

Photo courtesy of Kemin Industries

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## Integrated DNA Technologies completes 77,000-square-foot headquarters expansion

### *Life sciences company building on Iowa presence, adding capacity and jobs*

At a cost of \$10 million, Coralville, Iowa-based Integrated DNA Technologies (IDT) has completed its 77,000-square-foot headquarters expansion. And with it, IDT effectively doubled its research, support and production capacity, allowing it to better cater to increasing market demand for its products by enhancing its customer service and order fulfillment departments.

IDT is the largest supplier of custom nucleic acids in the United States, serving academic research, biotechnology and pharmaceutical development industries by manufacturing the highest quality custom nucleic acids.

"We sell short strands of DNA called oligonucleotides (oligos)," says Trey Martin, IDT chief operating officer. "The way one strand of DNA specifically binds to a second strand of DNA allows scientists to use oligos as research tools. Common uses for our oligos include diagnostic tests for genetic diseases and infectious diseases, research to discover new drugs or therapies for a variety of diseases, and producing safer and more plentiful agricultural products."

Founded in 1987 by Dr. Joseph Walder, IDT has achieved double-digit growth over the past 10 years. Today, the company synthesizes and ships more than 25,000 custom oligos per day, with more than 60,000 customers worldwide.

*Continued on page 6*



## BioTech training at specialized Iowa unit



As the need for skilled employees continues to grow, the Iowa Bioprocess Training Center (IBTC) is helping to train and deepen Iowa's labor pool for the expanding bioprocessing industry.

"Our aim is to develop a skilled workforce for Iowa's biotechnology companies," says Chuck Crabtree, IBTC director.

The IBTC houses the two-year credit program in bioprocess technology of Indian Hills Community College, as well as new process control technician and ethanol plant technician certificate programs. It also provides industry-specific, custom-designed training to existing workers in the biotech field.

Operated by Iowa BioDevelopment, the IBTC is a public-private initiative located at Eddyville's Iowa Bioprocessing Center complex. Partners in the training center's design and financing include the Iowa Department of Economic Development (IDED), Cargill, Ajinomoto Food Ingredients, Ajinomoto Heartland, Wapello, Mahaska, and Monroe counties, plus others.

As one of the five U.S. Department of Labor-designated Centers of Excellence for Biotechnology, IBTC is a 13,000-square-foot training facility that contains a fermentation pilot plant, a virtual reality fermentation center, process control training modules and classrooms.

"Job opportunities for those who complete our bioprocess program exist worldwide. In fact, 98 percent of our graduates have found employment opportunities with biotechnology companies," says Crabtree, adding that the graduates typically start at an annual salary in excess of \$30,000.

Crabtree says one need look no further than Eddyville's Iowa Bioprocessing Center to see how value-added agriculture and

biotechnology are transforming Iowa. Anchored by Cargill's massive corn wet-milling operation, five multinational companies are producing a myriad of value-added products from Iowa corn and soybeans.

Since 1985, when Cargill opened its operation, companies such as Ajinomoto Food Ingredients, Wacker Chemical Corporation, EPCO Carbon Dioxide Products, and Ajinomoto Heartland LLC have made capital investments of more than \$1.2 billion and created jobs for nearly 800 Iowans.

Iowa's rapidly expanding renewable fuels industry also holds increasing opportunities for a highly skilled workforce. The

Iowa Renewable Fuels Association says that by the end of 2006, Iowa will have a minimum of 28 ethanol plants as well as eight biodiesel facilities. This makes Crabtree all the more excited about the pilot facility at IBTC and its numerous research scale fermenters.

"Our 13-liter and 150-liter fermenters can be used by start-up life sciences companies for research or optimization purposes," explains Crabtree. "The equipment is designed to mimic on a smaller scale what would happen in the industrial fermentation arena."

The virtual reality model, designed by Iowa State University, is used to educate students and industry staff on the effects of changing fermentation parameters on the production of citric acid. "A seven- to 10-day fermentation run can be virtually modeled in seconds, providing valuable hands-on, real life problem solving experiences for students," says Crabtree.

By providing hands-on training of existing and future biotechnology workers in a state-of-the-art facility, Indian Hills' IBTC is helping fuel the growth of bioprocessing firms in Iowa now and into the future. ■





## Iowa's Kemin Industries develops new market opportunity in functional foods



**K**emin Industries Inc., a Des Moines-based provider of nutritional ingredients solutions, has created a new division—Kemin Food Ingredients (KFI)—to market superior shelf-life solutions that preserve the freshness and enhance the quality of food. The division will be based in Des Moines, Iowa.

“Iowa is a hub for agriculture, health and food industries and offers a very high caliber of scientific talent,” says Chris Nelson, president of Kemin Industries, “This allows Kemin to very effectively advance molecular discovery and create products for the functional foods market in addition to our other markets.”

Kemin Industries, Inc., which has been enjoying a 10-year run of double-digit sales growth while

venturing into many new markets, is in the midst of a \$17.8 million headquarters expansion, leveraged by a \$550,000 Iowa Values Fund award from the Iowa Department of Economic Development.

“Phase-one of Kemin’s expansion is underway and will enable expansion of our innovation center as well as additional production capacity, bringing new jobs to Kemin’s Des Moines location,” says Nelson.

The newly created KFI will leverage Kemin’s expansion as the group prepares for rapid global growth and new product and category development to drive long-term expansion.

“KFI will introduce a ‘Functional Foods Ingredients’ platform in 2006 and the first entry will be FloraGLO® brand lutein, which we will market to the food and beverage industries,” says K.P. Philips, president of the division.

Functional foods refer to ordinary foods that contain or have been enriched with health-promoting ingredients, as well as foods that may provide health, immunity or disease-fighting benefits beyond their existing value to daily nutrition.

For example, KFI’s FloraGLO® lutein, made from marigold petals, can help prevent macular degeneration, a leading cause of blindness. Current KFI product lines that help conserve the flavor, color and nutritional value of food include FORTIUM® brand natural antioxidants and extracts, SHIELD® brand antimicrobial systems and EN-HANCE™ brand synthetic antioxidants.

Over the next several years, researchers anticipate the functional foods (also known as nutraceuticals) market may increase an average of 9.9 percent annually. Fry Foods International estimates the total market for functional foods in Japan, Europe and the United States at approximately \$38 billion.

Imagine a drink that may help prevent blindness, breads and tortillas that can stay fresh for months, or foods that can improve skin health and keep certain cancers at bay. Every day the nutritional ingredient experts at Iowa’s Kemin Industries strive to turn these dreams into reality by developing an ever-expanding array of nutraceutical products. ■

## Nanotechnology is Huge at Iowa's BioForce

**In** Ames, Iowa, BioForce Nanosciences Inc., is poised to add manufacturing jobs due to continued market demand for its nanotechnology equipment.

According to Eric Henderson, BioForce founder and CEO, the company started out as a supplier of accessories in Atomic Force Microscopy.

“Today, we are providing products and services that allow researchers to work in ultra-miniaturized scale — where one nanometer equals one billionth of a meter, and one human hair measures 200,000 nanometers in diameter,” says Henderson.

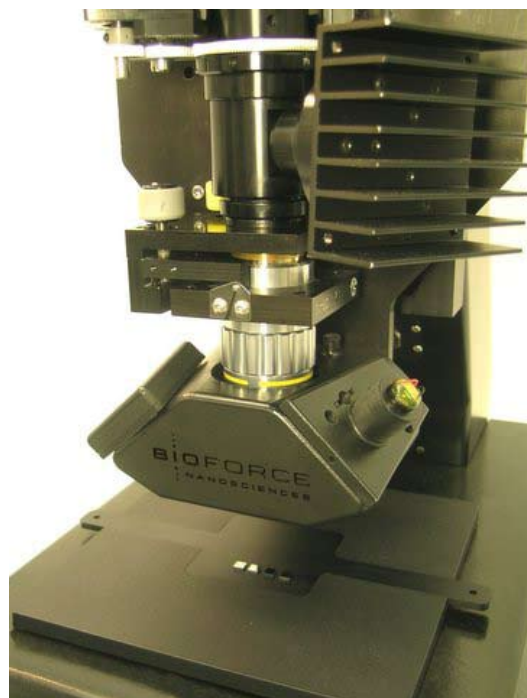
BioForce’s patented product, the NanoArrayer™, is the centerpiece of the company’s products and technologies.

Designed for biomedical purposes and costing upwards of \$125,000, “The NanoArrayer System allows researchers to run many tests with very little material—from a small sample of spinal fluid or a newborn’s blood,” says Henderson.

“The NanoArrayer allows scientists to view and track as many as 1,500 different samples at once. Previously, researchers were restricted to viewing one sample at a time,” he continues.

Depending on the type of research, the NanoArrayer can capture molecular reactions for cancer/disease screening, drug development, water and air testing, agricultural and industrial situations, and many other applications.

BioForce is now collaborating with Iowa State University (ISU) to develop a



sensitive nanotechnology-based method for detecting food-borne pathogens.

“We will focus on the combination of nanotechnology and molecular biology to create a new and powerful platform for pathogen detection in foods,” says Henderson, who is a professor of genetics and cell biology at ISU.

The company also has research collaborations and grants with the U.S. Department of Defense to find new ways to detect bioterror agents and with the National Cancer Institute and the Food and Drug Administration to apply nano-technology to the screening of ovarian cancer.

Other BioForce products include its ViriChip System, a proprietary ultra-micro detection system for viruses. “The ViriChip silicon wafer can be so small as to be invisible to the naked eye,” says Henderson. “It holds testing agents that

could help identify biological threats such as anthrax, sarin and small-pox.”

In the fall of 2005, BioForce was awarded \$500,000 from the Iowa Department of Economic Development to help the company commercialize its technology.

“BioForce has followed the tried and true model of beginning with a vision, then working for funding through grants, seed capital and other sources to fund research on nascent technology,” says Henderson. “After 11 years, we are now reaching our long-term goal of bringing new and innovative products to market.”

It’s ironic to consider that nanoscience, the technology that allows scientists to look at materials on the atomic and molecular level, is truly becoming the next “big” thing.

In Ames, 17-employee BioForce is using its 11 years of experience in nanotechnology and molecular biology to produce a series of proprietary products for its pharmaceutical, veterinary, government and education customers.

“With new products and services being developed all the time, we anticipate doubling our employment in the next year. We could even see spin-off businesses result as we focus on our specialty markets,” says Henderson.

**For more information on how an Iowa location can help your company secure huge returns, call an Iowa Department of Economic Development project manager for a confidential consultation at 800.245.IOWA (4692), or visit [www.iowalifechanging.com](http://www.iowalifechanging.com). ■**

# Genencor International expanding its Cedar Rapids, Iowa facility

***\$35 million expansion establishes Cedar Rapids as prime North American manufacturing operation***

**G**enencor International, a leading industrial biotechnology company that develops and produces enzymes for the bioproducts market, is in the midst of a \$35-million expansion at its production facility in Cedar Rapids, Iowa.

“Through the expansion, Genencor plans to establish Cedar Rapids as its prime manufacturing operation for North America,” says Frans Van Londersele, plant manager of the Cedar Rapids facility. “When completed in 2008, the expansion will double the current capacity of the plant and allow us to maintain our position as the preeminent supplier of enzymes and bioproducts for the ethanol, cleaning, textiles and chemical industries.”

“While the new expansion project was recruited by communities across the U.S., a number of options and criteria were compared, including manufacturing and operational costs, process performance and future capital investment needed in Genencor plants within the United States,” Van Londersele says. “Looking at all that, and the incentives offered, the best option was to expand in Cedar Rapids.”

The expansion project, which creates 17 new jobs and retains 80 jobs at an average hourly wage of \$20.37, received a \$750,000 Public Infrastructure Assistance Program award from the Iowa Department of Economic Development. The expansion was also approved for Enterprise Zone tax benefits.

The enzymes produced by Genencor are proteins that help a chemical reaction take place specifically, quickly and efficiently, and offer a number of environmental and worker safety



***Genencor was named to R&D Magazine's Top 100 Most Technological Significant Products for development of its STARGEN™ enzyme that significantly reduces the number of steps and costs in producing ethanol.***

advantages by replacing harsh chemicals or processes in many manufacturing operations. “For example, the use of industrial enzymes replaces acids and chemicals in the starch, paper and textiles, and other production processes,” explains Van Londersele.

Genencor, a division of Copenhagen-based Danisco A/S, built its greenfield production facility in Cedar Rapids in 1989. Since that time, its industrial enzymes have been used by laundry and dish detergent makers and in the grain processing and ethanol industries.

“Additionally, grain millers use our enzymes to convert the starch in corn, wheat and tapioca grains into value-added food and industrial ingredients,” says Van Londersele. “Our team of professionals also provide applications expertise and technical support to customers.”

In fact, Genencor’s newest product, STARGEN™, was named in *R&D Magazine's* Top 100 Most Technological Significant Products. STARGEN is an enzyme that significantly reduces the number of steps and costs in producing ethanol. “The potential advantages of our STARGEN technology to our customers include improved productivity, reduced energy consumption, higher ethanol yields and savings on capital expenses by reducing overall unit operations,” says Van Londersele.

And Iowa’s booming renewable fuels industry stands ready to take advantage of the technology. The Iowa Renewable Fuels Association says that by the end of 2006, the state will have a minimum of 28 ethanol plants capable of annually producing more than 1.8 billion gallons of the corn-based fuel. ■



## Integrated DNA — Continued from page 1

Completion of IDT's new headquarters will allow the company to increase its current employment base of 338 by up to 50 percent over the next two years, says Martin.

"Coralville is the heart and soul of IDT," he says. "From here we've become the supplier of choice for biotech labs all around the world, serving researchers across every time zone and across every area of biological study. Our expanded facility serves to strengthen our deep roots in Iowa, and shows our commitment to the state's future."

Iowa has reciprocated that commitment. The expansion project was awarded \$600,000 from the Iowa Department of Economic Development's Community Economic Betterment Account.

With the completed expansion project—IDT's fourth expansion since its founding—Martin says the company will build upon its strength as the largest supplier of custom nucleic acids in the U.S. "Our plans are to enter the European market, acquire competing custom-oligo manufacturers, and roll out more and more proprietary products to keep Integrated DNA on the leading edge of life science research," he says.

*If your bioscience company would like confidential assistance with an expansion, contact the Iowa Department of Economic Development at 800.245.IOWA (4692). ■*



## CET Research in Iowa may stem disease

Cellular Engineering Technologies (CET), located at the University of Iowa's Technology Innovation Center (TIC), has announced it is the first Iowa company to operate a robotic stem cell separator. The equipment will provide a vast array of opportunities for tissue and disease research.

Founded in 2000 by Dr. Alan Moy, a physician-scientist-professor from the UI Department of Internal Medicine and Biomedical Engineering, CET is commercializing technologies developed at the university and licensed from the UI Research Foundation.

The company will use the stem cell separator to build upon its collaborations with researchers at the UI, Iowa State University, Harvard and the University of Tennessee among others.

CET's \$50,000 Robosep uses two high-powered magnets to bind stem cells with an antibody. "The machine then isolates the cell from its originating blood, isolating any immunological cell from either umbilical cord blood or adult blood," says Moy. "The possibilities for tissue engineering and tissue development are endless."

Stem cells are master cells that have the potential to develop into any cell type in the body. Scientists believe they could act as a type of repair system to provide new therapies for illnesses ranging from diabetes to Parkinson's.

Stem-cell research is controversial, with many scientists believing the most promising stem cells for treating human diseases are derived from embryos left over from fertility clinics.

CET does not conduct embryonic stem cell research, which is banned

in Iowa. "Use of adult stem cells is more attractive from the standpoint of logistics and business economics," says Moy.

"Adult-derived stem cells have produced the same types of specialized cells as embryonic stem cells. It would be preferable to use a patient's own stem cells because it eliminates the risk of tissue rejection."

Adult tissues that contain stem cells include brain, bone marrow, peripheral blood, blood vessels, skeletal muscle, skin and liver. A stem cell is 100,000 times smaller than the thickness of a strand of hair.

Once CET isolates the cells, they are treated with different growth factors, grown in an incubator and then evaluated for their response.

"We research and develop therapeutic, research and clinical diagnostic tools to evaluate complex physiological responses in living cells, stem cells and tissue," explains Moy. "The results can be used to better understand pharmaceutical drugs' or genes' effects on cell functions."

Along with providing precise information on how drugs or genes affect human or animal cell function or how biological molecules alter cellular mechanics, Moy says he wants CET "to show that high-tech stem cell work is happening in Iowa.

"Universities, researchers and other biotechnology companies do not have to outsource stem cell isolation and testing to other states," says Moy. CET is one of nearly 90 high-technology companies that have been admitted to the TIC since the business incubator was established in 1984. ■

## Partnerships lead to growth at Iowa's AATI



Technology developed at Advanced Analytical Technologies, Inc. (AATI) is finding increased market acceptance in a wide range of industries.

With that acceptance is an expansion of manufacturing jobs at the Ames, Iowa-based company. The technology – a rapid bacteria detector (RBD) – is in demand in the pharmaceutical, food and beverage, and cosmetic and personal care industries.

“Companies like Procter & Gamble and Alberto-Culver Co., are using our technology because of the speed and accuracy in detecting pathogens and microbes in water and other liquids,” says Steve Lasky, AATI founder, president and CEO.

Companies and manufacturers in the pharmaceutical and cosmetics industries are required to run a series of quality-assurance tests on their products before shipping them to market.

Previously, to test for bacteria or pathogens in liquids, purified water and drinking water, samples would be placed on culture plates and placed in an incubator for up to 48 hours to see if a pathogen or bacteria would grow.

“Companies need to be able to move products faster and get test results more quickly, so we knew there was a need for rapid bacterial detection technology,” says Lasky.

AATI’s technology uses flow cytometry to detect bacteria in a sample. “Flow cytometry is a technology that counts individual, micron sized particles such as bacteria or yeast as they pass through a beam of laser light,” explains Lasky.

AATI’s latest detector, the RBD3000 is a patent-protected instrument that’s totally automated, can test up to 42 samples in quick succession and requires little training to operate.

“After liquid samples are loaded into the RBD 3000, its robotic arms add a fluorescent tag to each sample that adheres to the bacteria,” explains Lasky.

“Each sample is mixed and incubated for a short period of time before it passes through a laser beam. Any living bacteria will glow when the laser hits it, and the machine electronically counts and records each type of pathogen and its intensity.”

With more and more companies discovering the advantages of the RBD 3000,

the company is adding staff that will help it produce new products. AATI was heavily recruited by states on both coasts and the upper Midwest for the expansion project, but Lasky says its Iowa location has advantages.

“The advantage of Iowa really comes down to work ethic,” he says. “Out of all the states I’ve worked in, I’ve never seen such a committed staff. Ties to Iowa State University have also been helpful, with access to their research and scientific staff. More importantly, we’ve been able to work with John Poppajohn and companies like the Principal Financial Group and Farm Bureau Financial Group that have invested in us and stayed behind us,” Lasky says.

AATI’s expansion also received \$2 million in awards from the Iowa Department of Economic Development. In return, the company pledges to create 45 technology jobs and retain 35 existing positions.

Founded in 1998, AATI has weathered the many storms associated with high-technology start up companies. But through it all, the company had the backing of partners in the venture capital field, the university research arena and a supportive state government.

Now poised for great success, AATI is creating high-quality, high-paying jobs as well as helping build critical mass in the state’s scientific and technology industries. ■

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## g u e s t o p i n i o n

# Working together, Iowa's bioindustry and university researchers advance innovation



**Dr. Chris Nelson**  
President  
Kemin Industries

It was more than 45 years ago that my parents R.W. and Mary Nelson founded Kemin Industries in Des Moines, Iowa. While Kemin began as a manufacturer of animal feed ingredients, we've evolved to become nutritional ingredient experts for human dietary supplements, pet foods and newly introduced food products as well. Serving a customer base that impacts 80 percent of the global food production capability, Kemin Industries strives to touch the lives of people in the world every day through our products and services.

As we strive to increase our share in the many markets that Kemin serves and as we continue to make molecular discoveries that have widespread application potential, we have a powerful new partner to help assist our efforts. Iowa's bioscience companies have joined together with state university partners to form the Biosciences Alliance of Iowa (BAI).

As inaugural chair of BAI's executive committee, I am excited to help promote BAI's role as an advisory committee to the Iowa Department of Economic Development to focus state efforts in key agricultural, medical and plant bioscience areas. Our membership represents science, industry, education, medicine, agriculture, economic development and government entities. Our goal is to pool resources to develop new bio-based businesses in the state.

Using financial resources flowing to BAI, we have approved \$700,000 in state funds to Iowa State University's Center for Designing Foods to Improve Nutrition. Another \$450,000 was awarded to the University of Iowa for equipment and

software for advanced genomics research, with an additional \$500,000 to UI for the creation of a disease research center where bioscience companies can create animal models of human diseases.

Projects such as these support multiple businesses, not only nascent businesses growing around the universities, but throughout the state. World-renowned for their dynamic research capabilities in the plant, animal and human biosciences, Iowa's three public universities are welcoming partnerships with businesses on applied research projects. With BAI's support, Iowa companies will direct more research activity to the universities in the years ahead and work more closely with the scientific talent we have in the state. BAI also works to bolster existing collaborations between industry and Iowa's research institutions, and continually mines university research for marketable products.

The biosciences industry significantly impacts Iowa's economy. Kemin, Integrated DNA Technologies, Archer Daniels Midland Co., Roquette America, Cargill, Monsanto and DuPont's Pioneer Hi-Bred International are only a few of Iowa's 1,800 bioscience companies employing more than 83,000 people.

Everyday, Kemin and other Iowa life sciences companies seek to commercialize new bioscience innovations. Together with Iowa's outstanding business climate, a skilled, well-educated and adaptable workforce, and an enviable quality of life, Iowa is providing bioscience companies with an exciting new resource to assist us in our endeavors:

The Biosciences Alliance of Iowa. ■