

IOWA STATE UNIVERSITY COLLEGE OF AGRICULTURE

The College of Agriculture: A Committed Resource

Success in the bioeconomy. . . means a strong agriculture and vital rural economy for Iowa. Through the application of science to practical problems, the College of Agriculture serves as a catalyst for new ideas and technologies and a resource for identifying opportunities and setting strategies for the future. The College of Agriculture has long-standing working relationships and partnerships with Iowa's agricultural leaders and organizations. These stakeholders are strong supporters of research and sharing science-based knowledge. The College is committed to helping Iowans make their communities better places to live and work. Working together, we can use Iowa's agricultural base to build our economy.

www.ag.iastate.edu



Iowa State University does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, sex, marital status, disability, or status as a U.S. Vietnam Era Veteran.

Leadership in the Bioeconomy

IOWA STATE UNIVERSITY COLLEGE OF AGRICULTURE

Iowa agriculture is central to the state's economic vitality and to the food security for the nation and the world. Now, Iowa agriculture is poised to fulfill a new role in energy security. Iowa agriculture — with its matchless soils, climate and educated people — will make possible the transformation from a petroleum economy to bioeconomy.

That's why Iowa is synonymous with agriculture around the world. Similarly, few places in the world offer the breadth and depth of agricultural sciences and education found in Iowa State University's College of

Agriculture. For nearly 150 years, Iowa State's mission-oriented agricultural programs have played a significant role in the state's economy and society. When people turn to leadership in agricultural sciences, they cite Iowa State. Iowa State is the fifth most-cited university in the world for agricultural sciences (1994-2004, Thomson ISI).

Through fundamental and applied science, the College of Agriculture has helped transform revolutionary ideas into realities, including plant breeding and genetics that led to hybrid corn development; animal breeding and

genetics that improved livestock worldwide; agricultural biotechnology; sustainable agriculture; value-added agriculture; agricultural mechanization and technology; and agricultural economics and policy.

Today, the College of Agriculture continues to work on the frontiers of science, including biorenewables. The College provides significant leadership and resources for ISU's Office of Biorenewables Programs to achieve the goals of the Bioeconomy Initiative.

Leadership in the Bioeconomy

The College of Agriculture's Role in the Bioeconomy: Research

Portfolio of sciences

The College supports an outstanding corps of 280 faculty in academic departments. Also, nearly fifty faculty in other colleges receive support for their work through the college's 118-year-old research program: the Experiment Station. Research related to biorenewables is conducted in areas as diverse as agricultural and biosystems engineering, agronomy, animal science, biochemistry, biophysics and molecular biology, economics, natural resource ecology and management and statistics. A brief list of current biorenewables research led by agriculture faculty include:

- Biomass production systems
- Biomass storage and transportation
- Biomass machinery/technology systems
- New crops for biomass
- Economic impacts of increased energy production from agriculture
- Economic implications of corn-based ethanol industry
- Enhancing ethanol production efficiencies
- Crop-based plastics and other biobased products
- Nutritional studies on feeding DDGS to livestock

Team approach to science

College of Agriculture faculty actively participate in ISU's Office of Biorenewables Programs, helping to foster the interdisciplinary interactions important to mission-oriented research. The complex nature of the bioeconomy requires fundamental and applied research encompassing multiple disciplines. College of Agriculture scientists think broadly, take systems approaches and work collaboratively across disciplines to solve problems.

Economic development

Nationwide, state experiment station research and development has a huge economic impact. Public investment in agricultural research meant a 50 percent annual return to society from 1970 to 2000. In Iowa, College of Agriculture research provides science-based information used by producers, businesses and communities to make daily management and business decisions and to help them address new opportunities and be prepared for new challenges. Also, discoveries based on the College's Experiment Station resources are a key reason why ISU is one of the nation's top universities in technology transfer. Sixty-eight percent of ISU's FY05 active patent disclosures link to Experiment Station-supported research.

Federal science partners

Extensive, long-standing collaborations between the College of Agriculture and its federal partners in the U.S. Department of Agriculture Agricultural Research Service bring a strong emphasis to critical scientific issues, including water quality, air quality, crop and animal genomics, bioinformatics and computational genetics, and sustainable agricultural systems. USDA labs on campus include the National Soil Tilth Laboratory, Corn Insects and Crop Genetics Research Lab, North Central Regional Plant Introduction Station and the USDA-ISUA Crop Genomics and Genome Informatics Laboratory.

Technology transfer

The College of Agriculture has a strong track record in support of industrial business applications. Examples include the work of the Center for Crops Utilization Research and its Industry Incubator Facility and pilot plants; the Center for Integrated Animal Genomics for its work for the animal genetics industry; the Department of Agricultural and Biosystems Engineering's work to help firms improve new technological systems for the benefit of agriculture; the Department of Economics' work with many companies, communities and associations to analyze critical issues; the Department of Food Science and Human Nutrition's work with crop-based new products; and the Seed Science Center's development of new technology and tests to benefit the nation's seed industry.

The College of Agriculture's Role in the Bioeconomy: Extension

Extension to Agriculture and Natural Resources

ISU Extension serves as a source of unbiased, research-based information and education for farmers and agri-business professionals to maintain the economic base of Iowa agriculture. Extension to Agriculture and Natural Resources is the largest unit in ISU Extension, involving ninety-six campus faculty and staff members in ten departments and forty-eight field specialists, who work with county

extension education directors, agri-business, farm organizations, and service providers to provide information and education to producers. Nine centers based at ISU also support this work. The director of ANR Extension serves as associate dean of the College of Agriculture and coordinates extension activities in agriculture and veterinary medicine. See www.extension.iastate.edu/ag/

The research-extension hallmark

The relationship of College of Agriculture research and ISU Extension typifies Iowa State's commitment to "Science with Practice." ISU Extension, with its statewide network, has been the primary conduit for transferring the fruit of mission-oriented science and technology to Iowans. Through Extension, Iowans provide direct feedback to shape research in the College of Agriculture and campus-wide.

The College of Agriculture's Role in the Bioeconomy: Education

Future careers

The bioeconomy promises new career opportunities for a highly skilled and educated workforce. Educating these future leaders is a top priority for the College of Agriculture. The College successfully places 98 percent of its graduates. Two-thirds of recent graduates begin their careers in Iowa, finding opportunity in diverse fields of business, research, education, government and service. In its 2006 "America's Best Colleges" report, U.S. News & World Report's said: "At premier ag schools like Iowa State, old stereotypes about colleges of agriculture have little in common with the broad-based, interdisciplinary education [that] students encounter."

Biorenewables education

The College of Agriculture has more than a century of bioeconomy-relevant educational programs, from agricultural engineering to economics to statistics. Agricultural and biosystems engineering faculty member Raj Raman leads campus efforts today as associate director of educational programs for the Office of Biorenewables Programs. More than two dozen College of Agriculture faculty play a key role in ISU's first-in-the-nation biorenewable resources graduate program. With U.S. Department of Education funding, College of Agriculture faculty lead a consortium of U.S. and European Union schools in a renewable resources and clean technology program that takes students abroad to introduce them to international biorenewables topics. On the undergraduate side, faculty in agricultural and biosystems engineering are developing a bachelor of science degree in biosystems engineering to fill emerging needs for biological engineers.

Entrepreneurs and science mentors

The College's Agricultural Entrepreneurship Initiative promotes entrepreneurial skills, experiences and resources among both students and faculty. The College's Science With Practice program is in its second year of matching undergraduates with faculty mentors to gain experience in scientific fields, while earning funds and academic credits for their education.