

Greater Los Angeles Cluster: Nurturing the Biomedical Industry via Community Colleges

What:

Los Angeles-Orange County
Biotechnology Center

Hosted by:

Pasadena City College

Established:

1998

Connects:

28 regional community colleges,
eight California State University
(CSU) schools in the Los Angeles
Basin (C-LAB), regional four-year
universities and local industry

"I see my role as capacity building," said Wendie Johnston, Ph.D., Director of the Los Angeles-Orange County Biotechnology Center. Her key objective, she said, is to ensure ready connections among resources, missions and people.

The LA/OC Biotechnology Center is one of six statewide offices established in the mid-1990s by the California Community Colleges system to develop the biomedical industry workforce.* Through the Applied Biotechnologies Initiative, the biotech centers began developing new educational programs geared toward preparing California students to fill life science jobs.

Each center's director works within his or her region to determine local workforce development needs. Johnston applies her energies and skills to building bridges among the various components of the Los Angeles basin biomedical industry cluster—from pre-college through economic development. Since the program's inception in 1998, Johnston has seen firsthand that the region is fertile ground for the seeds her programs are planting.

*Another of the six biotechnology centers, the Central Coast Biotechnology Center, is located at Ventura College under the direction of Tricia Fausset. It also contributes to the workforce development in the LA/Ventura counties biomedical cluster.

Pre-College Science

Tomorrow's scientists, engineers, physicians and researchers are middle and high school students today. The LA/OC Biotechnology Center is reaching out to them and their teachers by making compelling curriculum available to them.

One example is the Amgen-Bruce Wallace Biotechnology Lab Program. The course allows students to conduct protocols for recombinant DNA labs and PCR experiments. In addition to training teachers in the curriculum and the associated experiments, Pasadena City College also provides short-term loans of the necessary wet lab equipment.

"Amgen deserves a gold star for this program," Johnston said, adding that credit goes "both to corporate for the equipment and to the Amgen Foundation for the outreach." She said that approximately 12,500 high school students from 80 Los Angeles and Orange County high schools have participated in the three-week program. More than a half dozen California high schools have parlayed or are in the process of parlaying the three-week program into a University of California-approved year-long biotech-biology course. The Amgen-Bruce Wallace Biotechnology Lab Program has been replicated in San Diego and the Bay Area through Amgen Foundation grants.

Community Colleges

The LA/OC Biotech Center region encompasses 28 regional colleges. All offer the basic math and science courses for a career in biosciences. A number offer certificate programs geared toward specific functions within biomedical companies (see sidebar). Other programs have been designed or are in development for launch once current budget constraints have been resolved.

Johnston notes that one advantage of offering workplace training at the community college level is that the

courses are accessible to everyone—first-generation college students, talented high school students, individuals pursuing a new career, displaced workers and veterans.

"We have people of all ages," Johnston said. She added that more than half of the students have earned their bachelor's degrees and are seeking added training to secure employment or enter graduate or medical schools. Most of the skills courses are conducted in the evenings as a convenience to working adult students.

Universities

In addition to arming students with the math and science credits they need to transfer to four-year programs, the LA/OC Biotech Center also works to bridge the programs at community colleges with those in the region's universities.

As a partner in the Southern California Summer Bioinformatics Institute at CSU Los Angeles, the LA/OC Biotech Center continues to assist in building career ladders to new and existing life sciences programs. The institute, which has just completed its seventh year of operation, is funded by a National Institutes of Health-National Science Foundation grant, for which Johnston is a co-principal investigator. More than 100 students have attended the 10-week institute and over 80 percent are working in computational biology or related scientific fields.

In other partnerships, universities provide internships and equipment donations for community college students. Among current internships are 10 one-year placements of Pasadena City College students at Caltech, the University of Southern California and Childrens Hospital Los Angeles. Johnston explained that the cooperative agreement is made possible by a California Institute for Regenerative Medicine (CIRM) Bridges to Stem Cell Research Award of \$1.7 million in spring 2009 to Pamela Eversole-

Cire, Ph.D., director of the Biological Technology Program at Pasadena City College. In addition to the internships, the grant is being used to further develop Pasadena City College's Stem Cell Culture program.

Industry

The LA/OC Biotech Center connects companies with academia in relationships that benefit both sides. Johnston said that she has helped identify and recruit members both for companies' scientific advisory boards and for grant and development committees in academia. She has helped line up internships for students and garnered equipment donations from local private and educational labs for colleges and high schools.

Working with Oak Crest Institute of Science in Pasadena, Johnston and the LA/OC Biotech Center provide high school, community college and university students with real-world experience in biomedical science. The institute, founded in 1998 as a non-profit chemistry research and education center, has participated in Caltech's Summer Undergraduate Research Fellowship (SURF) program for several years and has had a successful National Science Foundation Research Experiences for Undergraduates (REU) grant under which students from local community colleges held six- to 12-month fellowships—an invaluable experience, according to Johnston. The classroom education combined with hands-on experience gives students the training and confidence they need not only to secure a biomedical industry position but to launch an exciting, fulfilling career in research.

Economic Development

The final link in the interconnectedness that Johnston seeks through the LA/OC Biotech Center is the Pasadena Bioscience Collaborative (PBC), an "incubator" that provides space, equipment, interns and advice to startup "wet lab" companies. PBC is housed next door to Oak Crest

in Pasadena. Its equipment, donated by industry to both PBC and Pasadena City College, promotes new company formation while providing additional specialized education and training for the biomedical workforce.

Bruce Blomstrom, president of the Pasadena Bioscience Collaborative, said that companies interested in participating in the incubator must have a proper business plan, the financial strength to pay rent, a demonstrated adherence to Good Laboratory Practices and a current liability insurance policy.

PBC may be the San Gabriel Valley's best-kept secret for startups. "We provide access to the experts that early-stage companies may need," Blomstrom said, "whether those are in biotech, nanotech, bioinformatics, grant writing, legal, marketing or business." Since the incubator was opened in mid-2004, it has nurtured a number of companies with the goal of advancing the startups' science and business acumen to the point of being able to secure outside funding. In 2008, the PBC expanded from 3,000 square feet to 6,700 square feet, and by the end of 2009 additional expansion will bring the area to more than 10,000 square feet.

Although local political support, the availability of facilities, and the founders' personal preferences brought the incubator to Pasadena, Blomstrom joins Johnston in viewing their programs as serving the full LA Basin biomedical industry. They see the industry as an interdependent system that combines the strengths of academia, companies, investors and community services toward better medical knowledge and therapies—and better quality of life for patients everywhere.

Biomedical Electronics Technology Certificate

LA Valley College (Van Nuys)

Biotechnology Certificates

Pasadena City College

Biotechnology Certificates—
three levels

Computational Biology Certificate

Stem Cell Certificate and CIRM
Bridges to Stem Cell Research
Program

Fullerton College

Laboratory Technician

Chemical Technology Certificate

LA Trade Tech

Mt. San Antonio College (Walnut)

Electron Microscopy Certificate

East Los Angeles College

Histotech Certificate

Mt. San Antonio College (Walnut)

Manufacturing Technology Certificate

Cerritos College

El Camino College (Torrance)

Fullerton College

Glendale College

Medical Technology Program

Saddleback College (Mission Viejo)

College of the Canyons (Santa Clarita)

Mt. San Antonio College (Walnut)

Pharmacy Tech Certificate

Cerritos College

Process Plant Technology Certificate

LA Harbor College

LA Trade Tech

Long Beach College

Quality Assurance Certificate

El Camino College (Torrance)