BIOTECH
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A NEWSLETTER TRACKING TRENDS IN BIOTECHNOLOGY WORKFORCE TRAINING

A report from the panel discussion
"Pathways to Successful Careers: Biotechnology Internships, Apprenticeships and Outcomes
Winston-Salem, North Carolina / September 12, 2006

Winston-Salem - Internships and apprenticeships in biotechnology not only attract more students to the field, but also make a tremendous difference in their ability to immediately integrate into a working environment after graduation and to quickly meet a company's needs. Key to successful internships/apprenticeships, however, is offering students challenging assignments and hands-on opportunities that will truly translate into the workplace. Biotech companies who provide internships and apprenticeships are rewarded not only by a pipeline of qualified workers, but also by the leadership skills their existing staff members gain through mentoring the students. These were among the points mentioned by both students and faculty during "Pathways to Successful Careers: Biotechnology Internships, Apprenticeships and Outcomes," a program hosted by the National Center for the Biotechnology Workforce at the Piedmont Triad Research Park in Winston-Salem, North Carolina. Faculty and students from apprenticeship and internship programs in New Hampshire and North Carolina shared experiences and best practices. The program gave them the chance to learn from each other, inform other attendees and, through print and video, replicate the model for use in the country, noted Russ H. Read, Executive Director, National Center for the Biotechnology Workforce.

New Hampshire, National Model in Apprenticeships

Although the biotechnology curriculum at New Hampshire Community Technical College (NHCTC) in Portsmouth, New Hampshire, began as early as 1994, three important federal grants awarded beginning in September 2004 have since transformed the program into a national model, stated Dr. Sonia Wallman, NHCTC director and chair of biotechnology. Funds from the U.S. Department of Labor enabled NHCTC to become the National Center for Expertise in Biomanufacturing and begin the nation's first apprenticeship program in the field.

Thanks to input from partners such as Lonza Biologics, Wyeth Biopharma and Marine Polymer Technologies, Dr. Wallman's team produced a manual of skill standards in January 2005 that specified the knowledge and attributes needed for jobs in several areas: process development, validation, metrology, upstream/downstream processing, quality control microbiology, quality control biochemistry, quality assurance, and environmental health and safety. The standards are now being used as the basis for curriculum development and a better understanding of what the biopharmaceutical manufacturing sector needs in future employees, Dr. Wallman observed. In addition, the funds enabled the purchase of "industrial strength" biomanufacturing equipment, including four Applikon process-controlled, three-liter bioreactors and four Bio-Rad Liquid Chromatography systems.

The grant money is also being used to continually improve biotechnology instruction at the high school level. The incredible hands-on experiences the high school students have is an "infrastructure pump for students to continue their education at the community college," Dr. Wallman confirmed. "Students who learn to use a bioreactor in high school don't want to go to a four-year college where they might only see a bioreactor when they are about to graduate."

NHCTC's Biomanufacturing Apprentice Program enables students to spend several hundred hours in the classroom and 2,000 hours of paid apprenticeship

work (half of it paid by the Department of Labor grant) over a two-year period, before graduating with an associate degree in biotechnology.

Katrice Jalbert is currently in the program and doing her apprenticeship at Lonza. The first woman in her family to graduate from high school and go on to college, Jalbert has already been offered a full-time position as an Operator One at Lonza when she graduates in spring 2007. "I liked science in high school, but I didn't know where to start in choosing a career," she noted. "At Lonza, I've had a chance to visit each department and see how it works, from the bottom up. That has helped me determine which departments I like to work in, and the apprenticeship paid for my second year of school." Jalbert added that the fact Lonza has plants around the world was a draw for her; she hopes to work for the company in England and to continue her education there, at least some of it paid for by Lonza.

Another NHCTC student, David Haddad, is doing his apprenticeship at the college, using materials and processes such as plasmid DNA and electrophoresis to prepare materials that are used in the high school program. He is also certified to help the students and to train teachers as well.

Internships Benefit both Students and Biotech Companies

Debra Perret, community affairs and grants specialist, Targacept, Inc., Winston-Salem, North Carolina, said the company has had 20 successful internships completed since beginning its program in 2002. Targacept, which has 80 employees, is a biopharmaceutical company engaged in the design, discovery and development of drugs to treat multiple nervous system diseases and disorders by selectively targeting a class of receptors known as neuronal nicotinic receptors (NNRs).

Students from four-year colleges and universities as well as Forsyth Technical Community College work full-time at Targacept for 10 weeks in the summer, Perret explained. The four-year colleges co-fund the students' stipend along with Targacept, "which allows us to take more interns," Perret added. In addition to receiving real-world, hands-on experience, each student must give a formal presentation, which is attended by company president and CEO Don DeBethizy, about his or her work.

"The benefits to Targacept are that the students do specific, meaningful work assignments that we would otherwise have to pay contractors for; it provides good supervisory experience for the (employee) sponsor; and the talented students with top skills may get hired," Perret explained. The colleges and universities benefit as well because they can use the Targacept program as a model to apply for grants and to persuade other companies to offer internships, she added.

The Targacept program especially targets women and minority students, two groups traditionally underrepresented in biotechnology. Providing those students with internships is critical to getting them to choose a career in the sciences, said Dr. Rebecca Dunn, Chair, Biology Department, Salem College, a women's college in Winston-Salem. "Many studies have shown that students who do science, stay in science," she emphasized.

Brittany Owen, a Salem student, held a summer internship with Targacept. Aside from experience working with liquid chromatography and mass spectrometry, "it gave me experience in the working world and helped me understand the culture of the workplace," she said, adding with a smile: "It also prepared me for waking up early!"

Mature Workers Adapt Well to Biotech Jobs

Adapting to the rigor and culture of full-time work is sometimes difficult for young graduates, and that has opened doors for older students who are returning to community college for retraining, said Dr. Lucas Shallua, Forsyth Tech Chair of the Biotechnology Program and Director, National Center of Expertise in Biotechnology Research and Development Training. "The feedback we are getting from employers is that they want mature students," Dr. Shallua confirmed.

Another issue that emerged was that young graduates were arriving in the work place not knowing how to work with laboratory animals, and in some cases were actually afraid to handle them, Dr. Shallua observed. "We are now requiring our students to obtain at least 160 hours of hands-on lab experience in which they work with animals."

Another panelist and internship beneficiary, Jim Crawford, 56, told of how he was downsized from three different companies before he enrolled at Forsyth Tech. Crawford, a recent graduate of the

biotechnology associate degree program, stated that he very much wanted to remain in the Winston-Salem area but found himself either over-qualified or under-qualified for a small pool of available jobs. Despite years of management experience, his skills often weren't specifically what employers were looking for, he said.

"I had graduated from a four-year college with a science degree, but at the time I thought I would be better off going down a different path, into management," Crawford revealed. "I was pleased to find out that in biotechnology, my age would actually be an advantage." His internship at the Wake Forest University Institute of Regenerative Medicine led to a full-time job there. "We 'old dogs' can bring a lot to the table when we get retrained and supported by the community," Crawford joked.

Enrolling in the Forsyth Tech biotechnology program was the beginning of a transformation in Mica Welsh's life. Welsh told the group that she avoided taking any difficult classes in high school and became an 18-wheel truck driver. "But I got injured and had to retrain," she told listeners. "I saw on the news that Forsyth Tech had gotten a multi-million dollar grant for a biotech program! I went on the US Department of Labor Web site and read about it and thought, 'Well, let's give it a shot.'"

Now Welsh not only expects to graduate with honors in May 2007, but has also been elected student government council president at Forsyth Tech. Her work with RNA extraction during an internship with Dr. Kim H. Tan, Winston-Salem State University, Piedmont Triad Research Park, was invaluable to her training, she noted. "In class I learned a lot of specific skills. What I learned from Dr. Tan was to put the pieces together to create a pathway from a question to an answer."

Bob Kanode, a 51-year-old father of three, told the audience that although he graduated decades ago with a Bachelor of Science degree, he spent only a brief time in the laboratory before choosing to go into business for himself. Although he still has a landscaping business, "I chose to enter the biotech program because I see this as the future, and I need to pursue it," he explained. After briefly describing his internship with chemo-preventative chemicals in the Wake Forest University chemistry department, Kanode looked hopefully at the audience and said he is seeking full-time employment now.

More Company Internships Needed

Forsyth Tech is doing its best to graduate mature workers, but finding enough companies who will give the students internships is proving to be a challenge, admitted Dr. Stephen Johnson, the school's Biotechnology Workforce Outcomes Research Manager.

Johnson urged companies to think beyond the traditional summer-time internship program. Many students are willing to do internships, even for no pay, during the academic year. Faculty must learn to think outside the box when helping students find internships as well, he stressed. If an internship is not available in the student's favorite area of biotechnology, faculty and students must think creatively about other areas where internships might be more plentiful.

Another innovative idea for matching companies and potential interns was described by panelist Jenny Stokes, the Young Professionals Coordinator of Action Greensboro, a nonprofit group whose purpose is to recruit and retain "21- to 39-ish" professionals in the Triad area of North Carolina (which includes the three cities of Winston-Salem, Greensboro and High Point). Action Greensboro has proposed a Triad InternNet initiative that would allow students seeking internships and companies wanting interns to find each other through a Web site. Other plans include offering an "internship in a box" manual or kit that would actually help interested employers start an internship program in their companies. ❑

From left to right: Katrice Jalbert, David Haddad, Dr. Sonia Wallman

James Crawford

Mica Welsh

Bob Kanode

Debra Perret, Brittany Owen

Excerpts from "Pathways to Successful Careers: Biotechnology Internships, Apprenticeships and Outcomes"

A panel overview of the role of biotechnology internships and apprenticeships and the innovative practices involved, as described by biotechnology training experts, employers and student testimonials.

Date: September 12, 2006

Location: Piedmont Triad Research Park, 115 South Chestnut Street, Winston-Salem, NC 27101

Panelists

Sonia Wallman, PhD, Director, National Center for Expertise in Biomanufacturing Training; Director, New Hampshire Community Technical College Biotechnology Program, Portsmouth, NH*
Katrice Jalbert, Apprentice, Lonza Biologics, Portsmouth, NH
David Haddad, Apprentice, New Hampshire Community Technical College Biotechnology Program, Portsmouth, NH
Debra Perret, Community Affairs and Grants Specialist, Targacept, Inc., Winston-Salem, NC
Brittany Owen, Student, Salem College, Winston-Salem, NC
Dr. Lucas Shallua, Chair, Biotechnology Program, National Center of Expertise in Biotechnology Research and Development Training, Forsyth Technical Community College, Winston-Salem, NC*
James Crawford, BS, AAS, Biotechnology Associate Program Graduate, Forsyth Technical Community College, Winston-Salem, NC; internship completed at Wake Forest University Institute for Regenerative Medicine
Mica Welsh, Biotechnology Program, Forsyth Technical Community College, Winston-Salem, NC; internship completed in the laboratory of Dr. Kim H. Tan, Winston-Salem University
Bob Kanode, BS, AAS, Biotechnology Program Gradute, Forsyth Technical Community College, Winston-Salem; intern, Chemistry Department, Wake Forest University
Dr. Stephen Johnson, Biotechnology Workforce Outcomes Research Manager, Forsyth Technical Community College, Winston-Salem, NC
Jenny Stokes, Young Professionals Coordinator, Action Greensboro, Greensboro, NC

Moderators

Dr. Rebecca Dunn, Chair, Biology Department, Salem College, Winston-Salem, NC
Russ H. Read, Executive Director, The National Center for the Biotechnology Workforce, Forsyth Technical Community College, Winston-Salem, NC*

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