

Contact: Rachel Boon

**REQUEST FOR A NEW CENTER AT IOWA STATE UNIVERSITY:
CROP BIOENGINEERING CENTER**

Action Requested: Approval of the request by Iowa State University to create a Crop Bioengineering Center reporting to the Office of the Vice President for Research, Plant Sciences Institute.

Executive Summary: The proposed Crop Bioengineering Center (CBC) will capitalize on existing knowledge and skills within ISU to stimulate advances in crop bioengineering research through a strong record of extramural research funding, publications, technologies, intellectual property and training. The CBC will be funded entirely by extramural grants and contracts. The Board Office reviewed this request and recommends approval.

Background:

- ◇ Description of proposed new center. The proposed CBC will formalize an interdisciplinary venture established in 2013. The CBC strives to be a global leader in development and application of efficient, innovative and transformative crop genome engineering technologies. The proposed CBC will establish:
- a scientific platform that inspires, promotes and supports interdisciplinary, collaborative interaction among natural scientists, social scientists, humanists and engineers in the innovative development and application of crop genome engineering technologies;
 - a technology center that provides expertise and service in genome discovery, functional analysis and crop improvement; and
 - a knowledge and information hub that engages, communicates with, and educates the public with regard to biotechnology advances, regulatory implications and policy development in the area of crop bioengineering. The proposed CBC offers a platform leveraging existing intellectual power among ISU scientists and inter-institutional partners to provide public sector infrastructure for rapid and precise crop bioengineering.

The CBC will capitalize on existing knowledge and skills within ISU to advance crop bioengineering research through a strong record of extramural research funding, publications, technologies, intellectual property and training. Through the CBC, ISU will extend existing strengths as a provider of crop bioengineering expertise, services in plant transformation, and advanced genome engineering. The CBC thus will serve as a public sector leader in knowledge dissemination regarding plant gene discovery and crop trait development.

- ◇ Need for the proposed center. Feeding a growing world population requires new approaches to balancing crop production and sustainability that also consider societal impacts of emerging technologies. To address this challenge, there is a need to continue advancing gene editing and related technologies, their application to specific cropping systems, and evaluating the ethical, legal and societal impacts of these technologies. With this in mind, the initial consortium's goal was to develop innovative and transformative genome editing technologies for crops. In the research community, the consortium has been on the leading edge of using genome-editing technologies, for gene discovery and crop improvement, as well as in developing new genome engineering technologies. This includes a major shift in research methodology in gene discovery and function analysis, largely due to the success of the CRISPR/Cas9 technology in both animal and plant genome editing research. This

paradigm shift is likely to lead to both opportunities for positive impacts for agricultural and commercial product development, as well as additional funding opportunities.

- ◇ Relationship to mission. ISU's mission is to "create, share and apply knowledge to make Iowa and the world a better place," with a focus on "conducting high impact research that addresses the grand challenges of the 21st Century." The CBC aligns with this mission through its support of Iowa's biosciences industry as an engine for economic growth, education, research, and outreach, as well as through related initiatives such as the Cultivation Corridor. The CBC will have both direct and indirect impact on Iowa's seed industry by supporting its needs for biotechnology innovation through training, outreach and development of novel resources. It would potentially enrich opportunities for the ISU Research Park as a collaborative environment where academia and industry interact.
- ◇ Relationship to other centers at the university. The CBC will report to the Plant Sciences Institute (PSI) under the Vice President for Research. The PSI serves as the umbrella for a cluster of existing centers focused on different areas of plant science. The CBC's activities are highly synergistic with several of the PSI's centers, and will create new opportunities for collaboration. The current research thrust of the PSI is on predictive phenomics (i.e., the prediction of plant phenotype on the basis of genotype and environment), and none of the existing PSI centers emphasize the advancement and utilization of novel genome engineering technologies, which is the focus of the proposed CBC. The CBC will have a complementary relationship to the Plant Transformation Center (PTC), which is internationally recognized for its expertise in plant genetic transformation, a necessary component in the advancement of genome engineering. The PTC also reports to the PSI.

The CBC will use an internal faculty advisory group, made up of active ISU researchers, to advise the director regarding scientific directions. There will be no external advisory group.

- ◇ Unique features. The large presence of seed and plant biotechnology industry in central Iowa represents a nucleus for support of, and collaboration with, the proposed center. The technologies being advanced by the CBC represent an area where Iowa companies are deeply involved and that are being intensely scrutinized as a value-added enterprise. Further, ISU has internationally recognized excellence and expertise in crop genetics, genomics and breeding, and has made landmark breakthroughs in genome engineering and, more broadly, in the development and application of crop bioengineering technologies that add value to Iowa industry. ISU also has a cohort of well known scholars with expertise in biotech crop risk assessment, agricultural economics, bioethics, and communications.
- ◇ Resources. Sufficient administrative staffing for the CBC is already in place as part of the existing research activity. Affiliated faculty will continue to use their existing office and laboratory spaces. The CBC will also support a staff scientist through sponsored research collaboration in crop genome editing. No additional facilities or equipment is needed.
- ◇ Funding Sources. The CBC will be funded entirely by extramural grants and contracts. No state appropriations or tuition revenue will be used to support the CBC. The CBC's faculty researchers have a stable portfolio of \$2-3M per year. Major sponsors are currently NSF and USDA. Funds have also been received from non-profit organizations such as the Carnegie Institution for Science and the Danforth Plant Science Center. The support CBC administrative functions that are not allowable by external grants, ISU will allocate a portion of indirect cost recovery that flows directly from the CBC's external research funding expenditures (\$154,000 initially).

◇ Cost.

Total Costs	Source(s)	New Costs
Year 1 \$154,000	Indirect cost recovery	
Year 2 \$160,000	Indirect cost recovery	\$6,000
Year 3 \$165,000	Indirect cost recovery	\$5,000
Year 4 \$170,000	Indirect cost recovery	\$5,000
Year 5 \$175,000	Indirect cost recovery	\$5,000
Year 6 \$180,000	Indirect cost recovery	\$5,000
Year 7 \$185,000	Indirect cost recovery	\$5,000

◇ Evaluation plan. Each spring, the CBC's activities, metrics, progress and goals will be jointly reviewed by the Vice President for Research and the co-sponsoring ISU colleges. The director will be provided a written performance assessment based on that review. In addition, the CBC will be reviewed in its fifth year, and every seven years thereafter.

◇ Date of implementation. Upon approval, the Crop Bioengineering Center at Iowa State University will be established in May 2017.