



*Combining strengths of five premier community colleges from around the nation for new learning models to build our biotech workforce*

NH Community Technical  
**College**

**National Center Profile:**  
New Hampshire Community Technical College  
**Biomanufacturing Center of Expertise**

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*The President's High Growth Job Training Initiative supports visionary life science sector development sparking action at regional levels. Companies, educators, researchers, entrepreneurs and governments all work together to achieve new levels of innovation. This Profile presents the Biomanufacturing Center - ready to share ideas, resources and assistance at [www.biotech.nhctc.edu](http://www.biotech.nhctc.edu)*

**T**housands of biomanufacturing jobs are available within an hour's drive of the Biotechnology Education and Training Center (NH BET) at the Pease campus of New Hampshire Community Technical College. The Center educates students of all types for biotech careers, supplying workers ready to help biomanufacturing enterprises grow.

Responding to industry needs with about 300 biotech graduates already employed, the Center helps create a workforce needed now and for the future.

Expert college faculty use state-of-the-art training facilities to prepare traditional community college students, incumbent workers - and now student apprentices - for emerging opportunities in biomanufacturing.

“Having the enthusiastic support of biomanufacturing companies means we can better deliver the

education and training these companies need now to grow and bring more jobs to our region,” says Sonia Wallman, Ph.D., director of the Center and of Biotechnology at NHCTC.



Biomanufacturing Center staff (from left) Deb Audino, Tim Dubuque, Susie Harvey, Kari Britt, Sonia Wallman, Bob O'Brien

**S**ince 1994, Wallman's program in New Hampshire has been training biotechnicians using the tools, processes, and regulatory structures of the biotechnology industry. See more at:

[www.biomanufacturing.org](http://www.biomanufacturing.org)

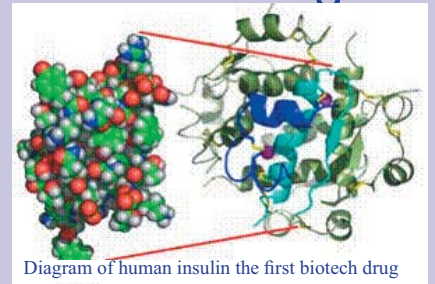
**To harness the power** of biotechnology industry potential – with a skilled, ready workforce – the U.S. Department of Labor Education and Training Administration created the National Center for the Biotechnology Workforce in 2004. Because community colleges are actively involved in meeting the needs of workers and industries in their communities, the National Center focuses energy and investments on five community colleges with different but congruent strengths in the biotechnology industry to create new curricula and infrastructure models that can easily be shared and replicated.

## Beginning the Center of Expertise in Biomanufacturing

New Hampshire was true to its tradition when it went after biomanufacturing in 1991, offering a low-interest loan to attract Celltech Biologics into the vacated Pease Air Force base in Portsmouth. The investment paid off. The company grew and evolved into today's Lonza Biologics, employing more than 500 people. In 2004 the Swiss-based contract biomanufacturing giant started up three 20,000 liter mammalian cell culture fermentation reactors here, the biggest single investment in its history. And Lonza is expected to double the size of this facility again.

Stryker Biotech (a developer of products for bone repair), GlycoFi, and Bentley are among the other 160 or so biotech companies operating in New Hampshire.

Close to Cambridge-Boston, the world leader in biotech, the NHCTC Biotechnology program, lead by Dr. Sonia Wallman with [www.biotech.nhctc.edu](http://www.biotech.nhctc.edu) links to many industry and educational resources, was the logical choice for the DOL-funded Center of Expertise in Biomanufacturing.



## Creating New Hampshire's Biotechnology Education and Training Center

Sonia Wallman is director of the NH BET Center, the Center of Excellence in Biomanufacturing, and the NBC<sup>2</sup>. She received her doctorate in Biology from Harvard University, doing research in the neurobiology of dopamine and serotonin.

In 2002, Dr. Wallman was instrumental in obtaining funding, designing and building the new 5,000 square foot center that mirrors a vertically integrated biotechnology company. The facility includes a 2,500 sq. ft. Discovery Research Laboratory, a 1,500 sq. ft. Biomanufacturing Suite and a 1,000 sq. ft. Core Facility for Production Support.



Sonia Wallman, Ph.D., Director, NH BET National Center of Expertise in Biomanufacturing

NHCTC offers several educational programs here, nested and linked by the requirement of two Cornerstone courses: Discovery Research and Biomanufacturing. It also functions as an incubator for small biotechnology companies providing students with authentic research, development and manufacturing experiences. The skills transferred here lead to careers in the biopharmaceutical industry; and they can be applied to opportunities emerging with industrial biotechnology.

### Incumbent Worker Training

The Northeast Biomanufacturing Institute was inaugurated in September, 2005 with a series of short courses to train incumbent workers. Courses continue in a variety of areas, including Six Sigma theory for the manufacturing process, project management, validation, mammalian cell culture, protein chemistry, chromatography processes, quality control - analytical biochemistry, application of cGMP to biomanufacturing, entrepreneurship in a high technology world and medical devices regulation.

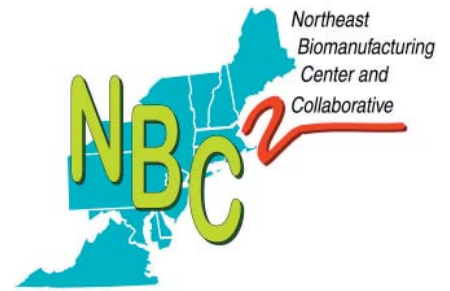


validation, mammalian cell culture, protein chemistry, chromatography processes, quality control - analytical biochemistry, application of cGMP to biomanufacturing, entrepreneurship in a high technology world and medical devices regulation.

NHCTC's Dr. Sonia Wallman, Deb Audino, and Robert O'Brien have been working with Lonza Biologics to customize biomanufacturing courses for incumbent workers. They started this relationship by developing a short course called, "Aseptic Awareness" currently being delivered to 200+ current employees and new hires.



# Northeast Biomanufacturing Center and Collaborative



Dr. Wallman at NHCTC administers an Advanced Technological Education grant from the National Science Foundation in the amount of \$2,998,015 to support a regional biomanufacturing center, the Northeast Biomanufacturing Center and Collaborative (NBC<sup>2</sup>). The organization combines resources of regional community colleges, high schools, and universities together with industry and government to build the education, training and workforce infrastructure to assist rapidly growing biomanufacturing industry in the region.

“The Northeast is a hotbed of biomanufacturing yet it is still difficult to find enough trained technicians and professionals,” says Wallman. “This initiative addresses one of the biggest obstacles to the growth of biomanufacturing in the Northeast: the need for trained workers.”

Six hubs serve a 12-state region: New Hampshire Community Technical College, the Community College of Baltimore County in Maryland, the Community College of Rhode Island, Finger Lakes Community College in upstate New York, Montgomery County Community College in Pennsylvania and Minuteman Regional High School in Massachusetts.



Katrice Jalbert

## Biomanufacturing Apprenticeships

Based on the biomanufacturing skills standards, Dr. Wallman worked with the DOL's state, regional and national Office of Apprenticeship and Training to create the first Registered Apprenticeship in Biomanufacturing. This unique opportunity to work in biomanufacturing during the pursuit of a Biotechnology Associate in Science degree is offered to recent high school graduates as they enter the NHCTC Biotechnology A.S. degree program. During the 2006 DOL-ETA Workforce Innovations conference in Anaheim, one of these new apprentices, Katrice Jalbert, 18, from NHCTC told a compelling story of why she chose biotech education as her career path.

[www.biomanufacturing.org](http://www.biomanufacturing.org)

## BIOMAN 06



Vendor demonstrations included a “Pipetting Olympics” by Artel, Inc.

New Hampshire Community Technical College welcomed 75 biomanufacturing educators and leaders to BIOMAN 06, a week long conference to exchange best practices and ideas in support of biomanufacturing education and training for the 21st century. Participants from around the nation and Puerto Rico included biomanufacturing educators from two year colleges, universities and technical high schools.

Sponsored by the Department of Labor's Center of Expertise in Biomanufacturing and the National Science Foundation's ATE Regional Center for Biomanufacturing, the Northeast Biomanufacturing Center and Collaborative (NBC<sup>2</sup>), professional presenters and keynoters included representatives from industry



BIOMAN 06 participant Rosa Buxeda, of the University of Puerto Rico in Mayaguez, prepares a bioreactor for culturing cells while Sheila Byrne, of Montgomery County Community College, Bluebell, Pennsylvania and Thomas Raymond, of Gaston College, Dallas, North Carolina, observe.

leaders Wyeth and Lonza. A vendor show included displays and demonstrations by top equipment dealers. The program in July ran hands-on workshops and events in the NH Biotechnology Education and Training Center's state-of-the-art facility.

**BIOMAN 2007: Coming July 23-27**

## College Program at BIO 06

The CBC-BIO Community College Program, organized by New Hampshire's Dr. Sonia Wallman, was held at BIO2006 in Chicago on Sunday, April 9th. It was a great success with more than 85 paid attendees (plus a dozen walk-ins). The program was arranged so both NSF ATE and DOL ETA programs were described by key representatives of both agencies. Gerhard Salinger presented the NSF ATE program and Gay Gilbert presented the DOL- ETA programs. Mark Cafferty and Russ Read chaired DOL grantee sessions; Elaine Johnson and Lisa Seidman of Bio-Link chaired NSF ATE grantee sessions. The program brochure and slides from the sessions are available at:

<http://www.bio-link.org/BIO2006X.htm>

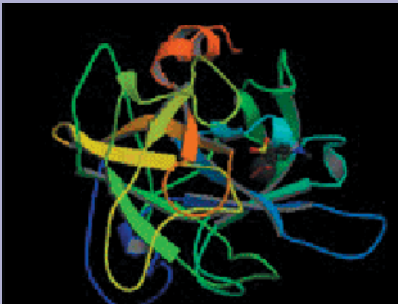


*Gay Gilbert, Administrator for the U.S. Department of Labor, Employment and Training Administration's Office of Workforce Investment Administration speaks at the Community College event organized by NHCTC at BIO2006 in Chicago*

Momentum is building for NHCTC Biomanufacturing - programs are adding more students, more graduates and more apprentices. Job opportunities also keep increasing.

Plans include:

- Increase outreach to high schools to recruit students for NHCTC's AS degree in biotechnology.
- Reach out to more New Hampshire and regional companies to expand incumbent worker training.
- Increase the numbers of Biomanufacturing Apprentices for the Northeast.
- Expand the innovative apprenticeship program to include a Discovery Research Apprenticeship.
- Equip NH Pilot Plant for production of biologics for small companies.
- Develop distance learning capabilities for the biomanufacturing suite, allowing students and teachers remote (synchronous and asynchronous, regional and national) access to the Cornerstone course in Biomanufacturing.



tPA - tissue plasminogen activator  
a biopharmaceutical clot-buster

## Moving Forward

## Thanks to Sponsors, Partners, Supporters, Participants:

The New Hampshire Biotechnology Education and Training facility at New Hampshire Community Technical College extends its thanks to Lonza Biologics, Wyeth, Bentley Pharmaceuticals, Stryker Biotech, Bio-Concept, Wunderlich-Malec, Glycofi, Seacoast School of Technology, Milford High School, Nashua High School, the University of New Hampshire

[www.workforce3one.org](http://www.workforce3one.org)

[www.biotechworkforce.org](http://www.biotechworkforce.org)

The National Center for the Biotechnology Workforce is the recipient of a Presidential High Growth Job Training Initiative Grant as implemented by the U.S. Department of Labor's Employment and Training Administration

**The National Center for the Biotechnology Workforce**  
preparing workers for in-demand jobs in high growth, advanced technologies  
maintaining U.S. competitiveness in our growing global economy.