



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



National Center Profile: MiraCosta Community College Bioprocessing Center of Expertise www.miracosta.edu/biotech

Contact Mike Fino
(760)757-2121x6499 mfino@miracosta.edu

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 Bioprocessing Center - ready to share ideas, resources and assistance at www.miracosta.edu/biotech

San Diego county has roughly 500 biotech companies and needs new workers constantly. In response, MiraCosta Community College in Oceanside, California - the National Center of Expertise in Bioprocessing Training - built a program to provide both the theoretical background and the hands-on experience required to gain employment in biotechnology. This Pacific coast model is a resource that can be replicated.

MiraCosta College (MCC) completed a first full semester in its newly developed state of the art facility last year with support from initial industry partner Biogen/Idec. Ric Matthews, Dean of Mathematics and Science, said the center cost about \$1.8 million, three-quarters of it from the college and the rest in donated services and supplies. Support from the DOL High Growth Jobs Initiative increased teaching capacity with equipment that enabled the immersive educational environment envisioned for the new facility.

Once Genentech acquired the nearby Biogen/Idec facility for its expansion, the college partnership continued to help train workers. Excitement about the program at MiraCosta reached high levels when a large percentage of the first biomanufacturing graduating class landed jobs even before they finished their classes. Regularly scheduled

open houses attract throngs of interested applicants. Numerous other outreach and dissemination activities are underway. Genentech also donated \$12,500 in scholarships to MCC students. "We want to support MiraCosta in getting people to enroll in their courses," says Mary Schwalen, education and training manager for Genentech.

The biopharmaceutical manufacturer builds its workforce primarily with students who earn associate degrees in the field because it's found that such employees tend to be more loyal to the company and most of the actual biomanufacturing is handled by workers with this level of education.

"The program could not be what it is today without the partnerships between education, DOL, the industry, plus state and local governments united in workforce development," says Center Director Matthews. "There's a confluence of opportunity that formed when we looked to grow this program. A brand new program giving students the same technologies being used in industry is an expensive venture. We've received

several hundreds of thousands of dollars in donations from local companies and service providers that see the value in the program and want to support and be a partner in our success. And we've learned others can do this too."



Life Science Bioprocessing Center staff (from left)
Mike Fino, Gail Baughman, Ric Matthews, Mike Urbach

www.biotechworkforce.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.

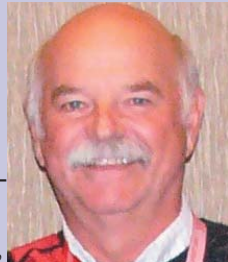
Starting the Center



Southern California's life science community is responsible for developing many new therapeutics. From cancer, to diabetes, and autoimmune diseases like rheumatoid arthritis and multiple sclerosis, companies here - including Genentech, Amylin Pharmaceuticals, Amgen and Biogen Idec - are advancing how patients are diagnosed and treated.

In the San Diego region, there are approximately 39,000 employees in more than 500 life science companies, making it the largest technology cluster in the county. Statewide, there are more than 230,000 jobs in California associated with the life science industry in more than 2,600 companies, with \$32.3 billion in revenue, according to the California Healthcare Institute.

MiraCosta College has had a biotech research and development program in place for many years. But since many companies in the industry are now moving their products into the production mode, workers in biomanufacturing are becoming more in demand. Faculty and staff at MiraCosta and representatives



Ric Matthews
Center Director

from the San Diego Chapter of the International Society of Pharmaceutical Engineers, Biogen Idec, Invitrogen and other biotech companies, worked together for months on how to expand the college's existing biotechnology program to include a new biotechnology manufacturing curriculum.

Biogen Idec started building the first manufacturing facility in Oceanside within three miles of the college campus. Genentech eventually took over the plant and continued the working relationship with neighboring MiraCosta Community College. Estimates are that Genentech will require 800 new trained workers over the next five years. Besides Genentech, Invitrogen is within district boundaries. The City of Oceanside is trying to attract new industry for redevelopment. Community and business leaders work with the college for mutual benefits in the region's economy.

How to Build a New Biotech Lab

Biotechnology students at MiraCosta College swapped their old, low-tech classroom for a state-of-the-art, professional-quality laboratory.



BEFORE

The center is in a former machine shop on the north side of MiraCosta's main Oceanside campus. "We really wanted to create an immersive environment that would feel professional," said Mike Fino, the

professor who heads MiraCosta's biotech department. "What we've built here provides real training and the process can now be readily replicated in the western United States and the nation."

Evidently, industry agrees. Genentech's Oceanside Product Operations has hired more than 20 students from the program already, with salaries ranging from \$30,000 to \$50,000 annually. Genentech is expecting to grow rapidly in the near future thanks to the success of its new cancer drug, Avastin.

The new MiraCosta facility will help prepare students to work at the many biotech companies in the region. Short

courses the college provides, using its new training facility, also help students fill available biomanufacturing positions.

"Our new lab looks like a miniature Genentech plant," said Matthews. The first classes were held Nov. 8, 2005 in the 3,300-square-foot facility, which includes the biomanufacturing lab and an adjacent classroom for lectures. There is also a simulated "clean" room. The labs feature: DeltaV controlled bioreactor systems, chromatography purification systems, tangential flow filtration systems, automated cell viability analyzer, chemistry analyzer, Laser and microbial air samplers.



and AFTER

Students learn to use devices and procedures that turn protein cells into a medicine called Activase, used for treatment of strokes and heart attacks. Instructors here also explain to prospec-

pective employees that jobs can include standing for long periods of time, working next to loud machines, wearing aseptic suits and knowing how to use special showers.

Experience in the Lab



Biotech students experience hands-on production and purification of a protein biopharmaceutical from flasks to fully-controlled bioreactors through filtration and chromatography.

Former student Greg Carlson points to a 3-liter glass vessel holding the cells being processed and notes its similarity to the two-story, 15,000-liter version in a commercial manufacturing plant.

Bioprocessing Certifications

Certificates of Competence: Combinations of basic science courses and laboratory instruction develop confidence, competence, and compliance for technical work in regulated environments.

Bioprocessing Technician: Students learn to grow a variety of cells and recover the proteins they produce while following good manufacturing practices to comply with quality system requirements and regulations. Graduates are employed in a range of positions including production, process development, validation, quality control, calibration, and maintenance.

Research and Development Technician: Designed to meet increasing need for entry-level laboratory technicians, especially in the field of research and development.

Biotechnology Laboratory Assistant: Designed to meet increasing needs for entry-level production (or manufacturing) assistance in biotechnology with a basic foundation in biology, chemistry and mathematics. Graduates are employed doing general tasks such as solution and media preparation, inventory and ordering of supplies reagents, and providing general assistance in the performance of tests and routine tasks related to the manufacturing and laboratory environments.

Associate of Arts Degree in biotechnology is obtained by completing certification requirements plus degree requirements.



Partnerships

Active and highly cooperative processes forge mutually productive relationships. Staff collected about \$20,000 in manufacturing and cleanroom supplies from Smith&Nephew Wound Management, a medical device company that was downsizing.

Genprobe donated water baths, vacuum pumps and centrifuges.

Andergene laboratory offered DNA fingerprinting equipment.



Mike Urbach

Another way industry helps is in the Materials Resource Program (MRP). It was established as a way for biotech companies to donate unused equipment and materials for use at area high schools. The materials are gathered by MiraCosta biotech lab technician Mike Urbach, repaired, put into working condition and housed at the college. Two or three times a year the college hosts the Biotech Equipment Give-away of Good, Reusable, Orphaned, Valuable Equipment for the Lab or what has affectionately become known as the "BEG and GROVEL." On these days, all the collected equipment and materials are displayed at the college and high school teachers are invited to come claim items for use in their classrooms. The only rule for "BEG and GROVEL" is that

Sometimes It's Good to "G.R.O.V.E.L."

a teacher must be able to describe how the equipment or materials will be used in a classroom setting with students. The regional biotechnology business group known as BIOCUM has promised funding to help run the program. It will continue to supply teachers with needed equipment and materials.

Meet a Student

Vincent Esguerra started at a four-year university and changed his major three times before enrolling in the MiraCosta biotechnology program. He earned a Certificate of Competence in biotechnology manufacturing operations and, in the spring of 2005, was one of only a few California students asked to interview for an internship at a San Diego-based biotechnology company.

At the interview, the students were asked to demonstrate laboratory knowledge and skills. "I got right to work," remembers Vincent. He was one of only three students hired and, later, he was offered a full-time position as a quality control analyst. "MiraCosta really prepared me - I had the hands-on experience I needed."



Vincent Esguerra

Moving Forward

MiraCosta Community College has had good success reaching displaced workers to retrain in bioprocessing; plans are to expand this work. The college is also in a great position to provide professional development for high school teachers with its advanced, well-equipped facility.

Efforts will be made to ensure that the college's extremely successful materials resources program - recycling of equipment from industry to schools - will remain strong and continue.

More incumbent worker training can be provided. MCC is in an excellent position to assist companies increasing their bioprocessing in the upgrade training of workers.

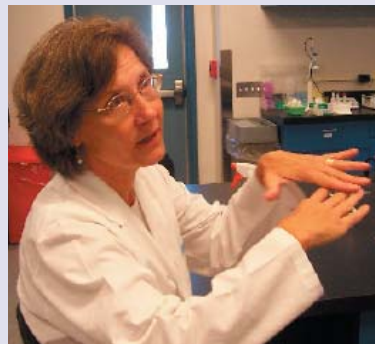
The college will create seamless articulations between schools, college and universities to enhance access for advancing on the career ladder. For example, students can now transfer to Cal State San Marcos, which recently added a biotech degree program.

MCC's accomplishments qualify it as a national resource. It will be able to support its areas of expertise and serve the nation's community colleges that need to build their own biotechnology training programs. MCC will be able to extend outreach to all community colleges by providing technical assistance.



Meet the Staff

Gail Baughman is lead instructor for the Research and Development program at MiraCosta and the other full time faculty person in biotechnology. Gail's basic techniques course provides the foundational laboratory skills development the new Bioprocess Technology program was built on.



Gail came to MiraCosta College from the Salk Institute for Biological Sciences, where she worked with Suzanne Bourgeois in cancer research.

OUTREACH

Consortium with members from CSUSM, SDSU, UCSD, UCSD Extension, and Miramar College. The group has a mission to increase cooperation among the various program to better serve students and overall biotech enrollment in the region.

MiraCosta held an Open House for the new facility. In attendance were former and current students and potential recruits, along with industry and academic (high school and college) partners, plus local government leadership and the local press.

Mike Fino attended the quarterly San Diego Biotech Educators



Mike Fino

A Biotechnology Intellectual Feast was held for all MiraCosta Faculty and Staff. This was a campus-wide event to show faculty and staff what people are doing in key disciplines across the campus. The visitors got a tour of the facility and history of the program. The event served as an internal recruitment opportunity.

Local television station KCOT produces a program called the Voice of Oceanside and featured an hour-long program with Mary Schwalen, Training Manager at Genentech, and Ric Matthews and Mike Fino from MiraCosta, titled "Genentech and MiraCosta." The event was hosted by Alison St. John, a reporter for KPBS.

Thanks to Sponsors, Partners, Supporters, Participants:

The new Biotech Training Facility at MiraCosta College was made possible by the donations of time and money from many individuals and companies.

Beckman Coulter, BiogenIdec, Broadley-James Corp., Caltrol, Cardinal Health, DPR Construction, DynalectricCo., Emerson Process Management, GE Healthcare, Genentech, Genprobe, Hope Engineering, International Society of Pharmaceutical Engineers, Invitrogen, Irvine Scientific, Lab Trader, McGraw/Baldwin Architects, Molecular Medicine Bioservices, Nova Biomedical, Pro-Tech Process, Randall Lamb, SD Analytic, Siemens Building Technologies, Smith and Nephew Wound Management, Statewide Biological Technologies Initiative, STERIS Corp., The Southern California Biotechnology Center, University Mechanical & Engineering Contractors, Walsh Engineering & Surveying.

www.workforce3one.org

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.