



# Biomass Program

## Sugars R&D

### Biomass Surface Characterization

Lignocellulosic biomass is perceived as a valuable and largely untapped resource for the future bioindustry. It is found in agricultural residues (e.g., corn stover, wheat straw), trees, grasses, and municipal solid waste and is composed of a recalcitrant matrix of lignin, cellulose, and hemicellulose.

When lignocellulose is separated into its components, it can be converted to biofuels and products. Because lignocellulosic biomass is so resistant to degradation, finding a cost-effective way to recover its individual components represents a significant technical challenge.

This project is designed to extend our understanding of the pretreatment and enzymatic saccharification reactions beyond bulk chemical compositions to address structural issues.

A new laboratory center dedicated to biomass surface characterization will be created with the acquisition of

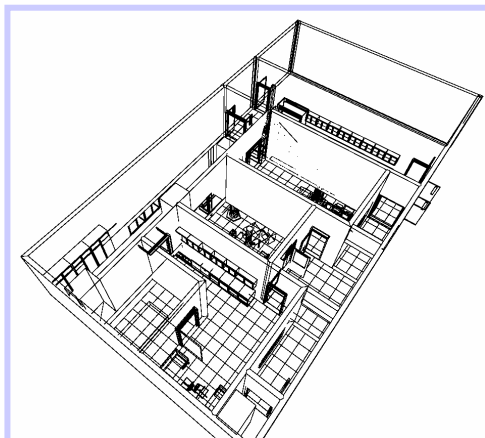
four key pieces of equipment for nanoscale surface characterization: an atomic force microscope, a near-field scanning optical microscope, an environmental scanning electron microscope, and a transmission electron microscope.

Characterization of lignocellulosic biomass will be extended from compositional analysis and macrostructural classification to microstructural and cellular characterization, while single molecule enzyme studies will allow accurate characterization of enzyme-substrate interactions.

### R&D Pathway

The center will utilize the new equipment and identify methodologies for characterization of native and pretreated lignocellulosic biomass, residue from saccharification, and enzyme-biomass substrate interactions. A user group will be developed and the center will establish collaborations with others in the biomass field.

**New facility at the National Renewable Energy Laboratory built for the Biomass Surface Characterization Lab that houses atomic force microscopy, near-field scanning optical microscopy, confocal raman microscopy, environmental scanning electron microscopy, and transmission electron microscopy tools.**



### Benefits

- Promote research in lignocellulosic biomass recalcitrance
- Promote fundamental knowledge needed to support a new bioindustry

### Applications

This center will contribute to the advancement of technologies that convert lignocellulosic biomass to sugars for the production of bioproducts.

### Project Participants

National Renewable Energy Laboratory

### Project Period

FY 2002 – FY 2006

### For more information contact:

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Visit the Web site for the Office of the Biomass Program (OBP) at  
[www.eere.energy.gov/biomass.html](http://www.eere.energy.gov/biomass.html)

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