Opportunities for Research

Post-doctoral and graduate positions now available

- Systems biology models for wall biosynthesis pathways
- Cell biology of the wall
- Hemicellulose and pectin biosynthesis
- New enzymes involved in polysaccharide biosynthesis
- Polysaccharide-modifying enzymes
- Wall structure and its relationship to recalcitrance
- High-resolution NMR spectroscopic analyses of cell walls
- Lignin-carbohydrate complexes

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The **BioEnergy Science Center (BESC)** is a US Department of Energy funded center with the unifying theme of enabling researchers to understand and overcome the recalcitrance of lignocellulosic biomass for conversion to fermentable sugars

DOE Bioenergy Research Centers
http://genomics.energy.gov

BESCs core team of top-tier universities, leading national laboratories and private companies are working together to make revolutionary advances in biological energy production from plant biomass.

BESC (www.bioenergycenter.org) is:

Oak Ridge National Laboratory with

Georgia Institute of Technology
National Renewable Energy Laboratory
University of Georgia
University of Tennessee

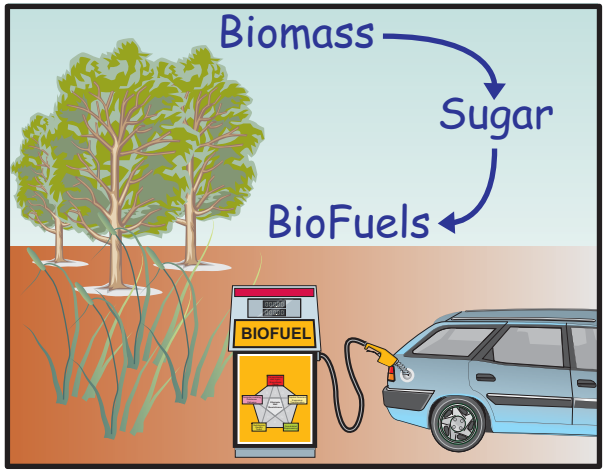
In partnership with
ArborGen LLC
Dartmouth College
Diversa Corp
Mascoma Corp
The Samuel Roberts Noble Foundation

With contributions from
Brookhaven National Laboratory
Cornell University
North Carolina State University
University of California-Riverside
University of Minnesota
Virginia Tech
Washington State University

BESC
BioEnergy Science Center

The CCRC Plant Cell Wall Biosynthesis and Structure Group

Growing fuels for our future



Complex Carbohydrate Research Center

The University of Georgia

Biomass to Bioenergy Goals

- Understand plant cell wall formation at the molecular level
- Alter wall composition to overcome its recalcitrance for conversion to fermentable sugars
- Facilitate development of cost-effective production of biofuels

The Research Group

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Lead - Biomass formation and modification

Debra Mohnen
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Lead - Polysaccharide biosynthesis and systems biology

Maor Bar-Peled
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Nucleotide sugar and polysaccharide modifying enzymes, cell biology of the wall

Michael Hahn
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Cell wall ultra-structure and polysaccharide biosynthesis

Malcolm O'Neill
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Hemicellulose structure and biosynthesis

William York
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NMR spectroscopy and hemicellulose biosynthesis

Research Areas

Systems biology models for cell wall biosynthesis pathways (Mohnen, Hahn, Bar-Peled)
Develop systems biology models to relate gene expression to wall recalcitrance

Cell biology of the wall and wall assembly (Bar-Peled, Hahn, Mohnen)
Understand cellular processes leading to wall formation

Glucuronoxylan and arabinoxylan biosynthesis (York, O'Neill, Bar-Peled, Mohnen)
Identify genes involved in hemicelluose biosynthesis. Use this information to generate plants with altered wall composition and reduced recalcitrance

A tool-kit to study wall biosynthesis and ultrastructure (Hahn, York, O'Neill)
Generate glycosyl acceptors for glycosyltransferases and for *O*-acyl and *O*-phenyl transferases. Use monoclonal antibodies to investigate changes in wall ultra-structure during pretreatment and deconstruction.

Identify and purify new cell wall biosynthesis proteins and protein complexes (Mohnen, Hahn, Bar-Peled)
Develop novel affinity matrices to identify protein complexes involved in wall biosynthesis

Cell wall structure and architecture
(York, O'Neill, Hahn)
Determine chemical features of biomass that affect recalcitrance

NMR spectroscopy (York)
Develop NMR spectroscopic techniques to identify biomass structures, including lignin carbohydrate complexes, that affect recalcitrance.

Opportunities within BESC

Post-doctoral fellows and students will be encouraged to interact closely with BESC researchers investigating other biomass to bioenergy topics including:

Plant transformation and growth
Biomass characterization and modeling
Biomass deconstruction/conversion

About the CCRC

The CCRC is organized to optimize interaction and collaboration among plant, microbial and biomedical glycosciences, and synthetic and analytical chemists.

The CCRC has 17 faculty, and ~200 staff, postdoctoral research associates, and graduate and undergraduate students. The CCRC has specialized laboratories for molecular and cellular biology, synthetic chemistry, biological mass spectrometry, and NMR spectroscopy.