

## **Plant Sciences Institute Innovative Research Grants Program Request for Proposals**

The Plant Sciences Institute announces its Innovative Grants Program for FY09-FY10 to support promising research that positions Iowa State investigators for future competitive funding. Priority will be given to proposals based on scientific quality, impact of proposed research and benefit to several investigators or research groups on campus. Proposals should propose new research and not be a continuation of existing research programs. Proposals should align with one of the five Research Initiatives or with a new focus area on Plants and Climate Change.

### **Research Initiatives:**

The Plant Sciences Institute has pursued five research initiatives to address major challenges in Iowa agriculture and to enhance the value of Iowa crops. The research initiatives call on our core competencies in genomics, bioinformatics, plant metabolism and molecular breeding to tackle problems of significance to Iowa's agriculture and industry. They aim to focus the efforts of the Institute on term projects and coordinate the activities of the research centers. The research initiatives make efficient and focused use of the Institute's resources to solve significant problems challenging Iowa agriculture and its bioscience industries.

**Genomics** -- This initiative makes use of the enormous advances in maize genomics to discover the molecular basis for the most important component of yield in corn, hybrid vigor (heterosis). Information from global gene expression and metabolic profiling analyses will be used to create more vigorous hybrids -- overcoming present day limits on corn production in Iowa. Patrick Schnable, leader (schnable@iastate.edu); Robert Jernigan, co-leader (jernigan@iastate.edu).

**Biopharmaceuticals** -- Plant-made pharmaceutical production represents an unparalleled opportunity for producing high-value products in Iowa crops. Research projects in this initiative address some of the major technological challenges in biopharmaceutical production -- particularly the development of methods for the safe and efficient production/processing of plant-made pharmaceuticals. The biopharmaceutical initiative partners with the Biosafety Institute for Genetically Modified Plants (BIGMAP) to address safety and regulatory issues that limit the development of this industry in Iowa. Kan Wang, leader (kanwang@iastate.edu); Manjit Misra, co-leader (mkmisra@iastate.edu).

**Nutrition** -- This is an initiative to enhance the nutritional value of plant products in food. The initiative will attempt to develop more nutritious human foods from Iowa crops and will focus on the development of slow sugar-release starch to combat obesity and type 2 diabetes. Diane Birt, leader (dbirt@iastate.edu); Martha James, co-leader (mgjames@iastate.edu).

**Biorenewables** -- This initiative is a joint effort with Iowa State's Bioeconomy Initiative to tailor feedstocks to create better raw materials and more biomass for bioenergy and biobased product production. The initiative aims to develop soybean oils that are "ready-made" biodiesel fuels (do not require refining) and better adapted for lubricant uses. This initiative will also attempt to develop lignocellulosic materials (plant residues) that convert more easily to fermentable feedstocks. Larry Johnson, leader (ljohnson@iastate.edu); Basil Nikolau, co-leader (dimmas@iastate.edu); Thomas Lubberstedt, co-leader (thomasl@iastate.edu).

**Crop Protection** -- This initiative will provide fundamental knowledge for developing novel disease and pest control techniques. A program within this initiative employs multiple approaches to understand the interactions between the recently introduced soybean aphid and soybeans, using a variety of tools, including viruses as functional genomics tools and as potential aphid control agents. At a broader level, research providing basic understanding of the response of plants to pests and pathogens, or development of molecular tools for such investigations, will facilitate sustainable management of pests and pathogens. W. Allen Miller, leader (wamiller@iastate.edu); Bryony Bonning, co-leader (bbonning@iastate.edu); Gustavo Macintosh, co-leader (Gustavo@iastate.edu).

#### **New focus area:**

**Plants and Climate Change** -- Climate change is one of the great challenges of our times, and the Plant Sciences Institute has adopted "Plants and Climate Change" as a theme without putting forward a specific research agenda in this area. This year, the Institute is opening its innovative grants program to projects on crop plants and climate change. Hopefully, proposals and funded projects in this area will help guide the Institute in pursuit of climate change research. Climate change is clearly of global proportions – and in addressing this issue, it is important that efforts be scaled to manageable activities and to projects that are productive with real outcomes.

The Institute envisions two major areas of research – one on the effects of climate change on crops and plant products (adaptation) and the other on the influence of crops on climate change (mitigation). Concerning the effects of climate change on crops, the Institute will focus on stress responses as adaptive mechanisms in plants. Climate change is expected to have different effects in different regions of the world and in different areas of the U.S. Some areas are predicted to be dryer, some wetter, some warmer, some colder, but most climate conditions are expected to be more variable. These changes, particularly weather extremes, create stress for plants and increase risk for crop failure. Some of the stresses are abiotic and attributed directly to climatic conditions – such as temperature, drought or flooding. Other stresses, such as biotic stresses, may be indirect – caused by the introduction or movement of pathogens in response to climate change.

The effect of climate change on crops will also have major ramifications on food safety and security. We depend on a continuing supply of our crops to insure food security and our well being. Climate change could present challenges in maintaining the continuity of

the food supply and the stability of present cropping systems. Given the increasing demands of our crops for both food and fuel, it is important that we find ways to protect crop production from the effects of both abiotic or biotic stresses. Issues of food safety are also associated with matters of climate change. For example, stressed plants produce plant products, such as defense compounds, that may be detrimental to human and animal diets. Stephen Howell (shh@iastate.edu)

For more information about the Plant Sciences Institute, please visit our Web site:  
<http://www.plantsciences.iastate.edu>

**Eligibility:**

The Innovative Grants Program is open to all Iowa State University faculty members, professional and scientific (P&S) staff at the level of P17 or above and postdoctoral research fellows. Please take special note of the eligibility of postdoctoral research fellows.

**Funding:**

Funding will be considered for any allowable expenditure necessary to achieve the project goals, including but not limited to: labor, equipment, supplies, summer salaries, sabbatical leaves, travel, visiting scientists, post doctoral research associates, graduate students, conferences, etc. Funding per project is limited to \$30,000 per year for two years. Activation date for successful proposals is expected to be July 1, 2008. The total funding for the entire program in any given year is limited to \$150,000.

Patents and intellectual property associated with the research conducted in these projects will be handled by the Iowa State University Research Foundation (ISURF).

**Only one proposal can be submitted per PI;** however, a PI may be coPI on other proposals.

**Application process:**

To apply for a Plant Sciences Institute Innovative Grant, please submit a proposal (as one Word document or one PDF file) to dbrill@iastate.edu containing the following:

**Descriptive title.**

**Name of principal investigator (PI) and coPIs (limit two).**

**Abstract (300 word limit).**

**State which of the Research Initiatives or the focus area on Plants and Climate Change that best aligns with the proposal.**

**Project description** that addresses the funding criteria above (three-page limit). Particular emphasis should be placed on how this project will aid in advancing the goals of the Research Initiative or Plants and Climate Change, as well as how the new area of research will move the Plant Sciences Institute forward.

**Budget and budget justification** (two-page limit per year; suggested budget template attached).

**List of current or pending awards** for PI and coPIs.

**CVs of PI, coPIs and other senior personnel in budget** (two page limit per investigator).

**Due date:**

5 PM, Wednesday, March 5, 2008. Please call Deanne Brill at 294-5255 if you have any questions about the program.

**Note:**

An Iowa State Goldsheet is NOT required.

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