

Please provide a 1-3 sentence description of your organization.

The **Office of Biological and Environmental Research** in the **Department of Energy's Office of Science** is a federal funding agency that supports fundamental research on climate change, environmental remediation sciences, low dose radiation research, and, of greatest relevance to this questionnaire, microbes and plants that can inform the development of robust, cost-effective strategies for bioenergy.

Relative to bioenergy, what are your top problems and which research products (or researchable questions to which you need answers) would help you solve these problems?

Structure of lignocellulose, its production and biology-based strategies for both its modification in plants and its enzymatic deconstruction. There is a need to research products ranging from fundamental plant biology to genetic engineering to new analytical tools for the visualization and characterization of lignocellulose structure, its production and its deconstruction.

Identification and characterization of microbes and microbial communities that have the potential for efficient and cost-effective conversion of lignocellulosic material into liquid transportation fuels. Fundamental research is needed to better understand the regulation and control of microbial systems, both single microbes and communities of diverse microbes, on tools for the redesign and engineering of microbes and specific enzymes or metabolic pathways ranging from synthetic biology to traditional genetic engineering, and on strategies for the development of integrated biological systems capable of "one-stop" processing of lignocellulose to liquid biofuels.

What do you think ARS's top bioenergy research priorities should be (no more than five, please)?

- ◆ Sustainability of new and potential bioenergy crops.
- ◆ Agronomics of bioenergy crops including regional differences through the U.S.
- ◆ Environmental issues associated with large scale production of bioenergy crops including water, fertilizer, other energy inputs, and ecological impacts.