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RFP 9 Update

The Center has received a record number of 30 proposal submissions for the RFP round that closed this past January. With the support of the Department of Community and Economic Development and the Air Force Research Lab at Wright Patterson Air Force Base, the Center engaged Pennsylvania-based universities, small and large industries and start-up companies as they develop a plan to commercialize the technology application of advanced material research. Applying a competitive review process, the Center is on track to award three commercialization and six pre-commercialization grants. These early stage commercialization efforts will primarily focus on transitioning the innovative product concepts to working prototypes. The winners will formally be announced in April.

Upcoming Proposal Rounds

The Center is pleased to announce that we will be accepting Idea Submissions starting late May 2011. The RFP announcement and details will be posted on the Center's website in the foreseeable future.

Executive Briefing Series

"Regulation of Nanotechnology - Where Innovation and Environmental, Health and Safety Concerns Intersect"

This program will include two components. First, Mary Beth Deemer of the law firm of Jones Day will discuss existing and proposed regulation of products containing nanoscale materials and issues relevant to such regulation. Second, Gary Casuccio of RJ Lee Group, Inc. will discuss the state of the art with respect to sampling, analysis and risk assessment, including evaluation of nano particles from a work exposure and environmental release perspective. Save the date June 2, 2011.

This event is the second in a quarterly series sponsored by Center and Jones Day. These events are intended to provide key decision makers with information and networking to be more informed about incorporating nano into their new product development plans.

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Bayer MaterialScience Fights Pain and Infection with Carbon Nanotubes

By Tim Hayes

Imagine a thin sheet, so unobtrusive that you may never even notice its existence, saving you from pain and infection. It's one of the Pennsylvania NanoMaterials Commercialization Center's newest developments, working in partnership with Bayer MaterialScience LLC.

These flexible sensing films, utilizing new Baytubes® carbon nanotubes technology from Bayer, have been developed with the help of the Quality of Life Technology Center, a joint venture between Carnegie Mellon University and the University of Pittsburgh.

The sensing films utilize the mechanical properties of Baytubes® carbon nanotubes, which provide electrical conductivity through their large surface area. By leveraging the benefits of the nanotubes in the final product, the technology will potentially provide flexibility, durability and customization to prevent pressure sores and deep tissue damage for wheelchair users.

"Pressure sores are a big issue for certain at-risk populations, including non-ambulatory people with spinal cord injury, those bedridden in nursing homes and diabetics," explained Mike Gallagher of Bayer MaterialScience. "There are 1.6 million spinal cord patients in wheelchairs worldwide, and nearly 50 percent of the U.S. population is considered obese and susceptible to diabetes. This sensing film product can serve these markets almost immediately. It has been personally rewarding to be part of a project that increases the quality of life for these people."

Gallagher shared studies showing that pressure sores represents \$1.7 billion in cost to the U.S. healthcare industry.

"When the average person is in a chair, you can shift your body if you are uncomfortable, but a non-ambulatory person can't do that," he said. "Sores are caused by pressure, moisture, sliding back and forth, temperature, diet and the physiology of the patient. We developed a device that's thin and flexible, like a film. It measures temperature, pressure, and moisture, so the electronics in this film can tell the patient there's something amiss."

Carbon nanotubes are very small semi-conducting materials that can transmit current. By putting them into coatings and applying them onto flexible film, researchers at Bayer MaterialScience found that they could help in this specific application – informing people that they need to adjust their positions to avoid sores and infections. An interesting future development might be to integrate the sensing film with an actuator that would automatically adjust the patient's position in response to a stimulus. As Gallagher explained, it's like the auto focus on a digital camera – it reads the situation and adjusts accordingly.

"There have been a lot of technical challenges, but with nanomaterials very little goes a very long way," Gallagher explained. "Mixing these nanotubes into conventional coatings and applying them onto film is an easy, inexpensive, and highly effective tool. We always look at developing new materials and add to conventional materials to achieve new applications. We seek out projects like this."

To prove the cost-effective argument, Gallagher said that prototypes of the new sensing film product for use by wheelchair-bound patients cost less than \$1,000. Customized products for this segment attempting to perform a similar function available now cost \$11,000. Of course, more work needs to be done to determine savings potential more precisely.

"The Human Engineering Resource team at Pitt did much of the prototype testing, and the people at CMU did more user-interface development and testing," he said. "It's still a work in progress, with additional testing for new devices occurring now."

"A pressure-sensing pad like this has a long approval process with several government agencies. We all want to be assured the final product is safe and effective. Insurance companies also need to recognize the value and include it in their coverage," Gallagher continued. "Bayer MaterialScience is now exploring new collaborators to carry this technology forward from here. The prototypes will continue to evolve and could find its way into applications like pressure sensory pads for spinal cord patients or foot pads for diabetics. Diabetics can lose feeling in their feet, and they don't always know they're at high-risk behaviors and need to get off their feet to get swelling down or avoid infection. The sensing film can be made to look like a little piece of ribbon, but it can do all these things."

The project was supported by the Pennsylvania NanoMaterials Commercialization Center with funds provided by the Air Force Research Laboratory in Dayton, Ohio. The Center's Director, Dr. Alan Brown, commented that this project illustrated how university-company partnerships can quickly develop working prototypes of innovative solutions for the medical industry.

www.bayermaterialscience.com

DIRECTOR'S COMMENTS:

Welcome to this spring 2011 edition of NanoMaterials Quarterly. It has been a very busy winter for the Center. We just completed our ninth proposal round on January 28 and were pleased to receive 36 idea submissions and 30 formal proposals. The proposals represented a breadth of new product ideas using nanotechnology; energy, aerospace, sensors, coatings, basic materials, and the health sector.

This heightened activity in innovative ideas reflects the continuing resilience and growth in the high technology sector in our region. This was reinforced during a recent event hosted by Enterprise Forum on March 9, which brought together many investor and economic development organizations in Pittsburgh. The discussion focused on how each organization assists entrepreneurs and start-ups. In addition to the Center, many local organizations were represented; Innovation Works, Life Sciences Greenhouse, Pittsburgh Equity Partners, Blue Tree Allied Angels, Bridgeway Capital, Prestige Capital and the Urban Redevelopment Authority.

During the meeting, I realized the range of services and support for budding entrepreneurs. By comparison to other areas of the country where I have lived, Pittsburgh truly excels in the variety and expertise of our various entrepreneurial support organizations, coupled with the leading research from our universities. However, I also realized that we have a marketing problem. We don't communicate effectively within the region and also outside the region on our support services and at what stage we can assist start-ups. For its part, the Center will strive to better communicate our message both regionally and nationally and support similar efforts by our sister organizations.

Check out two websites which try to address these issues; [Pittsburgh Technology Council's Entrepreneurs Resource Center](http://PittsburghTechnologyCouncil.org), and the [Help Startups web site](http://HelpStartups.com). Join me in supporting their efforts.

Alan G. Brown
Executive Director



NANO CENTER NEWS

CENTER ANNOUNCES NEW BOARD MEMBERS

The Center is happy to announce that it has two new Board members. Help us welcome Ms. Rachel Allen from Jones Day and Dr. Carlo Pantano from The Pennsylvania State University. (+)

CENTER RECEIVES \$450K GRANT FROM BFTDA AND RELEASES NEW ECONOMIC IMPACT DATA

The Pennsylvania NanoMaterials Commercialization Center was awarded \$450,000 for a university research commercialization grant aimed at developing an industry and university network for building the state's energy sector. The funding comes from The Pennsylvania Department of Community and Economic Development (DCED) budget of \$4 million. (+)

CENTER PORTFOLIO COMPANY NANOLAMBDA FEATURED AT CES 2011

nanoLambda's spectrum sensor™, the world's smallest spectrometer-on-a-chip, can be used not only for bio-chemical detection and wearable health monitoring, but also for accurate color and light measurement of consumer electronics devices. Examples include, but are not limited to, camera, TV or LED lightings to enable accurate and consistent colors across devices and applications. (+)