

National Center for the
**Biotechnology
Workforce**



www.biotechworkforce.org



Forsyth Technical Community College, NC

NH Community Technical College, NH

Indian Hills Community College, IA

Bellevue Community College, WA

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



INDIAN HILLS
COMMUNITY COLLEGE

National Center Profile: Indian Hills Community College

Agricultural Bioprocessing and Renewable Fuels Center of Expertise

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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 Agricultural Bioprocessing and Renewable Fuels Center - ready to share ideas, resources and assistance at www.indianhills.edu

More than 1800 companies, employing over 83,000 skilled workers, are engaged in Iowa's biosciences. Many employers apply biological and biochemical sciences in agriculture, biofuel production, value-added processing and health products. Iowa leads the nation in production of raw biomass; ranking first in corn and egg production, plus large scale operations in soybeans, cattle and sheep.

These strengths in animal and plant sciences, according to the Battelle Institute's Report, point to increasing biotech breakthroughs, including growth in biofuels, with large-scale market potential. More investments mean more employment opportunities.

Indian Hills Community College (IHCC) heeds the call to provide skills for tomorrow's biotech workforce. Industry driven programs are delivered at the Iowa Bioprocess Training Cen-

ter located in Eddyville, near a massive bioprocessing center. Multinational companies, anchored by Cargill's corn wet-milling operation, are producing many products from Iowa corn and soybeans here.

Janet Paulson, coordinator of the National Center in Eddyville, Iowa, says "Having strong industry partners is essential to success." She's proud of the \$2.5 million pilot training facility built on land donated

by Cargill, an international agricultural industry leader.

"Our DOL grant has really enhanced our training and technical assistance capabilities," says Paulson. "We are now able to meet the training needs of the bioprocessing workforce and educators at a more technical level than before, which will enable more bio-based industries to start-up and thrive."



Agricultural Bioprocessing and Renewable Fuels Center of Expertise staff (from left) Jane Lewachowicz, Janet Paulson, Suzanne Keller, Chuck Crabtree and Eric Olson

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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 National Center of Expertise

Since 1985, when Cargill opened its corn wet-milling operation in Eddyville, bioprocessing around southeast Iowa has been booming. With support from Cargill, IHCC started bioprocess training on the Ottumwa campus in 1996. Since then it's grown into a seasoned, effective model program, offering training in fermentation principles, process control, and tissue culture techniques.

During the last decade, Cargill and other companies such as Ajinomoto and Wacker Chemical Corp. added more than \$1.5 billion in new capital investment into the Eddyville complex, where IHCC opened its Bioprocessing Training Facility in 2002.

Iowa offers support and incentive programs for bioscience companies. Development is fast-paced. Iowa State University is building a \$425 million global center for the commercialization of new products from plants. And Iowa's renewable fuels industry is rapidly expanding to be the number one producer of both ethanol and biodiesel in the country.



Pilot Plant Fementation Center

Trained workers are needed to capitalize on these emerging bio-opportunities. Designating Indian Hills Community College as a National Center strengthens the collaborative approach to growing the biotechnology industry as part of the state's economic base. IHCC, with support from industry and the DOL, has increased its training infrastructure and capacity with a pilot facility available for use by industry and entrepreneurs, and the development and offering of an ethanol plant technician program in 2005.

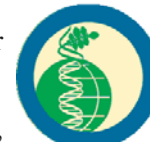
More than 90 percent of the IHCC Bioprocess Technology Associate Degree graduates who sought jobs are now employed in local biotechnology industries. The college mission also reaches out to industry, for partnerships that deliver needed skills to incumbent employees.

Iowa BioDevelopment

Chuck Crabtree is director of Iowa BioDevelopment - an outreach program of the Business and Industry Resource Center at IHCC, headed by Mick Lawson. "Our collaborative model enables better ways for Iowa's biotechnology companies to gain the training and the skilled workers they need," says Crabtree,

Training can be delivered to incumbent workers at a company site, at any Indian Hills Community College loca-

tion, at the Iowa Bioprocess Training Center in Eddyville, or via the Iowa Communications Network and "VBrick,"



Iowa BioDevelopment
Indian Hills Community College

Indian Hills' videoconference system for distance learning, which serves its surrounding ten county area.

Trainers, university and community college faculty - as well as industry experts - deliver customized training, general workshops and laboratory sessions.

The onsite Pilot Plant allows hands-on training. For example, two, one-day high performance liquid chromatography courses (using equipment purchased with DOL grant funds) were provided to incumbent workers for the first time. Bioprocess students were able to attend portions, benefiting their future job opportunities. Two IHCC students received internships with one of the technical assistance clients, Glycon/BiOva; and they were both hired upon graduation.

Iowa BioDevelopment staff also conduct annual teacher workshops that are two days long (16 contact hours). Instructors can attain continuing education or master credits through a four year college. The success, in part, for these workshops is due to the relationship IHCC has with the local Southern Prairie Area Education Agency. Courses in hot topics such as Bioethics, Renewable Fuels, and Forensics attract interest. To learn more visit:

www.indianhills.edu/biodevelopment



Iowa BioDevelopment staff (from left) Chuck Crabtree, Suzanne Keller and Janet Paulson are shown at a "Growing the Bioeconomy" conference held in Ames, Iowa with Iowa State University

Iowa Bioprocess Training Center

Indian Hills Community College helps train and deepen Iowa's labor pool for the expanding bioprocessing industry through the Iowa Bioprocessing Training Center.

This Eddyville home of IHCC's 21-month bioprocess technology program - and the new process control technician certificate and ethanol plant technician program - is much more than classrooms. There are two laboratories and a pilot plant used for hands-on, experiential learning.

Laboratory courses for the Associate of Science/Career Option degree program are held here. Students prepare for careers in Laboratory, Process Control, or Quality Control technician positions. Coursework is available in biotechnology, ethanol fermentation, biodiesel, genetic engineering, DNA forensics, bioethics, vaccine development, microbiology, advanced fermentation, process control, organic chemistry and more.

Among the resources being employed here are:

Fermentation Pilot Plant: provides companies access to equipment, including four 13-liter New Brunswick BioFlo bioreactors, one 50-liter fermentor and advanced analysis equipment, for developing or scaling up new products with on-site expertise and personnel. It's mutually beneficial - companies benefit and students get to learn real processes.

Virtual Reality Center: allows students to rapidly determine optimal conditions for fermentation. A seven to

ten day fermentation can be modeled in ten seconds, saving valuable time. The virtual reality system can be transported to conferences and schools to increase knowledge of biotechnology processes and career opportunities.

Process Control Modules: mimic actual conditions of a large bioprocessing plant, giving students hands-on, real life problem solving skills. Process control modules were enhanced through DOL grant funds. IHCC also offers a 21-credit hour process control certificate program.

Ethanol Plant Technician: program focuses on ethanol fermentation processes with instruction in electrical/electronics theory, process control, bioprocess lab techniques, digital fundamentals, and high level equipment maintenance and analysis.



Hands on fermentation activity at the Iowa Bioprocess Training Center

Workforce Development Model Project

The Iowa Biotechnology/Bioprocessing Workforce Development Model Project is a statewide collaborative project between education and industry with Indian Hills Community College in the leadership role. One result is the development of a new program in proteomics. Industry around the Des Moines Area Community College needed workers trained in proteomics. The Project brought resources together to develop the curriculum and equip the lab.

The Development Model Project promotes bioscience to the residents of Iowa in more ways. It:

- grows Iowa's future workforce by educating middle and high school students and Iowa Job Corps participants about bioprocessing and the career options available
- coordinates multiple opportunities for science teachers to build curriculum and skills in the biotechnology field
- provides pre-employment assessment and training to the unemployed and underemployed in cooperation with Workforce Development
- provides training and retraining for existing workforce based on a statewide biotechnology industry training needs assessment
- develops and delivers industry-specific training programs for Iowa's rapidly growing ethanol industry

OUTREACH

IHCC exposes thousands of Iowans to biotech career options through radio, print, websites, and more.

A 3-D virtual reality experience of the process of fermentation goes around to fairs and is viewed by thousands. Outreach to schools features industry employer visits plus the use of the mobile training unit Project S.E.M.I. (Science Education Mobile Instruction) Lab, which visited nearly twenty schools, reaching thousands of students and community members.

Instructors contact students through virtual reality fermentation presentations, biotech workshops, career fairs, and by lending high schools technical equipment to use in lab activities. Presentations were given to students in the public school system on corn milling, DNA extraction, fermentation (using the virtual reality system), and in bioprocessing career opportunities.

Iowa's middle and high school students, plus Job Corps participants, learned about career options. Multiple workshop opportunities were coordinated for science teachers to build curriculum and skills in the field.

Moving Forward

IHCC will continue educational outreach, technical assistance and training initiatives for bioprocessing in agricultural, renewable fuel and food science disciplines. It will address novel industrial needs for course development, promote biotech/bioprocess training, and disseminate training materials.

Presentations for bioprocess training at IHCC service center locations through distance learning and VBrick video conferencing equipment will be strengthened.

Currently, the college is planning to partner with business and industry to co-sponsor regional Renewable Fuel Symposia and develop more Biofuel Training.

IHCC will develop relationships with four year colleges to address bio-based industry training needs. A plan to develop an apprenticeship program for students with local industries is in the works. A program to accurately identify useful, standardized skills for the creation of job models is also underway.



Young students enjoy the innovative 3-D virtual reality system to experience the process of fermentation



Bioprocess tech students focus on documentation skills

A curriculum for biotechnology technicians specializing in proteomics- a new field working to identify and understand the proteins cells produce in different situations - is being developed with Des Moines Area Community College and will be made available to post-secondary institutions nationwide.

The college will continue outreach and curricula sharing to high schools, including use of the 3-D virtual reality system that illustrates the process of fermentation as a tool for bioscience outreach and educational programs.

IHCC will keep providing

bioscience courses for the professional development of teachers and supplying materials, curricula and an equipment lending system to facilitate biotech coursework in schools.

The college also seeks to build new programs in bioprocessing and biomass conversions that use fermentation, cell culture, and other associated processes. The goal is to be the state's premier agricultural bioprocessing and renewable fuel workforce development institution.

A Model Program

IHCC was honored by the Department of Education when it was selected as a national model for community college industry partnerships in biotechnology. College staff and partners in industry and education were interviewed for a report on how such successful working relationships became established.

IHCC is one of four community colleges in the country selected for this full review process. The Education department highlighted how IHCC's model can serve other areas seeking industrial - educational partnerships.

Thanks to Sponsors, Partners, Supporters, Participants:

Ajinomoto Food Ingredients, Ajinomoto Heartland, Alliant Energy, Cargill, Des Moines Area Community College, Garst Seed, Genencor, Indian Hills Regional Development Corporation, Iowa Biotechnology Association, Iowa Economic Development, Iowa Renewable Fuels Association, Iowa Workforce Development, Kemin Industries, MidAmerican Energy, Phytodyne, Pioneer Hi-Bred International, Southern Prairie Area Education Agency, U.S. Department of Agriculture - Rural Development, U.S. Department of Commerce - Economic Development Administration, Wacker Biochem Corporation, Wapello County

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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.