the trillion dollar mark,” Chandler said. “The cluster of faculty in our new Center for Nanoenvironmental Risk Assessment will serve as a valuable information and consultation resource to industry as it produces new nanomaterials almost every day.”

Michael Bolick, president and CEO of Selah Technologies, said Selah is one of four companies nationwide who have joined the In-Depth Portion of the EPA’s Nanomaterials Stewardship Program.

The company’s support for the new center was a logical next step as Selah Technologies works with the government and other members of the program, he said.

“This is truly a stewardship opportunity,” Bolick said. “We are fortunate to live in a time when nanotechnology’s promise has begun to bear fruit in the fight against cancer, cleaning up the environment, and in energy efficiency. Selah Technologies is committed to a proactive cradle-to-grave approach to assess, manage, and minimize environmental risks of our nanomaterials. It will be very exciting to see this center grow right here in South Carolina.”

The center likely will focus initially on developing new analytical techniques and sensors to detect nanomaterials in the environment and assessing health effects, Chandler said.

Research projects in the center will look at human health and worker exposure to nanoparticles, such as those in the carpeting industry, which embeds nano-silver particles in some of its products for germicidal purposes. Carbon, silica and gold-based nanoparticle research already is a strength at the university.

“We can’t rely on traditional toxicology methods to test the effects of nanomaterials because nanomaterials have different behaviors in organisms, soil and water,” Ferguson said. “We’ll have to design experiments very differently to determine how nanoparticles behave compared to traditional environmental pollutants such as DDT.”

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