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University Of New Hampshire, Northeastern University And The University Of Massachusetts Lowell Collaborate To Manufacture Nanoscale Devices

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DURHAM, N.H. - The National Science Foundation announced a $12.25 million renewal grant (five years) for the Nanoscale Science and Engineering Center for High-rate Nanomanufacturing – a joint partnership between the University of New Hampshire, Northeastern University and the University of Massachusetts Lowell.

The Center for High-Rate Nanomanufacturing (CHN) aims to address one of the greatest challenges in nanotechnology: the ability to commercially produce nanoscale devices with components that are measured in nanometers (one nanometer equals one-billionth of a meter-- the diameter of a human hair is approximately 50,000 to 80,000 nanometers). Nanomanufacturing directs the assembly of nanoscale building blocks like nanotubes, nanowires, or proteins to produce very small devices with superior properties and features for applications in electronics, alternative energies, new materials and medical fields.

For example, the Center for High-Rate Nanomanufacturing is developing miniature nano-biosensors capable of detecting cancer at a very early stage, years ahead of current detection techniques. CHN also is working on ultra-low power flexible electronics that are hundreds of times faster and smaller and require less power than current solutions; high capacity miniature or large batteries that could be fully charged in minutes; plastics as strong as steel or as conductive as copper; and flexible, high-efficiency, lightweight solar cells.

The full potential of nanotechnology products is projected to reach a $1 trillion market by 2015 and can only be realized with the aid of nanomanufacturing research. CHN is working with a number of industrial partners on developing the tools and processes to accelerate the creation of highly anticipated commercial products. These tools and processes also will support development of next generation applications that have yet to be imagined. CHN uses high-rate/high-volume guided self-assembly of nanoelements as the platform for its manufacturing processes. CHN also concurrently investigates the environmental, economic, regulatory, social, and ethical impacts of nanomanufacturing. The National Science Foundation grant will extend CHN funding for an additional five years.

“One key to CHN’s success is its multidisciplinary approach toward solving nanoscale science and engineering problems,” says CHN associate director Glen Miller, professor of chemistry and director of the materials science program at UNH. “At the University of New Hampshire, faculty and students from the materials science program as well as the departments of chemistry, physics, and mechanical engineering are working to create new nano-building blocks.” UNH faculty and students also are working to understand and control the self-assembly of nano-building blocks so that low-cost, high-rate nanomanufacturing can be...
achieved. They also are developing new nanopatterning techniques that are capable of creating nanoscale features as small as 15 nanometers on a variety of substrates.

In addition to Miller, CHN leadership at Northeastern University is provided by director Ahmed Busnaina (William Lincoln Smith Professor of Mechanical Engineering), associate director Jackie Isaacs (professor of mechanical engineering) and associate director Nick McGruer (professor of electrical and computer engineering). CHN leadership at the University of Massachusetts Lowell is provided by deputy director Joey Mead (professor of plastics engineering) and associate director Carol Barry (professor of plastics engineering).

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 11,800 undergraduate and 2,400 graduate students.

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