



Center for High-rate
Nanomanufacturing



NSF Nanoscale Science and Engineering Center for High-rate Nanomanufacturing

Northeastern University's Center for High-rate Nanomanufacturing Develops Revolutionary Technology for Nanoscale Assembly at Wafer Level

*Prototype will be showcased at Nano Science & Technology Institute's Nanotech 2008
Conference in Boston at Booth #211*

Boston – May 15, 2008 – Researchers at the NSF Nanoscale Science and Engineering Center for High-rate Nanomanufacturing (CHN) at Northeastern University, with partners UMass Lowell and University of New Hampshire, have discovered an innovative technology that will have a tremendous impact on the nanotechnology industry. Under the direction of Ahmed Busnaina, Ph.D., researchers developed a technique to scale-up the directed assembly of single-walled carbon nanotube (SWNT) networks, from microns to inches, creating a viable circuit template that can be transferred from one substrate to another for optimum productivity. The revolutionary assembly process has the potential to change the way electronics and other applications are developed for consumers.

This leading research and the work of the CHN partner schools, UMass Lowell and the University of New Hampshire, will be on display at Booth #211 at the upcoming NSTI Nanotech 2008 Conference in Boston from June 1-5, 2008.

Ways to create nanoscale structures, and develop a method to mass-produce those structures while ensuring that they are reliable and cost-effective, are top priorities for the nanotechnology industry. One of four NSF funded nanomanufacturing centers in the country, the CHN has been able to develop a novel way to assemble these nanoelements (nanotubes, nanoparticles, etc.) into nanostructures and devices that enable the mass production of atomic-scale structures and will lead to the production of devices such as biosensors, batteries, memory devices and flexible electronics very quickly and efficiently and with minimal errors.

“This technology is a platform for many applications, and the fact that it is scalable makes it easier to bring to market,” said Busnaina, William Lincoln Smith Professor and Director of the CHN. “The cost of current nanomanufacturing techniques is sky high, and our product has the potential to increase productivity tremendously without sacrificing reliability.”

The revolutionary assembly process, developed by Busnaina and his team, scales-up the nanoscale structures on a wafer level on a variety of hard and soft substrates such as silicon and polymers. In addition, the assembled structures could also be transferred to other substrates in continuous or batch processes.

Concurrently, researchers at the CHN are investigating the environmental and biological implications to ensure that these devices and techniques are safe for people and for the environment.

Other projects that researchers at CHN are working on include:

- Nano-biochips to detect and treat cancer and other diseases

- Thin, lightweight and fast-charging batteries with a longer life than current batteries
- Flexible PDAs and phones
- Flexible lightweight solar collectors that can power homes
- Super-tiny memory devices that resist heat, cold, magnetic fields and vibrations that can be used to create smaller machines
- Sturdy, lightweight materials to replace metal in aircraft or automobiles, creating stronger structures with less weight

While many of these applications are years away, some may come more quickly. “The role of our research is pivotal in bringing nanoscale inventions to market,” added Busnaina. “Some of what we are working on, like biosensors and batteries, could be available as soon as the next 3-5 years. There is a world of possibilities for additional ways that nanodevices can improve current ways of life.”

For more information about SWNT research at Northeastern, please contact Jenny Eriksen at (617) 373-2802 or via email at j.eriksen@neu.edu.

About the Center for High-rate Nanomanufacturing

The Center for High-rate Nanomanufacturing is focused on developing tools and processes that will enable high-rate/high-volume bottom-up, precise, parallel assembly of nanoelements (such as carbon nanotubes, nanoparticles, etc.) and polymer nanostructures. The center’s nanotemplates are utilized to conduct fast massive directed assembly of nanoscale elements by controlling the forces required to assemble, detach, and transfer nanoelements at high rates and over large areas. The developed nanotemplates and tools will accelerate the creation of highly anticipated commercial products and will enable the creation of an entirely new generation of applications.

About Northeastern University

Founded in 1898, Northeastern University is a private research university located in the heart of Boston. Northeastern is a leader in interdisciplinary research, urban engagement, and the integration of classroom learning with real-world experience. The university’s distinctive cooperative education program, where students alternate semesters of full-time study with semesters of paid work in fields relevant to their professional interests and major, is one of the largest and most innovative in the world. The University offers a comprehensive range of undergraduate and graduate programs leading to degrees through the doctorate in six undergraduate colleges, eight graduate schools, and two part-time divisions. For more information, please visit www.northeastern.edu.

