Center Focuses on University’s Strengths in Animal Genomics

The goal of the Center for Integrated Animal Genomics (CIAG) is simple: to make Iowa State University one of the world’s top institutions in integrated animal genomics.

The university program in animal genetics and genomics is considered one of the top three in the world and is associated with outstanding programs in bioinformatics and infectious disease. The center brings together more than 40 faculty members from centers, institutes, and academic departments from five colleges who conduct research in genetics and genomics, animal health and production, and infectious disease. The center focuses on integrating multiple forms of genetic and genomic research to identify, map, and understand how genes function and control animal and human health and performance.

“The Center for Integrated Animal Genomics will ensure that Iowa State continues to rank among the very best universities in animal and microbial genomics. It also will provide excellent opportunities to collaborate with faculty in plant genomics and food safety,” said Max Rothschild, distinguished professor of animal science and co-director of CIAG. Susan Carpenter, professor of veterinary microbiology and preventive medicine, is the other co-director.

Research by faculty in CIAG builds on the university’s strengths in areas that are predicted to be important for agricultural development over the next five to ten years. Two key research areas are comparative genomics and animal-microbe interactions.

Comparative genomics involves comparing genomes of multiple species using computational biology and bioinformatics. By comparing the genomes, scientists can learn more about gene structure, function, and evolution. CIAG researchers are using comparative genomics to discover ways to produce agricultural animals with desired traits for improved animal nutrition and other animal products for human consumption.

Animal-microbe interaction research studies how microbial diseases occur and spread. Microbial genomics studies diseases and their affects on a genetic level, which allows researchers to better understand disease resistance and to develop improved vaccines and diagnostic tests. Research conducted by CIAG researchers in animal-microbe interaction will have implications for food safety and security, public health, and bioterrorism. This area of research benefits by collaborations with scientists at the U.S. Department of Agriculture’s National Animal Disease Center, located in Ames.

Collaboration with scientists from other institutions around the world is a primary objective of the center. To meet this goal, the center offers a scholars and fellows program to bring scientists and researchers from other institutions to Iowa State University for two- to six-weeks. Visiting scientists work and interact with CIAG researchers, attend workshops and seminars, and develop research collaborations.

The center supports a competitive grant program to provide seed money for research in animal, microbial, and comparative genomics. The grants are awarded to CIAG researchers, and collaborations are given high priority.

“The center provides a forum to bring together people from across campus to advance animal genomics, microbial genomics, comparative genomics and bioinformatics, and ultimately to enhance the health of animals and people,” Carpenter said.

Thanks to funding by the College of Agriculture, the President’s Office, the College of Veterinary Medicine, the Office of Biotechnology, and the department of animal science, two new positions have been developed in companion animal genomics and animal disease genetics. It is expected that these positions will be filled this year. In addition, a major effort to create an endowed chair in animal breeding and genetics is underway.
The center is administered by the College of Agriculture in collaboration with the Colleges of Liberal Arts and Sciences and Veterinary Medicine. For more information about the center, contact Max Rothschild at 515-294-6202 or mroths@iastate.edu; Susan Carpenter at 515-294-5158 or scarp@iastate.edu; or go to www.ciag.iastate.edu.

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**Biotechnology News**

**Collaboration Opportunities Highlighted at Economic Development Meeting**

Economic development professionals from across Iowa attended a recent meeting at Iowa State University to discuss how the university can partner with the state's industries and businesses.

The July 8 meeting focused on the university's resources for life-sciences industries and included visits and tours at more than 10 offices and facilities, including the ISU Research Park, Institute for Physical Research and Technology, Center for Crops Utilization Research, biotechnology instrumentation facilities, and the college of veterinary medicine.

"With an increased emphasis on economic development in Iowa, the university wants to make the state's companies aware of the partnership and collaborative opportunities Iowa State University offers," said Lisa Lorenzen, director of industry relations and biotechnology liaison.

Participants at the all-day event talked with researchers in various life sciences fields and technologies as well as with economic development experts. Specific topics discussed included information technology, including information solutions, assurance, and virtual reality; how to maintain contact with appropriate resources at the university; renewable energy sources and development; current technologies to advance animal and public health; and how to start and grow technology-based companies.

“Through this event, we hope not only to start new dialogues between the university and the industries and development organizations in the state, but also to build and maintain long-term relationships," Lorenzen said.

The event was sponsored by the Office of the Vice Provost for Research and Advanced Studies and the Office of Biotechnology. To learn more about collaboration and assistance for industry and economic development, contact Lorenzen at 515-294-0926 or llorenze@iastate.edu.

**Fifth Annual Career Day Scheduled**

Biotechnology Career Day has been bringing Iowa State students and the state's top biotechnology companies together for four years, and this October 15 will make five.

Held in the atrium of the Molecular Biology Building, one of the central research and teaching hubs for biotechnology on campus, Biotechnology Career Day is a unique opportunity for companies to focus specifically on the audience they look to hire, from undergraduates to post-doctoral students.

Since the first Biotechnology Career Day in 1999, more than 1,000 students have brought their resumes to the event, looking for jobs and internships with attending companies. Each year, they represent more than 30 majors in five colleges. Majors include agronomy, chemical engineering, and molecular biology.

“Biotechnology companies in Iowa are among the best in the nation, and Iowa State students are among the best prepared for working in the industry. Biotechnology Career Day is an important link between companies and the students who may become their employees,” said Lisa Lorenzen, coordinator of the event.

Doug Getter, president of the Iowa Biotechnology Association, which co-sponsors the event, said it is important for Iowa's biotechnology companies to connect to students through events like Career Day. "In order for students to know what Iowa has to offer in the field of biotechnology, companies need to showcase their strengths in research and development," he said. "Biotechnology Career Day is a simple and effective way to bring the message that Iowa is the place for biotechnologists."

Companies that are members of the Iowa Biotechnology Association can attend Career Day for free; non-member companies pay a small registration fee. Companies are provided booth and storage space, electricity access upon request, and free lunch. The event is held from 9:00 a.m. to 4:30 p.m.

For more information about Biotechnology Career Day, contact Lisa Lorenzen at 515-294-0926 or llorenze@iastate.edu. Companies can register online at www.biotech.iastate.edu/Industry_resources/career_day2003/industry_app.html.

**Guidelines Outlined for Off-Campus Collaborations**

Iowa State University is committed to developing partnerships with external sponsors who support research and scholarly work of university scientists. The ISU Research Foundation (ISURF), Office of Sponsored Programs Administration (OSPA), and Office of the Vice Provost for Research and Advanced Studies recently developed documents that outline the principles, guidelines, and agreements involved in research collaborations. The goal of the documents is to make it simpler for external sponsors to develop relationships that meet their requirements and those of the university.

**Principles and Guidelines**

The university follows specific principles and guidelines for sponsored research to ensure the integrity of research and scholarly...
activities of university scientists and students as well as the successful achievement of the sponsored activity’s goals.

A new document provides the principles and guidelines used by the university in eleven key areas, including public disclosure, confidentiality, intellectual property, material transfer, research compliance, termination, authorized signatures, conflict of interest, budgets and rewards, overhead, and governing laws and regulations. In addition, university contacts are provided for additional questions and clarifications not covered in the document.

The principles and guidelines are posted on the OSPA web site at www.ospa.iastate.edu/principles_and_guidelines.htm and can be downloaded as a PDF file.

**Standard Agreements**

Agreements are legal documents that establish the specific objectives, procedures, and timelines for an externally funded research collaboration. Depending on the nature of the collaboration, different agreements may be necessary to ensure the benefits to both parties. Five kinds of standard agreements used by Iowa State University for collaborations have been developed and are available online at www.ospa.iastate.edu/standard_agreements.htm. The documents include non-disclosure, material transfer (simple and extended versions), sponsored project, and subcontract agreements. Each agreement online provides a summary of the appropriate uses for the agreement and can be downloaded in PDF format. The purpose of the downloadable standard agreements is to facilitate interactions and decrease negotiation time between the university parties and external sponsors. OSPA will provide an editable version of the agreements upon request by calling 515-294-5225 or sending an e-mail to grants@iastate.edu. The office also prepares signature documents and obtains signatures as needed.

General questions about working with Iowa State University on collaborative research efforts should be directed to Lisa Lorenzen, director of industry relations and biotechnology liaison, at 515-294-0926 or llorenze@iastate.edu.

**New Center for Catalysis Focuses on “Green Chemistry”**

A new center at Iowa State University is using “green chemistry” to develop new ways to eliminate environmental pollutants in industrial and agricultural production.

The Center for Catalysis (CCAT) researches various ways that catalysis can be used to develop products without producing hazardous or polluting byproducts. Catalysis involves adding a substance, called a catalyst, to a chemical or chemical compound. The catalyst causes or accelerates a chemical change to the original chemical compound, but the catalyst itself is not changed and is removed from the final product.

Chemical processes are used in the creation of various products, including plastics and lubricants. Traditional chemical processes often use heat, high pressure, and hazardous chemicals, which can result in hazardous waste. “Green chemistry” catalysis could replace these harmful processes because catalysis can occur at room temperature under ordinary pressure, require less energy to conduct, and use water as a solvent. This results in less energy usage, quicker processing, and fewer harmful byproducts than traditional processing.

CCAT conducts research on developing new catalysts that mimic nature and on developing ways to use agricultural commodities as raw materials in catalysis. Research also is being conducted on the use of biorenewable foodstocks, such as vegetable oils, starches, and wood fibers, for use in plastics and lubricants, as well as value-added products, such as biodiesel and degradable polymers.

“It is a goal of the center to create new markets for midwestern agricultural commodities as raw materials for industry, thus benefiting the farm economy,” said George Kraus, director of CCAT.

Five research projects currently underway at CCAT include the use of nanoscience to develop new catalysts that more efficiently produce biodiesel; more benign oxidation catalysts, oxidative degradation of aromatic hydrocarbons, a process that would use visible light; and a method for converting carbohydrates into hydrogen, which, in addition to being a renewable source of hydrogen, could be used to transform into fuel certain biotech plants that would otherwise be destroyed.

The center involves researchers from a variety of fields to develop catalysts and applications. Chemists, biochemists, materials scientists, and engineers work together to move the catalysis methods from laboratory-scale to industrial-scale projects.

CCAT is part of the Institute for Physical Research and Technology (IPRT) of the U.S. Department of Energy’s Ames Laboratory. IPRT includes research, technology-transfer centers, and industrial-outreach programs at Iowa State University.

For more information about CCAT, contact George Kraus at 515-294-7794, e-mail gakraus@iastate.edu, or visit the center’s web site at www.iprt.iastate.edu/ccat/combi.html.

**Upcoming Events**

**August 7**—Biotech Mixer IV. This meeting series gives biotechnology industry personnel a chance to meet others and to learn more about the industries that call Iowa home. The fourth mixer will be held at Kemin Industries in Des Moines (www.kemin.com/). For more information, contact Lisa Lorenzen at 515-294-0926 or llorenze@iastate.edu.
**Available Technologies**

Iowa State University is seeking industrial partners to develop and/or commercialize the following technologies. For more information and for a complete listing of all available technologies, contact the Office of Intellectual Property and Technology Transfer at 515-294-3893 or [www.iastate.edu/~isurf](http://www.iastate.edu/~isurf).

**Recycled Biotech By-Products Make Organic Fertilizers**
Researchers have developed a method to produce organic fertilizer from mixtures of various biotechnology by-products that are enriched with nutrients and processed under controlled conditions. The fertilizer contains low concentrations of inorganic nitrogen and high concentrations of organic nitrogen. When added to soil, the fertilizer breaks down into inorganic nitrogen to be taken up by crops, which prevents nitrates from entering the ground-water supply and increases fertilizer efficiency. The fertilizer has potential use where most conventional fertilizers currently are applied. ISURF# 02872

**Organic Wastewater Converted to High-Protein Animal Feed**
A new technology converts organic industrial wastewater into a yeast biomass that contains high protein levels. The product is well balanced with amino acids and is suitable for animal feeds. The process also provides biodegradation and chemical oxygen demand (COD) removal properties for wastewater. The reactor operation requires less space than traditional anaerobic water treatment equipment, and is an economical means of producing commercial-grade protein biomass. ISURF# 02766

**Research Update**

The following are a subset of the grants recently awarded for biotechnology-related research at ISU. For more information about establishing research relationships with ISU biotechnology researchers, contact Lisa Lorenzen at llorenze@iastate.edu.


Rice, M.; VanDyk, J.; Todd, J.; and Hellmich, R. Entomology. Improving field corn integrated pest management using site-specific information to incorporate transgenic technology. Pennsylvania State University.
