



# Biomass Deconstruction and Cellulose Degree of Polymerization

## Christopher Hubbell



### PROGRAM DESCRIPTION

- Study the effects of Poplar and Switchgrass deconstruction on cellulose chain length
- Monitor cellulose DP as a function of enzymatic hydrolysis
- Determine the effect of cellulose DP on cellulase activity during enzymatic digestion



### TECHNICAL DETAILS

- Gel permeation chromatography (GPC) to determine cellulose molecular weight distributions
- Carbohydrate analysis using High-Performance Anion-Exchange Chromatography (HPAEC)
- HPLC to quantify glucose release as a result of enzymatic digestion of cellulose
- FOSS Soxtec system for HTP removal of poplar and switchgrass extractives



### PAYOFF

- Better understanding of the role cellulose DP plays in conversion of biomass to biofuels
- Increase fundamental knowledge of lignocellulosic systems
- Development of more cost-effective renewable alternatives to fossil fuels
- Reduce biomass recalcitrance

### KEY ACCOMPLISHMENTS

- Optimized alkaline cellulose isolation method for effective removal of hemicelluloses without reduction in cellulose DP
- Obtained holocellulose and cellulose DP values for biomass from leading pretreatment technologies
- Studied cellulose DP as a function of lignin content during acid-chlorite delignification



*Professor AJ Ragauskas, Supervisor*

