



The Great Lakes Bioenergy Research Center (GLBRC) is led by the University of Wisconsin-Madison, in close partnership with Michigan State University. Located in the world's most productive agricultural region, the GLBRC is exploring scientifically diverse approaches to converting sunlight and various plant feedstocks — agricultural residues, wood chips, and grasses — into biofuels. In addition to its broad range of scientific research projects, the GLBRC is collaborating with agricultural researchers and producers to help develop the most economically viable and environmentally sustainable practices for bioenergy production.

To increase the contribution of biofuels to the U.S. energy portfolio, the GLBRC will conduct fundamental, genomics-based research to remove bottlenecks in the biofuel pipeline. To accomplish its research goals, the GLBRC will have 5 major research thrusts:

Improved plant biomass: Among the bottlenecks in using biomass for bioenergy production are the inability to degrade the major constituents of cell walls (cellulose, hemicellulose, and lignin) and the inability of many plants to store carbon in energy-rich hydrocarbons. The GLBRC will strive to increase the yields of easily degraded polysaccharides within cell walls and to increase the yields of hydrocarbons in biomass tissues.

Improved biomass processing: Processing plant biomass into sugars is another biofuel production bottleneck. The long-term goal of the GLBRC will be to develop new physical and biological strategies for processing plant biomass feedstocks (corn stover, switchgrass, or poplar) envisioned for the bioenergy pipeline.

Conversion of biomass into energy products: To increase the contribution of biofuels to the U.S. energy portfolio, plant-derived chemicals must be efficiently converted to bioenergy compounds. The long-term goals of the GLBRC are to improve methods for conversion of cellulosic biomass into ethanol and to develop novel ways to convert plant material into hydrogen, electricity or other chemical feedstocks that can replace fossil fuels.

Development of a sustainable bioenergy economy: For a bioenergy economy to positively impact the U.S. energy sector, it must be integrated into agricultural, industrial, and behavioral systems. The GLBRC will develop economically and environmentally sustainable best practices for the entire biofuels production cycle.



Enabling technologies for bioenergy research: To realize these goals, the GLBRC will deploy high-throughput technologies, integrate information from computational, physical, and biological approaches, and develop predictive models for relevant enzymes, pathways, or networks. Thus, the center's success hinges on the application of enabling biological, physical, systems and computational approaches to biomass production, processing, conversion, and sustainability.

Industry partnerships: The GLBRC will generate linkages with the private sector that will help bring technologies to the marketplace. New technologies developed at the GLBRC will be tested in production-line facilities.

Education and outreach: With a history of excellence in the land-grant missions of education, training, and outreach, GLBRC academic partners are deeply committed to training the bioenergy leaders of tomorrow while removing today's bottlenecks in the biofuels pipeline. The partners will offer new bioenergy-focused summer research programs, labs, seminars, and special courses. By working with existing programs at university partners, GLBRC scientists will develop workshops and educational modules for K-12 teachers on carbon chemistry, sustainability, and biodiversity issues related to biofuel production. Additionally, GLBRC researchers will develop informative materials and host public forums to raise awareness of and generate support for biofuels among farmers and communities.

GLBRC Partners

- University of Wisconsin-Madison
- Michigan State University
- University of Florida
- Iowa State University
- Illinois State University
- Lucigen Corporation
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory