



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

## National Center for the Biotech Workforce Partner Grant Wrap-Up

### Centers of Expertise Leaders meet, summarize grant initiatives

*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.*



**Biotech Grant WrapUp Meeting Participants (see names on back cover)**

**L**eaders and partners of the National Center for the Biotechnology Workforce gathered at Forsyth Technical Community College in Winston-Salem, NC on Tuesday, Dec. 11, 2007.

Culminating 36 months of widespread work around the country, all of it sparked and supported by a \$5 million Department of Labor, Employment and Training Administration grant (awarded June 28, 2004), the meeting surveyed achievements and lessons learned through the creation and progress of the National Center for the Biotechnology Workforce (NCBW).

A nationwide enterprise, developed under the President's High Growth Job Training Initiative, the Center engages numerous workforce challenges facing the biotech industry today. The five partners, all community colleges and each one a proven "Center of Expertise" in its own specific area of industry training and geographical region, came together and were united to represent the whole nation and all spheres of our nation's growing biotechnology industry.

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

*To harness the power of biotechnology industry potential – with a skilled, ready workforce – the U.S. Department of Labor Employment 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.*

# Centers of Expertise Leaders meet, summarize grant initiatives

National Center for the Biotech Workforce Partner Grant Wrap-Up Meeting Dec. 11, 2007

**T**hrough enduring partnerships created and maintained between educators and industry by the National Center for the Biotechnology Workforce (NCBW), responses to current biotech workforce demands were formulated and developed into programs and curricula for easy access at community colleges. Used in classrooms and newly-equipped training laboratories, these responses and initiatives are producing hundreds of new, skilled workers.

Tasks completed by the NCBW include training strategies, meetings, coordinated support for teachers and students, plus new teaching materials, equipment purchases and implementations, tools and new curricula for major segments of the high-growth biotech sector. The grant's sustainable processes continue.

"The grant we started with is not the one we ended up with, it's been a dynamic, growing process," said Russ Read, NCBW Executive Director, explaining the purpose behind gathering Center members, participants and stakeholders.

The event helped conclude and capture knowledge from initial phases of the grant's work. "Our goal was to leverage resources, expand partnerships, and coordinate existing efforts while creating a sustainable network that can amplify results, anticipate and respond to ever-changing requirements of an American industry growing by more than fifteen percent year over year. We must be able to prepare workers ready to contribute to this rapidly growing industry to maintain our global competitiveness."

**T**his profile summarizes the achievements and ongoing work of the five Centers of Expertise, as well as the actions and achievements of the National Center Office itself, discussed and recorded at the Dec. 11, 2007 event. Perspectives expressed and received by individual center directors, representatives from industry partners, along with statements by government officials and other participating stakeholders, plus tours of labs and new equipment, were all part of the day-long meeting and evening reception.



**Russ Read welcomes members, participants, stakeholders and supporters to a Winston-Salem reception held in recognition of the National Center for the Biotechnology Workforce. Attractive easel displays featured highlights and achievements of the three-year, nationwide program created by a Department of Labor - Employment, Training Administration grant through the President's High Growth Job Training Initiative.**

## The story of the grant

The National Center Office, located at Forsyth Technical Community College in Winston-Salem, NC, provides administrative oversight for the Department of Labor ETA National Center for the Biotechnology Workforce, serving the five Centers of Expertise in community colleges throughout the country. The initial goal was development of a coordinated network of leading institutions, each with capabilities in a specific biotechnology arena, to provide program and faculty development in different regions and coordinate national responsibility for development of skills standards and workforce data. The plan was to quickly identify and respond to the most pressing workforce demands by region and niche.

Center of Expertise	Region	Functional Expertise
<b>Forsyth Technical Community College</b> Winston-Salem, North Carolina	Southeast	Biotech Research and Development
<b>New Hampshire Community Technical College</b> Portsmouth, New Hampshire	Northeast	Biomanufacturing
<b>Indian Hills Community College</b> Ottumwa, Iowa	Midwest	Agricultural Bioprocessing & Renewable Fuels
<b>Bellevue Community College</b> Bellevue, Washington	Northwest	Life Science Informatics
<b>MiraCosta Community College</b> San Diego, California	Southwest	Bioprocessing

## Expertise Centers Meet, Review Activities, Achievements Together

**National Center for the Biotechnology Workforce** ongoing activities and goals include:

*Regional meetings to support faculty development in biotechnology.*

*Creation and dissemination of replicable programs and materials.*

*National meetings to convene community colleges and other technician training providers.*

*Employer-college joint initiatives to develop skill standards; with dissemination of these standards.*

*Enhanced capacity for training at each of the regional centers; leadership in its area of expertise.*

## Roundtable Captures Knowledge, Sets New Stage

Hosted by Forsyth Tech in Winston-Salem, NC, the members, stakeholders and participants of the National Center for the Biotechnology Workforce met on Dec. 11, 2007 to recount endeavors and discuss the experiences and achievements of their nationwide partnership and enterprise.

The discussion was often lively and surprising. Here Gwyn Riddick (center) shares a laugh with Rebecca Keith (right) and others at the table.

**(see Roundtable report on page 9)**



## Center Leaders Discuss Accomplishments on Video



**Sam McCormick produced videos to record experiences and knowledge for later dissemination.**



## Videos

**available online:  
[www.biotechworkforce.org](http://www.biotechworkforce.org)**

**National Center for Biotechnology Workforce: Key Learning & Future Plans**

**Demand Driven Biotechnology**

**Careers & Pathways in Biotechnology**

**70th Anniversary of DOL Apprenticeship Program**

**Center of Expertise for Biotechnology Research & Development Training**

**Center of Expertise for Bioprocessing**

**Center of Expertise for Life Science Informatics**

**Center of Expertise for Biomanufacturing**

**Center of Expertise for Agricultural Bioprocessing and Renewable Fuels**

**We chose to record** this de-briefing step by step; it's an example of how we make our work replicable. We find we are leveraging two dollars for each dollar spent. We make our grant dollars work.

Each Center has a list of multiple industry partners. This sets the tone for how productive we are. Look how far we've come working together.

There's a lot in the program, you only have to go to [www.biotechworkforce.org](http://www.biotechworkforce.org) and visit each center virtually through their profiles to see how the grant has a snowball effect.

With our NCBW mandate we created a lot of synergy, more was accomplished through the partnerships than could be individually. Core values of openness and partnership helped us accomplish synergistic outcomes.

We set lofty goals as a team in a growing industry. As a

business person I am comfortable with objective outcomes. I was focused on making numbers for this grant but I noticed that with our quarterly reports I kept reading about success stories of people who had transformed their careers from being downsized plant or office workers or former truck drivers to biotech technicians regardless of the challenges that many faced. To this numbers person this was heartening and it rekindled something in me about these students and their resilience.

Going forward I think a real need is to produce high quality biotechnology graduates who are at ease with innovation. The best thing we can do for the work force needs is to produce a highly skilled tailor fit employee who is comfortable working, taking on assigned responsibilities, and is an effective team player for the company or institution.

### **Russ Read Comments to Center Directors, Allies**

## **Indian Hills Community College** **Agricultural Bioprocessing & Renewable Fuels** **Ottumwa, Iowa**



**Russ Read congratulates Janet Paulson of IHCC and Marvin Knoop of Cargill with a certificate in recognition of their work and accomplishments leading a Center of Expertise.**

**E**xperiencing an enrollment increase of 50 percent in its Bioprocess Technology, A.S. degree and its new Ethanol Technician, A.A.S. degree programs, Indian Hills Community College (IHCC) growth keeps pace with regional growth in biofuels production.

As outlined in President Bush's January 2007 State of the Union address, new renewable and alternative fuels standards will help increase upper Midwest ethanol production. Projected economic impact of this growth is significant, potentially creating 1,573 new jobs for skilled workers.

"Having strong industry partners is essential to success," says Center Coordinator Janet Paulson. She attended the Dec. 11 event with Marvin Knoop of Cargill, a proud partner of her Iowa Bioprocess Training Center, located in Eddyville, Iowa. Cargill is an international provider of food, agricultural, and management services with 158,000 employees in 66 countries. The company donated the land to build the \$2.5 million training facility with its pilot plant and technical students and staff accessible to industry. Indian Hills began offering its ethanol plant technician program here in 2005. Five Biotech companies have used the pilot plant to advance their skills and knowledge, so far.

Part of the Center's work, says Paulson, is in developing new curricula and training models for bioprocessing. They've worked with industry to develop skill standards for bioprocess technicians; ethanol plant maintenance technicians; and ethanol plant operators. Using other support, including from Iowa BioDevelopment, the college helped complete a statewide workforce training needs assessment of fifty biotechnology companies designed to expand training options throughout Iowa. And it offers bioprocess technician training models to other community colleges as a shared program.

**W**e've improved access to all our bioprocessing training through video conferencing and online learning," says Paulson. Among many accomplishments, the Training Center's helped facilitate incumbent worker training logging over 10,000 attendees (in EMT, wastewater, high performance liquid chromatography, technical, safety, maintenance, and process control) through June 2007.

Despite the growth, Paulson continues to emphasize outreach. The Training Center's biotech experts and advocates attend and display their fermentation virtual reality models at major events including Workforce Innovations Conferences, teachers conferences, and the Iowa State Fair. The Training Center and Cargill also co-sponsor the Heartland Area Education Association's S.E.M.I. Lab project, providing supplies and materials for the mobile biotech laboratory delivering biotech science curricula to secondary schools throughout Iowa and in cooperation with the state's fifteen community colleges. Plus, twenty high school students have taken the online course "Introduction to Biotechnology."

"We've done an enormous amount of outreach - so many venues - we've reached thousands," said Paulson. "I had no idea how many people do not know about biotechnology. Our work advances the industry, gives people a better understanding of biotechnology and offers better access to biotech programs. We've had hundreds of students come to our facility. At the beginning, we had to go out and call them. But now, they call us."

Paulson added that she was happy to be participating at the Grant Wrap-up event. "It's such an asset to have the National Center, these partners are great. It helps our outreach to have other colleges from around the country contact us and come to see our facility and programs."

# MiraCosta Community College

Bioprocessing

Oceanside, California

**M**ira Costa's strength has been in building partnerships. Industry partners, including IDEC and Genentech, helped design and build the new biotechnology teaching center. Today, students enjoy a resource that simulates research and development on the lab bench as well as in the flow of material through a large-scale bioprocessing facility.

"The hands-on experience cannot be underestimated in preparing students for work," says Ric Matthews, director of the Center of Expertise in Bioprocessing at MiraCosta Community College in Oceanside. "Generous industry donations and DOL grant money provided state-of-the-art equipment to allow MCC to build capacity for our programs."

San Diego County enjoys the distinction of being the third most densely populated biotechnology region in the country. There are more than five hundred registered biotechnology entities here. It is estimated that roughly 90 percent of all students who have completed the biotechnology program found employment in the field. Several were hired even before completing the program.

MiraCosta College provides specialized training via its Continuing Education arm, including customized training for Invitrogen workers. MCC also works with the local workforce board, the San Diego Workforce Partnership, to provide customized training to help displaced electronics workers return to the workforce in bioprocessing.

Over the past three years, MiraCosta College has worked

closely with California State University, San Marcos (CSUSM) so students can move from MCC to CSUSM and obtain a baccalaureate or masters degrees.

The college has a strong presence through Tech Prep with feeder high schools. "We need to find a way to reach schools and get to the general public. Twice a year we hold an open house and invite the public," says Matthews. "Kids are natural scientists, somewhere our system loses them. How do we meet students - online maybe? We need to extend our reach beyond normal paths to whatever is next in this virtual world. Things like You Tube are automatic for our

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**Mike Urbach (left) and Ric Matthews accept a certificate from Russ Read (right) for their work and accomplishments leading a Center of Expertise.**

students but unknown by many teachers."

In response to industry demand, MiraCosta College developed one Certificate of Achievement, two Certificate of Competences, and offers two Associate in Arts degrees through the expanding program.

**W**orking with the Southern California Biotechnology Center, the MiraCosta Career Center, and through the faculty's established network of industry connections, MiraCosta places students into internships.

As part of the biotechnology grant, the area sent four high school teachers to North Carolina for advanced training in how to teach biotechnology. All California Community Colleges offering biotechnology are linked through a statewide EdNet initiative with regional colleges serving as pass through points.

MiraCosta College invested more than \$500,000 of General Fund dollars in the past three years building the biotechnology/bioprocessing program. In addition, the college created a tenure track faculty position in bioprocessing, initially sharing this cost with Genentech. Seeded with equipment purchased in conjunction with the DOL grant, the college made bioprocessing one of its Career and Technical Education programs.

Through the college's budget and planning processes, this new bioprocessing program has been assimilated into the catalog of programs that the college offers. It has a dedicated tenure track professor and its own laboratory support personnel. The college has committed resources for supplies and eventual equipment replacement.

# Bellevue Community College

Life Science Informatics  
Bellevue, Washington

**K**eying off extensive industry input, and the fast-changing nature of biomedical advances, the Life Science Informatics Center of Expertise team at Bellevue Community College decided to compile a suite of flexible curricular elements.

This guiding mission led to a set of creatively conceived and executed resources for colleges seeking to start a life science informatics program, enhance an existing offering, or infuse these critical technology skills into standard coursework, such as biology and chemistry.

“It’s a big thing to spread education on a specific subject across different divisions at a college,” says Center Director Dombrowski. “Grant funding allowed us to develop practical strategies with easy uptake that an instructor can use to bring class content current.”

The Center devoted significant resources to development of both bioinformatics and clinical informatics research as well as formation of skill standards, curricular elements, a prior learning assessment model, and trends analyses. These very tangible products are now available to all community colleges.

“We acted like good carpenters and took the measure of industry twice, before electronically publishing. Subject matter experts guided the effort, followed by practitioners review. The result gives students an experience with the life’s blood of the new bio-based economy,” says Dombrowski. Partners include the University of Washington, Microsoft, BIO-Link, the National Workforce Center for Emerging Technologies, the Health Information Management and Systems Society, Geospiza, and the Washington Biotechnology and Biomedical Society.

The Life Science Informatics Center of Expertise

became one of the founding members of the Washington Life Science Education Advancement Partnership. This created an active association for community college and university educators to contact their high school counterparts and move the agenda of biotechnology forward. A very robust group of nearly one hundred participants emerged and have participated in two summits, so far.

**T**he Center was also instrumental in linking industry needs to training through the formation of the Washington Life Science Industry-Education Council. And more regional effects were realized, including state Skills Panel participation; career pathways construction with the Washington State Office of the Superintendent of Public Instruction; plus hosting regional and national events.

The Center’s approach to dissemination was to keep visibility high and consistent. A signature look and feel to publications and communication was cultivated. Coverage included a front page feature, on line and in print, in the international industry publication “BIO-IT World.” The extensive plan

for dissemination did not neglect the personal touch: 141 phone calls were completed to individual life science division heads and biology faculty in eight states. These contacts resulted in follow up e-mails with live links to products and publications.

“The fruits of this frequent communication has created many ‘hardwired’ relationships that frame BCC as the go-to organization for life science informatics,” says Dombrowski.

Given the mission to affiliate BCC with industry and peer colleges for the purpose of infusing Life Sciences Informatics into broad curricula as well as biotechnology training, the net effect to BCC is significant and continuing.



**Russ Read congratulates Patricia Dombrowski of BCC with a certificate in recognition of her work and accomplishments leading a Center of Expertise.**

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# New Hampshire Community Technical College

## Biomanufacturing Portsmouth, New Hampshire

**T**he first Registered Biomanufacturing Apprenticeship with the Department of Labor began with a partnership between the Apprenticeship Office in Concord, NH and Sonia Wallman, Ph.D., director of the Center of Expertise in Biomanufacturing at New Hampshire Community Technical College in Portsmouth.

The Apprenticeship program is based on the skills, knowledge and attributes required for ten targeted biomanufacturing jobs developed in a partnership with an NSF ATE project grant to create the Northeast Biomanufacturing Collaborative. Participants, including representatives of industry and education, worked together to produce these Northeast Biopharmaceutical Manufacturing Industry Skill Standards.

On September 7, 2005, the Secretary of Labor, Elaine Chao and the Administrator of the Apprenticeship Office in Washington, Anthony Swoope, signed the Certificate of Registration for two of the ten biomanufacturing jobs: Bio-Manufacturing Technician (Upstream) and (Downstream). The rest of the eight biomanufacturing jobs will also be fully registered with the U.S. D.O.L.

“We use the Biomanufacturing Apprenticeship program as an infrastructure pump to bring recent high school graduates into our Associate in Science in Biotechnology program at NHCTC,” says Dr. Wallman. Two of the 2005-2007 Biomanufacturing Apprentices, Katrice Jalbert and David Haddad, finished more than 1,000 hours of on the job training in bio-

manufacturing and graduated with Biotechnology Associate in Science degrees from NHCTC in 2007.

About 60 students a year are enrolled at NHCTC as Biotech majors. During the grant period, the program graduated 27 Biotechnology A.S. Degrees, 21 Academic Certificates, 49 Certificates, and 32 “reverse articulations” into its biomanufacturing cornerstone course, BTEC 220. The program also trained 236 incumbent workers in Aseptic Practices. Of the 97 graduates, more than half are working in the biotechnology industry, including 22+ at Lonza in production or quality control.

“We have proven our value to Lonza,” says Dr. Wallman. Sonia “They pay us \$1500 for each student they hire after three months. We can use that for scholarships.”



**Russ Read congratulates Sonia Wallman of NHCTC with a certificate in recognition of her work and accomplishments leading a Center of Expertise**

**C**apacity building for the Biomanufacturing portion of the NHCTC Biotechnology Associate in Science Degree, Academic Certificate, Certificate and Incumbent Worker Short Courses is complete. The Biomanufacturing Suite is also used for incumbent worker short course training: Aseptic Techniques and the hands-on portion of the Biomanufacturing Seminar, offered collaboratively with SPI USA are taught there.

The NCBW, including the Director of the Center of Expertise in Biomanufacturing, presented at numerous conferences and meetings across the nation, including

annual meetings of the League of Innovation in the Community College and the American Association of Community Colleges. Dr. Wallman was also a leader at the Community College Program (CCP) during the Biotechnology Industry Organization Annual Meetings in Chicago (2006) and Boston (2007).

Another venue for dissemination has been the annual BIOMAN Conferences convened every year at NHCTC. “We show off our hands-on materials for teaching Biomanufacturing; at BIOMAN 2008, we intend to show off our popular incumbent technician Aseptic Techniques short course,” says Dr. Wallman.

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# Forsyth Technical Community College

Biotech Research and Development  
Winston-Salem, North Carolina

**F**orsyth Tech is now the largest biotechnology training program in North Carolina. With its new building and fully-equipped facility, the Center of Expertise in Research & Development Training prepares people to meet increasing industry demands for highly-skilled biotech technicians.

Lucas Shallua, V.M.D., Ph.D., director of the Center and Forsyth Tech's biotechnology program, spoke with the assembled leaders of the NCBW. "It started with leaders in Winston-Salem like Gwyn Riddick and Dr. Gary Green," he told his colleagues and partners. "As part of our college, they asked, 'What can we do to be on line with biotech industry?' 'Can you, as a teacher in life sciences, can you help us build a curriculum?' And with the help of such leaders we put together a program. Now, look at what's happened. It's become national with links across the country."

Forsyth Tech not only trains for needed workers, it innovates and develops new curricula and training models that can be replicated across the nation. The program, with its president Dr. Gary Green, has twice won Recognition of Excellence Awards from the U.S. Department of Labor, and received an Award of Recognition of Excellence from the NC Biotechnology Advisory Committee.

Situated in the Piedmont Triad, a vital North Carolina research and biotechnology area, the Center of Expertise forged numerous successful partnerships with industry leaders, including research-based institutions such as the nearby Wake Forest School of Medicine. Teaching is done in real world settings, internship is required. Graduates are qualified, capable and arrive at job sites ready to work.

"People from all over the world look to us as a model; we sometimes work as tour guides," said Dr. Shallua. "You need partners and support. It's not cheap to run biotechnology, my wish list would equal the budget of the whole division! The Department of Labor really helped us to be able to train workers for industry. These developing biotechnology companies are crucial to the economic - as well as the physical well-being of our people here."

The Forsyth Tech job placement rate at Piedmont



**Alan Beard makes a point on a tour of Forsyth Tech lab and class facilities during the Grant Wrap-Up Meeting on Dec. 11, 2007. Shown (from left) are Lucas Shallua, Brad Wiggins of the Department of Labor, Sonia Wallman.**

Triad companies, universities and medical center research labs is good. "We love the Forsyth Tech graduates, they are competent and very hands-on," said a representative of Tengion, another working partner in the Forsyth Tech program. "Our in-company training period is shortened by half."

**P**lus the Center of Expertise responds to industry partner demands for incumbent worker training, assisting biomanufacturing and bioprocessing companies with specialized training programs for workers on the job. "If a company needs specialized training we quickly adjust our curriculum and send our graduates in a heartbeat. That's why we exist, to make sure we meet those demands," said Dr. Shallua.

Outreach and dissemination are important parts of the plan. "It was an inward focus the first two years, then we took our focus outward," said Dr. Shallua. Forsyth Tech forged agreements with nine other community colleges in the region to provide a second year of education for students in biotech. The college has developed articulation agreements with the University of North Carolina at Greensboro, North Carolina Central University and Winston-Salem State University. Plus, the college also links with the Winston-Salem/Forsyth County school system, closely working with K-12 schools plus Wake Forest University Health Sciences.

*How do we take college to where it is needed? We need to make education exciting not painful.*  
- Lucas Shallua



## Roundtable Discussion at National Center for the Biotech Workforce Grant Wrap-Up Meeting



**C**ommunication is key to success,” said Patricia Dombrowski, director of the Life Science Informatics Center of Expertise at Bellevue Community College near Seattle.

And communication certainly was evident as the round table discussion, including national leaders in biotech education and training, got underway. The Dec. 11, 2007 event brought together directors of the five centers from around the country with industry partners and stakeholders. Naturally, the subject of industry-educator partnerships kicked things off.

Marvin Knoot, Technical Training Coordinator for Health and Nutrition business unit of Cargill (international food provider that generated \$2.3 billion in 2007) attended the meeting as partner in training with the Agricultural Bioprocessing & Renewable Fuels Center of Expertise at Indian Hills Community College, Ottumwa, Iowa.

“I’d say 100 of our 500 Eddyville employees are from IHCC,” Knoot told the group at the table. “We bring in student interns each year. They come in to work six weeks, and dozens have moved immediately from internship into full time employment. Graduates from IHCC join us with technical skills such as understanding process control loops and the ability to analyze process streams. This work takes hands

on experience, and graduates rapidly become valued contributors.” Janet Paulson of IHCC added, “Our president says this is one of our most productive partnerships.”

Russ Read, director of the NCBW, acknowledged the successful partnership and noted that other centers, including Forsyth Tech in North Carolina, are getting similar positive feedback. “That is great,” said Read. “We also hear that from Tengion, they say they can train our grads in half the time.”

**C**ommunication was emphasized again as crucial to success of industry-education partnerships. “We as trainers have improved since we started in the 1990s, and we’ve learned,” said Paulson. Both she and Knoot agreed good communication is at the core of this process. They had people at the roundtable laughing as they told about impromptu meetings at lunch. Other Centers have similar stories. “We’ve had communication with Genentech for a decade,” said Ric Matthews, director of the Center of Expertise in Bioprocessing at MiraCosta Community College in Oceanside, California. “We have a relationship. Mike Fino has his own identity badge. There’s trust in an industry full of secrets. We’re collaborators.”

The fast pace of the biotechnology industry was identified as one of the reasons communication is so

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crucial. “What products will we make next year? I don’t know,” Knoot told the group. “It could be cholesterol reducing food. Now we can have biofuels, dietary supplements, nutraceuticals - the industry is expanding. The trend is we should be flexible.” Read said: “The DOL has been very flexible. We don’t have the same grant we started with. For example, there was nothing at the beginning said about biofuels in North Carolina. Three and a half years later North Carolina has biofuels - our focus can change.”

Knoot also talked about the need for rapid response to demands. “It used to be okay to bring out a product in eighteen months. But with globalization, there’s no way we can plan on having eighteen months.” This prompted a discussion about how community college management works. “Business wants results. Industry must be quick to tool up because the business may not be there if you’re late. But if you want college credit you have to go through the conventional process, locally and in the state. It’s like our ‘FDA,’” said Matthews.

#### **Roundtable participants shared ideas for solutions.**

“We can move quickly in North Carolina,” said Gwyn Riddick, director of the Piedmont Triad office of the North Carolina Biotechnology Center. “We can respond to a request with a course without credit, a certificate. It’s a more local process, with biotech and high tech needs emerging, we can respond.”

The group identified a trend to branch out in hybrid bioprocessing training centers more directly dedicated to meeting the industry’s needs. “This is more like our model,” said Read. “Certificate awarding centers, not offering only community college credit courses.” Cargill’s training coordinator Knoot agreed. “We can meet and train people in the plant, but it makes more sense to have a facility that is set up for training. And the industry can come together - that’s valuable.”

“Industry has a need for research,” said Paulson, identifying another important aspect of her training facility. “Our students conduct research for smaller companies in the classroom and our lab. Some clients have a bench-top process ready to scale up to 100 liters in our pilot facility. They’re happy - and it could mean more jobs for our students. It’s one of our brightest accomplishments. An experimental process piloted by our students is being evaluated for use in a major



**Ron Shelton, Forsyth Tech grants director (standing) and Rebecca Keith, grants accounting director, spoke at the meeting. “Thank you all for your participation. You’ve created more than fifty partnerships among you. You are to be commended,” said Shelton.**

bio fuels plant. We have advantages for industry; we have non-disclosure agreements to protect intellectual property. We have experienced staff. It’s exciting, an area to continue pursuing.”

Sonia Wallman, Ph.D., director of the Center of Expertise in Biomanufacturing at New Hampshire Technical Community College in Portsmouth, was attending the roundtable with Eszter Birck-Wilson, Ph.D., a veteran of 16 years in the biotech industry. Her expertise includes both early and late stage process and analytical development; bacterial expression; transgenic expression of various recombinant proteins in dairy animal milk; and mammalian expression with Serono and Lonza. “Eszter is assisting with our pilot model, based on our connection with ‘Innova Bio,’” said Wallman, referring to an innovative program that taps research and development resources of colleges in win-win ways with industry.

Creating productive partnerships like this helps bring newer, better equipment and more experienced experts into a college’s labs. The main beneficiaries are students. “The issue is hands-on training, said Birck-Wilson. “That’s the learning experience students never can get from a book. Hands-on training shows not just how to do things but how everybody has to do things together. In a quality control lab during manufacturing, every piece of data must match. There must be consistent training, everyone learning in the same way.”

For Mike Urbach, instructional associate at Mira-Costa, having a state-of-the-art facility is an exciting high-tech opportunity, for everyone involved. “Having

the high-performance liquid chromatography equipment Genentech donated can really give our students well-developed skills,” said Urbach. “We have equipment Cal State would envy. And students love it! Four hours at a time will bring dexterity with a pipette. We also have transition people enrolled - average ages 30s to 40s - for the younger folks it makes a more positive environment.”

Read noted that these qualitative improvements are just as important as boosting numbers, at this point. “We increased the capacity for training,” said Read. “The important thing is we keep increasing the ability to train and the quality of that training.”

Patricia Dombrowski has developed ways and means at the Center of Expertise for Life Science Informatics for adding the power of information to curricula in different ways. “We’ve had the support to create informatics products and strategies that we can now

infuse into developing curricula,” said Dombrowski. “A business or math course can benefit from them. Without doubt, life science curricula must be updated to include informatics.”

Participants spent time discussing how to raise the level of quality in training for biotechnology. “We are training for good manufacturing processes, but there is one important piece missing: problem solving,” said Riddick. “In the workplace you must be able to ask, ‘what went wrong?’ That’s how you lose money, but you could solve it with training, information and communication.” Dr. Wallman agreed: “The root cause analysis must be taken; environmental health and safety are most important concerns,” she said.

Despite the advances and the achievements - everyone agreed the impact on biotech training as a result of the grant has been big - there are many challenges and obstacles remaining.”Go into middle school - ask

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**D**ebra Perret, communications coordinator at Targacept, delivered a strong message about the need for trained biotech workers. “The war for talent is real,” she told the assembled NCBW group, which also included other industry participants.

Engaged in a productive partnership with Forsyth Tech and other educational institutions, Targacept actively touts its internship program. “It’s a big commitment of our time and resources, but we do it because we know that local workforce development is one key to the success of biotechnology in the region,” said Perret. The Targacept program involves interns from universities, technical colleges and, occasionally, high schools.

She explained how to set up an internship program and how to recruit and manage the students, then took questions and discussed challenges, benefits and final outcomes of the program.

Targacept works with complex receptors in the brain, so helping the public understand neuroscience is important. Perret described outreach efforts to younger students among initiatives her company takes in the field of human resources and recruiting. “We present Brain Awareness events, with teasers, puzzles, optical illusions and the like, designed to help people know what’s happening in their brains,” said Perret. “The teachers also want to learn. When they ask me, ‘What does industry need?’ I say: ‘Make science and math interesting so kids will choose to study them.’”

Targacept shares science in a big way. Partnerships with the Chamber of Commerce include BioSummer, a program with nearly 200 students competing for the 45 treasured spots. High school and middle school students work together in the summer program, in labs and classrooms.

Targacept’s internship program began in 2002, with two interns from local universities. In the past six years, the company has expanded the undergraduate internship program to include high

## Learning at lunch: Interns in Industry

school, associate degree and graduate students.

Their interns are carefully selected and given substantive projects to work on. “Assignments are carefully crafted to provide hands-on experience and, in addition, to provide a broad overview of our industry,” she noted. Internal department directors and staff are consulted and involved. “We must have advocates,” said Perret. Screening candidates is important, and background checks are done. All interns receive a stipend; area colleges and universities co-fund, with Targacept, the stipends for their interns.

**S**tudents are supervised and mentored by educators and company staff. Each intern gives a presentation at the end, attended by employees and their advisors.

Shepherding students through an internship produces an extra benefit, Perret pointed out. “It’s career preparation in human resource management for our staff that may not yet have direct reports.”

Interns are expected to demonstrate responsible work habits, be on time and focused, and to keep safety as a top priority. “We give interns the same safety training as our employees,” she stated. Interns also sign a confidentiality agreement to address intellectual property protection.

Many benefits flow from the program. “We are able to be a good corporate citizen and contribute to our community, while at the same time promoting careers in the life sciences,” said Perret. “And we’ve also hired a few employees from our internship pool.” There are intangible benefits as well. “Having intelligent, young students in the lab is exciting for our scientists. It also helps us to understand curriculum needs, to advise the schools so they can better meet our needs. And for the interns, it clarifies their plans for future study and career choices.”



about biotech. It doesn't exist," said Dombrowski. "It's important to excite that age group to science now." Paulson mentioned how, even though enrollments are up, they have not stopped recruiting and outreach efforts. "We offer secondary education courses for teachers; we tour industries," said Paulson. She also noted that IHCC has two grants in which both dissemination and outreach are important. "Having two grants is good, we want leveraged relationships," added Read.

Dr. Wallman reported on some of her Biomanufacturing Center's activities in New Hampshire. "We bring kids into our school on Fridays, the instructor does one hour workshops on proteins, molecules. We have animations, laptops and we follow up on the web. We're reaching high schools all over the state. We even have a bus come down from Dixville Notch,

from way up in the mountains."

More discussions took place, including ideas about how to track and measure the outcomes of training on students. Ideas for improving the programs and maintaining sustainability were shared.

Finally, Read wrapped up this session of the all day meeting. "We've taken the grant and multiplied its intent, broadened it. We've been able to bring in partners, not only in the original five regions, but more, coast to coast. We get our message out about increasing challenges to stay competitive in the world. We're also successful in gaining trust with industry. We are already linked to other colleges. This group is the epitome of action; we have the personalities to do that. Altruism is infectious. It becomes critical when you accrue so many accomplishments. Now let's focus on it and gather what must be done."

(Pictured on the first page) Gathering for a group shot at the conclusion of the Partner Grant Wrap-Up Meeting Reception are the National Centers of Expertise Leaders from around the country shown with colleagues and supporters (from left) Rebecca Keith, Mike Urbach, Ric Matthews, Janet Paulson, Eszter Birck-Wilson, Sonia Wallman, Brad Wiggins, Lucas Shallua, Alan Beard, Patricia Dombrowski, Mica Welsh, Mona Cofer, Russ Read.

## Grant Wrap-Up Meeting Reception



**Dr. Gary Green, President of Forsyth Tech Community College (second from right) : "It's amazing to see how the National Center for the Biotechnology Workforce has grown, to see all the partners in our developing team. This has been a great opportunity for community colleges to step up and prepare the workforce for the 21st century. I want to thank everyone, it is moving and exemplary. Now, let's get on to the next phase!"**