Governor Chet Culver signed the Power Fund Policy Bill at Iowa State University in CCUR’s wet processing pilot plant creating the historic $100 million Iowa Power Fund.

“Today, I believe, is the time for Iowa to take the lead in the race to become the energy capital of the world,” said Governor Culver. “The Power Fund is an exciting, forward-thinking plan that will coordinate our efforts as we explore our new energy frontier. By signing the Power Fund into law, we can create the jobs of the future in Iowa that will keep our kids at home where they belong. I believe the Power Fund is one of the most important pieces of legislation the Iowa legislature has passed in recent history, and I commend them for their efforts.”

The goal of the Power Fund is to invest in cutting edge research and development that is required in the new energy economy. This will create the jobs of the future and work to wean ourselves off foreign oil. The Iowa Power Fund establishes the Office of Energy Independence which will: 1) coordinate administration of the Fund; 2) coordinate existing state and Federal energy policy programs; 3) pursue new research investment funds from public and private sources; 4) establish renewable energy performance measures; and 5) develop an Iowa Energy Independence plan. It also establishes the Power Fund Board which will be made up of 11 representatives from Iowa government and postgraduate educational institutions.

Governor Culver signs the Power Fund Policy Bill at Iowa State.

Johnson recipient of Kansas State University Distinguished Service in Agriculture award

Larry Johnson, director of the Center for Crops Utilization Research (CCUR) and professor of Food Science and Human Nutrition, received the Kansas State University Distinguished Service in Agriculture Award for Teaching and Research. Johnson presented a university seminar, Biorfineries – A Revolution in American Agriculture, as part of the program.

“We are pleased to honor Dr. Johnson, who has made significant contributions in the field of crops utilization for food, feed, and industrial applications,” said Fred Cholick, dean of the College of Agriculture and director of Kansas State Research and Extension. “He is also an extraordinary educator.”

“I nominated Dr. Johnson because of his success in building the Center for Crops Utilization Research in the mid-1980s and for his success in teaching and research in renewable materials,” said Paul Seib, Kansas State professor in the Department of Grain Science and Industry.

Johnson entered Kansas State as a research assistant in the Department of Grain Science and Industry in 1975. He completed a Ph.D. in food science with an emphasis in grain science and engineering technology from Kansas State in 1978.

Johnson started his Iowa State career in 1985 as an associate professor in the Department of Food Technology and professor-in-charge of the Food Crops Processing Research Center. He became director of CCUR in 1999.

Dr. Johnson receives his award from Dean Fred Cholick
Lt. Gov. Patty Judge visits Iowa State labs

Iowa State University News Service

Iowa Lt. Gov. Patty Judge visited Iowa State’s Center for Crops Utilization Research on Feb. 1 to learn about some of the biorenewable projects on campus. “The work that you’re doing here will be a benefit not just to our state, but to our entire nation,” she told Iowa State researchers and graduate students.

“We really applaud you.” But, she said, “We can’t rest on our laurels. That’s my message for you today. If we are going to succeed in the next century, we will have to invest more in biorenewable energy and develop the bioeconomy for our farmers, our communities and our state.”

Scientific curiosity fuels research by Iowa State professor on feeding corn milling co-products

Susan Thompson, Communications Service

Count Allen Trenkle among those who think increasing ethanol production in Iowa is a good thing. “I’m enthusiastic about it. We have opportunities in Iowa that other parts of the country don’t have, and one of those is to use this increase in ethanol production to increase cattle production,” he said.

Trenkle is a Charles F. Curtiss Distinguished Professor in Agriculture at Iowa State University. He’s retiring after 44 years on the animal science faculty. But as an emeritus professor, he said his “scientific curiosity” will lead him to continue his research on how co-products of corn milling operations can be used as feed sources for livestock and poultry.

Trenkle’s interest in this area started in the 1980s with the expansion of Iowa’s corn wet milling industry, producing corn syrup and sweeteners. The Iowa Beef Industry Council and the Iowa Corn Promotion Board funded Trenkle’s research on how the by-product of that milling process – corn gluten feed – could be incorporated into cattle rations.

In the mid-1990s, the Iowa Corn Promotion Board was planning a series of meetings to promote ethanol production. Trenkle was asked to talk about incorporating the co-products into livestock rations.

“We hadn’t done any work with distillers grains yet,” Trenkle said. “There weren’t any plants in production in Iowa, so we hauled wet distillers grains from Minnesota for our trials. We found it makes an excellent feed source, maybe better than the corn gluten feed we had tested earlier.”

Trenkle presented his research results at the American Society of Animal Science annual meeting in 1996. At the time, he said distillers grains should be considered a co-product, rather than a byproduct, because of its value as a feed. “It is an excellent feed and based on the performance of cattle, has a higher apparent energy value than corn,” he said.

“I thought we had all the answers,” he said in a
Dr. Johnson receives honorary doctorate

Larry Johnson, director, Iowa State University Center for Crops Utilization Research (CCUR), received the Honoris Causa Degree from Ghent University on March 23, 2007, in Ghent, Belgium. Johnson was honored for his work the past 25 years in the multidisciplinary approach to the use of bioproducts for food and non-food purposes, which resulted in the establishment of CCUR at Iowa State University in 1987.

The laudation prepared by Roland Verhe, professor, Ghent University, stated that Johnson has carried out pioneering work in renewable raw materials and biofuels. In 1983 he had started using vegetable oils as fuel for diesel engines. Under his direction, CCUR has supported research in biodiesel, biocomposites, and ethanol as well as the development of advanced food ingredients and products. As a result Johnson is regarded as a prominent pioneer of multifunctional agricultural production and the integral valorization of crops for food and non-food purposes, using sustainable and clean technology.

In addition, Johnson worked to create biorenewables educational opportunities for students. He helped create a Master of Science program in renewable resources at Iowa State, convincing departments to offer this new program. Johnson is one of the partners of a European Union–United States exchange program in biorenewable resources.

Verhe stated that Johnson’s example inspired Ghent University to create a Centre of Renewable Resources.

Dr. Johnson and wife Bernice catch-up with past study-abroad BRT students from Belgium. From left: Eike Vermoeson, Dirk Aertz and Miet deBaer.

Direct fungal fermentation of lignocellulosic biomass

The team of Hans van Leeuwen, Tony Pometto, Samir Khanal and David Grewell is using fungi to convert lignocellulose to biofuels. The current enzymatic bioconversion of lignocellulosics to sugars and biofuels requires chemical (acid or alkali) and/or heat and high pressure pretreatment. These pretreatments are highly polluting, difficult to operate and create environmental hazards. Pretreatment remains one of the most expensive unit operations in a cellulosic biorefinery. Furthermore, it also requires the addition of expensive externally derived enzymes.

Both brown rot and white rot molds have been known to degrade lignocellulosics which include wood and grasses. Current work at Iowa State University has demonstrated that species of each of these fungi can produce the cellulases and hemicellulases to degrade both cellulose and hemicellulose in wet milling corn fiber with no further pretreatment. Most sugars released by these fungi are fermentable to ethanol by yeasts.

The work needs to be expanded to other more ubiquitous sources of lignocellulosic material such as grasses, miscanthus and forestry product residues. Additional non-polluting pretreatment will need to be developed. Preliminary tests at Iowa State have already proven that ultrasonication prior to fungal treatment enhances both the conversion and the rate of saccharification of different lignocellulosic materials.
College of Agriculture presents awards to faculty

Roger Ginder, professor of economics, received the award for Outstanding Achievement in Extension. Ginder began his career at Iowa State in 1978 after receiving his doctorate from the University of Kentucky. Ginder is a leading expert in the financial and strategic management of cooperatives and has developed and conducted training workshops on an annual basis for executives, managers, board members and employees of cooperative business organizations.

The Dean’s Citation for Extraordinary Contributions to the College of Agriculture was presented to Robert Brown, professor of mechanical engineering, chemical engineering and agricultural and biosystems engineering and the Iowa Farm Bureau director of the Office of Biorenewables Programs at Iowa State.

CCUR featured on Iowa Minute

Larry Johnson was interviewed by Laurie Groves for the February 2007 edition of the Iowa Minute, an Iowa Farm Bureau Federation outreach program to educate consumers about today’s agriculture. Johnson highlighted research on the use of corn and soybeans in biorenewable products by CCUR affiliated researchers.

BRT Student Profile: Mary Rasmussen

Noel Holton Brathwaite, Office of Biorenewables Programs

After graduating from the College of Saint Benedict in St. Joseph, Minnesota with a degree in natural science, Mary Rasmussen knew that she wanted to continue her education, but she had yet to discover her true calling. She decided to travel to Nicaragua to help out at a village orphanage for a year, and was dismayed at the lack of clean drinking water.

This experience led her to Iowa State University and the Department of Civil, Construction and Environmental Engineering, where she is currently pursuing a dual doctorate degree in environmental engineering and biorenewable resources and technology.

Although her research doesn’t directly deal with improving the quality of drinking water, she is looking at ways to improve processing at corn dry-grind ethanol plants in order to reduce water and energy demands while increasing the value of the byproducts.

Working with Hans van Leeuwen, professor of civil, construction and environmental engineering, Anthony Pometto, professor of food science and human nutrition, and Samir Khanal, research assistant professor of civil, construction and environmental engineering, Rasmussen is investigating the cultivation of fungi on the corn-to-ethanol co-product thin stillage. The fungal biomass could serve as a dietary supplement and be co-fed with distillers dried grains (DDG) to hogs and chickens, which would help resolve the anticipated overproduction of DDG from the booming ethanol industry. Currently, DDGS, which are retrieved from whole stillage and require a lot of energy to dry, are primarily used to feed cattle. The research has been funded by the USDA CSREES through the Iowa Biotechnology
CCUR and IGQI Advisory Board Meetings

The CCUR Industry/Stakeholder Advisory Board met in Ames on February 23. Larry Johnson presented the findings of the Battelle Study for CCUR technology commercialization and the proposed response by CCUR. The Board offered suggestions for the implementation plan and requested Johnson move the plan forward within the College of Agriculture for approval.

The Iowa Grain Quality Initiative held its industry advisory committee meeting on January 12 in Ames. The committee saw these presentations: Sourcing Corn for Ethanol: Impacts of Local Processing, Connie Hardy; Fractionation of Corn for Ethanol Production, Roger Ginder; Grain Storage and Management Practices Training Module, Howard Shepherd; Management of Glyphosate Resistance, Mike Owen; and The Impact of an Auditable Quality Management System (QMS) in a Grain Elevator Application, Chad Laux.

The committee also discussed the Advanced Corn-to-Ethanol Platform and IGQI support of the bioeconomy.

Grants and Contracts

Improvement of Baked Cookies and Cookie Dough, Clear Lake Specialty Products, $30,934, S. Beattie, T. Boylston, and K. Bentley.

Uniformity in Near Infrared Measurements of Soybean Quality, American Oil Chemists Society, $54,647, C. Hurburgh.

Regional Variation in Soybean Traits: Data Mining and Analysis, United Soybean Board, $10,000, C. Hurburgh.

Harmonization of USB Soybean NIR Efforts: Whole Grain Instruments, United Soybean Board, $24,949, C. Hurburgh.

Impacts on Livestock Industry of an Expanded Biobased Economy, Smithfield Swine Industry Enhancement Grant GP Program, $34,261, J. Lawrence, R. Wisner, R. Ginder, and D. Jarboe.

High Moisture Extrusion of Fibrous Soy Protein Meat Analog, University of Missouri, $19,620, R. MacDonald.

Scale-up of Soy Hydrolysate Ingredient for Wood Adhesive Formulations, United Soybean Board, $79,687, D. Myers.
Trenkle
From page 2

recent interview. “We had looked at a 40 percent inclusion rate and had success at that level. But producers said they wouldn’t feed that much. So we did more experimentation, looking at digestion and other factors at lower inclusion levels. Now we have all these ethanol plants coming online and producers are asking if they can feed more than 40 percent.”

So Trenkle’s research continues. He’s looking at 60 percent inclusion levels, and at the effect of combining dry distillers grains with distillers grains with solubles. “Every plant has a different output,” he said. “These excess solubles have value, but you can’t feed as much because it’s higher in oil.”

Trenkle earned a bachelor’s degree at the University of Nebraska in 1956, a master’s degree at Iowa State in 1958 and a doctorate degree at Iowa State in 1960. He was in a postdoctoral fellowship at University of California, Berkeley for 18 months before joining the Iowa State University animal science faculty in 1962. He was named a distinguished professor in 1983.

Additional information available online: Research is Ongoing on Livestock Use of Ethanol By-Products

Rasmussen
From page 4

Byproducts Consortium (BBC) and the Grow Iowa Values Fund.

Rasmussen’s passion for her research and its potential application is evident in her academic performance. Upon completing her Master’s degree in August 2006, she received a Research Excellence award, which honors students engaged in outstanding thesis and dissertation work. She has also received the top student award for earning the highest exam score among six ISU students and dozens of European students from 15 different countries who took part in the two-week BRT Intensive Exchange Program held in France in June 2007.

CCUR Visitors

Tate and Lyle, Fort Dodge, Iowa, December 15.
BiOva, LLC, Ames, Iowa, January 8.
Iowa Lieutenant Governor Patty Judge, February 1.
Republican presidential candidate Governor Mitt Romney, February 8.
Iowa Renewable Fuels Association board of directors, March 5.
Summit Green Tiger Investments, March 29.
Democratic presidential candidate Senator Christopher Dodd, April 12.
Mid Iowa Growth Partnership, April 13.
PRIME BioSolutions, April 19.
Chinese Biotechnology Regulators, Trade and Development Authority Delegation, April 20.
Pinches Consolidated Industries, New Zealand, April 26.
Students from Zhejiang University, Hangzhou, Zhejiang, China, May 4.

Rasmussen is using a fermentor to break down thin stillage.

BULLETIN

Bulletin is the newsletter of the Center for Crops Utilization Research (CCUR). Bulletin is published quarterly by CCUR at Iowa State University, 1041 Food Sciences Building, Ames, Iowa 50011; 515-294-0160.

Director: Lawrence Johnson
Editor: Darren Jarboe
Layout: Jeni Maiers

To be added to our mailing list, e-mail ccur@iastate.edu.
On the web at: www.ccur.info.

Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of Equal Opportunity and Diversity, 3680 Beardshear Hall, (515) 294-7612.