

# New Hampshire focuses on education and training for biomanufacturing

Dr Sonia Wallman, Director of the Center of Expertise in Biomanufacturing located at New Hampshire Community Technical College, describes the educational facilities and programmes which support the state's biotech industry.

In the 2006 Battelle Report two states were cited that focus on biomanufacturing education and training and the workforce. These states were North Carolina and New Hampshire.

New Hampshire has always been a manufacturing state and biomanufacturing in the state dates back to the early 1980s when Verax Corporation was founded in West Lebanon. It became one of the very first contract biomanufacturing facilities in the world. Stryker Biotech now operates this facility for the biomanufacture of OP-1, a therapeutic protein involved in bone repair. Many biopharmaceutical companies that are working on the development of protein products have sprung up in the Upper Valley including GlycoFi-Merck, Bio-Express, Adimab, and Woomera. Another company, Mascoma, using similar technologies to produce cellulosic ethanol has recently located in the Upper Valley.

### Biotech degree programme

In the early 1990s, the state gave a low interest loan to locate Celltech Biologics (now Lonza Biologics) on the Pease International Tradeport in Portsmouth, and in 1994 New Hampshire Community Technical College (NHCTC), also at Pease, began a Biotechnology Associate in Science degree programme with a biomanufacturing focus, followed by the offering of Biotechnology Certificates for people with higher education degrees or unable to spend two full years at college before going to work.

The biotechnology programmes were begun by Dr Sonia Wallman at NHCTC

**NHCTC students following an SOP for an ELISA quality control biochemistry test.**



with the first round of funding from the Advanced Technological Education (ATE) programme of the National Science Foundation (NSF) in July 1994. In 1998, the NSF ATE programme funded Bio-Link, a national biotechnology centre, and Dr Wallman became Northeast Region Director of Bio-Link. One of the off-shoots of NSF ATE funding was the founding of the New Hampshire Biotechnology Council in 1999.

As students graduated from NHCTC's industrial biotechnology programme in the mid-1990s, most went to jobs in biomanufacturing at Wyeth and Lonza in production (upstream and downstream processing) or quality control (microbiology and biochemistry). But the list of biomanufacturers employing our graduates has grown and includes over 30 biomanufacturers and biomanufacturing-related companies in New Hampshire, Maine, Massachusetts, Rhode Island, New Jersey and California. The list of jobs grew, as well, to include quality assurance, validation, and process development.

### Biomanufacturing technicians

In 2003-2004, with the help of another NSF ATE grant, our partner companies came together to determine the skills, knowledge and attributes for ten biomanufacturing technician jobs. This grant laid the groundwork for three additional grants, one from the NSF ATE programme and the other from the Department of Labor (DOL) Employment and Training Administration.

In 2004-2007, the DOL funded the National Center for the Biotechnology Workforce with the Center of Expertise in Biomanufacturing located at NHCTC under the directorship of Dr Wallman. This grant allowed for the purchase of equipment to outfit the biomanufacturing suite, part of NHCTC's 5000 sq ft (460 sq m) New Hampshire Biotechnology Education and Training Center. It also provided funding to start a DOL registered biomanufacturing apprenticeship programme based on the biomanufacturing skill standards and the Northeast Biomanufacturing Institute for incumbent worker training.

In 2005-2009, the NSF ATE programme

funded the Northeast Biomanufacturing Center and Collaborative (NBC<sup>2</sup>). The purpose of the grant is to develop the infrastructure for biomanufacturing education and training throughout twelve northeastern states, including the development of strong biomanufacturer-community college partnerships and the regionalisation of the biomanufacturing apprenticeship programme. And in 2005-2008, the DOL funded 'bioCONNECTnh' to build the state infrastructure for biotechnology / biomanufacturing education and training by focusing on high schools and companies.



**NHCTC student assembling a bioreactor for CHO cell culture that will produce the clot-buster, tPA**

Now Dr Wallman is spearheading the development of a National Biomanufacturing Center and Collaborative in order to provide the national infrastructure to support the great growth in biopharmaceutical manufacturing and the advent of the bioeconomy that is occurring throughout the US. The biomanufacturing sector of the biotechnology industry employs the greatest number of technicians. Community colleges, with the help of local biomanufacturers, are poised to provide entry level and replacement technicians and to train their incumbent technicians and professionals for the careers available in biomanufacturing.

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