

E.5. Agriculture Systems and Technology

The Agriculture Systems and Technology area addresses agency strategic goals to enhance the competitiveness and sustainability of rural and farm economies and to enhance international competitiveness of American agriculture. Activities supported in this area also generate knowledge that support agency strategic goals to support increased economic opportunities, improved quality of life in rural America, to enhance protection and safety of the Nation's agriculture and food supply, and improve human health and wellness.

Programs in this cluster range from fundamental research to applied research on product development, process improvement, and engineering technologies, including:

- New uses and new products from traditional and nontraditional crops, animals, byproducts, and natural resources
- Novel tools and products based on nanoscale understanding and control of materials
- Robotics, energy efficiency, computing, and expert systems
- New hazard and risk assessment and mitigation measures
- Water quality and management

The scientific knowledge generated will lead to new and improved uses for agricultural and forestry biomass in bioenergy and industrial applications and apply cutting edge technologies and tools, such as nanotechnology, genomics, proteomics, and metabolic engineering, to ensure that agricultural production in the U.S. remains competitive, innovative, and sustainable.

In FY 2009 the AFRI invites applications in the following programs in the Agriculture Systems and Technology area:

- a. Biobased Products and Bioenergy Production Research**
- b. Nanoscale Science and Engineering for Agriculture and Food Systems**

The following cross-cutting AFRI programs also contribute to the goals of the Agriculture Systems and Technology area:

Managed Ecosystem
Water and Watersheds
Food Safety and Epidemiology
Markets and Trade
Improving Food Quality & Value
Disaster Resilience in Rural Communities

a. Biobased Products and Bioenergy Production Research

Program Code - 95150

National Program Leader – Dr. Chavonda Jacobs-Young (202-401-6188 or cjacobs@csrees.usda.gov)

Total Program Funds – approximately \$5.4 million, with up to \$4.4 million for research projects and up to \$1million for education projects.

Proposed Budget Requests –

- Proposed research project budget requests must not exceed \$500,000 for project period of 2-4 years (including indirect costs).
- Proposed education project budget requests must not exceed \$1million for project periods of 4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline – February 11, 2009 (5:00 P.M. ET) for research projects only; see Part II, F for format and submission instructions.

Anticipated Application Deadline – April 2, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background

The Biobased Products and Bioenergy Production Research Program promotes the production of economically and environmentally sustainable biobased industrial products and fuels. Program activities will expand science-based knowledge and technologies needed to advance the conversion of post harvest agricultural and forestry residuals into value-added industrial products and biofuels.

The long term goals (10-years) for the program include increasing the sustainable production of fuels, chemicals, and materials from biomass; increasing the inventory of biobased products for replacement of petroleum based products; and the reduction of costs associated with the conversion of biomass to fuels and industrial products by developing biocatalysts that can convert low cost agricultural and forestry feedstocks.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Improvement/Development of economically and environmentally sustainable biocatalysts. The program is specifically seeking applications which produce biocatalysts that are more resistant to inhibitors, capable of degrading multiple sugar types and capable of increasing product yield in the biological conversion of agricultural and forestry lignocellulosic biomass to value-added industrial products and fuels.
2. Improved production and processing technologies for the economically and environmentally sustainable biological conversion of agricultural and forestry lignocellulosic biomass for the production of high-value industrial biobased products and fuels. The program is seeking applications which specifically address the long term goal of single stage fermentation, and other conversion steps that limit the efficiency of the biological production of fuels and industrial biobased products from agricultural and forestry residuals.; and
3. Novel, economically and environmentally sustainable agriculturally based industrial biobased products which are direct substitutes for traditionally petroleum based products. Products must be innovative and demonstrate the potential for economic competitiveness within the next 10 years.

Other Key Information for Research Projects

- A letter of intent is required for this program. The letter of intent deadline is **February 11, 2009 by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.
- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**
- Applications that focus on plant biochemistry should be submitted to the Plant Biology: Biochemistry Program. Animal feed, fertilizer, bioremediation, thermo-chemical processes (i.e., pyrolysis, gasification), syngas production or conversion, algae, market analysis, and economic analysis applications should not be submitted to this program.
- Engine performance testing and emissions characterization will not be supported.
- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

FY 2009 Priority for Education Projects – Applicants must address the following priority.

1. Development of innovative, multidisciplinary, research-based, graduate education and training activities to support the production of sustainable value-added biobased products and fuels. Participation by faculty from collaborative departments (e.g. plant science, microbiology, engineering, marketing) is encouraged, as are submissions involving multiple institutions. Students should gain strengths in multiple disciplines while maintaining competence in their major field by focusing on problem-oriented rather than discipline-oriented education and research. The project should offer training and experience relevant to both academic and nonacademic careers by linking graduate education and research, through internships and

mentoring, with research and extension in industry, national laboratory, or other settings. Students supported by the project should choose a research problem that integrates multiple disciplines (including biological sciences, chemistry, and engineering) in working toward a tangible solution to a practical problem.

Other Key Information for Education Projects

- A letter of intent is not required for education projects submitted to this program.
- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**
- Proposals may request up to \$1 million for four years, including indirect costs. The contribution to the graduate stipend is up to \$30,000 per year per student, accompanied with a tuition allowance of up to \$12,000 per year per student.
- Please see Part IV, A. for the criteria that will be used to evaluate education proposals.
- Applications that do not address the stated education program priority will be returned without review.
- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

b. Nanoscale Science and Engineering for Agriculture and Food Systems

Program Code - 95250

National Program Leader – Dr. Hongda Chen (202-401-6497 or hchen@csrees.usda.org)

Total Program Funds – anticipated funding at approximately \$ 5 million in FY 2010

Proposed Budget Requests – **Not accepting applications for FY 2009**

Letter of Intent – Not required for this program.

Application Deadline – Nanoscale Science and Engineering for Agriculture and Food Systems will not be offered in FY 2009. This program will be offered in alternate years and will be accepting applications for the first time in FY 2010.