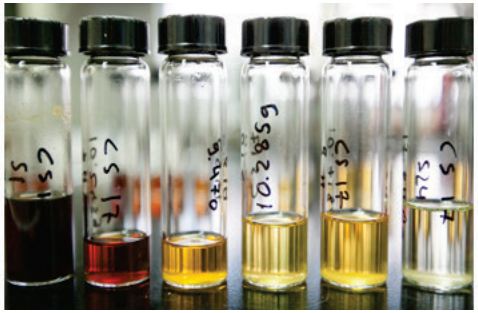
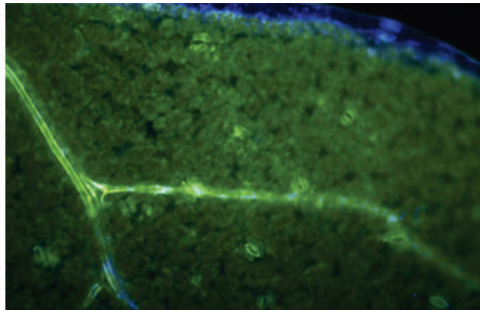
GREAT LAKES BIOENERGY RESEARCH CENTER





Timothy Donohue

Director, Great Lakes Bioenergy

Fetzer-Bascom Professor of Bacteriology

University of Wisconsin-Madison

Director, Great Lakes Bioenergy

Interim Director, Wisconsin Energy Institute

Fall 2017, BERAC Meeting

November 2, 2017

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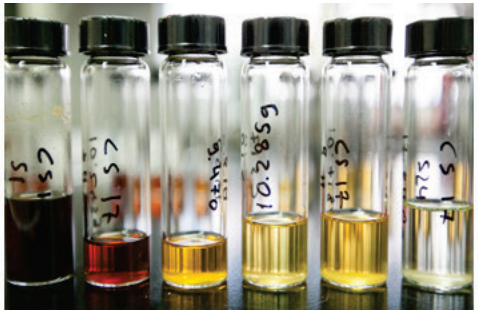
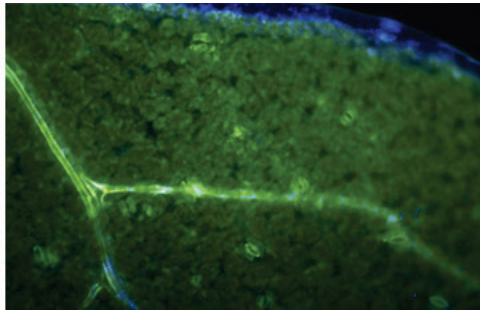
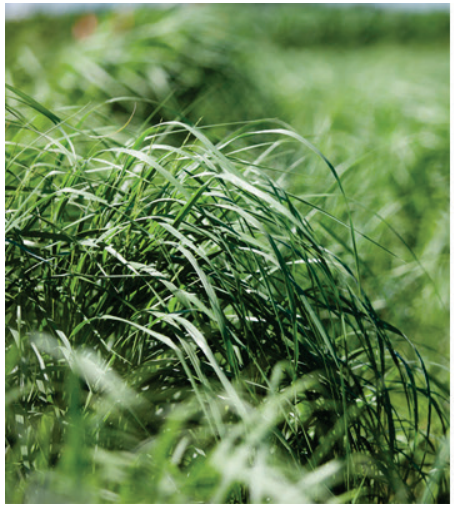
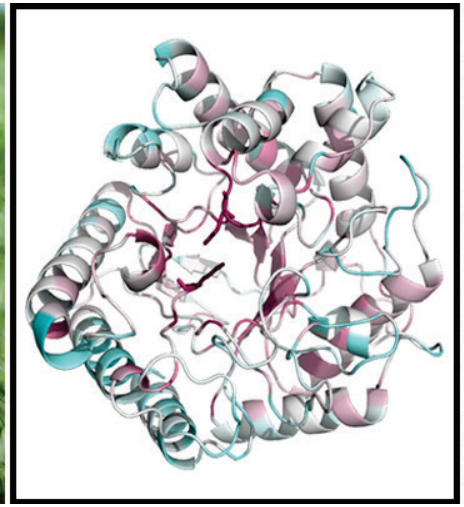
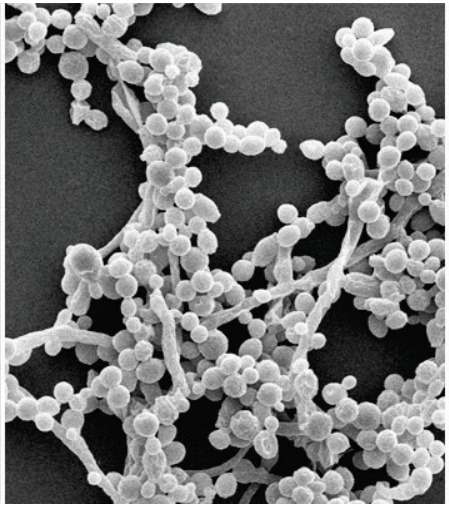
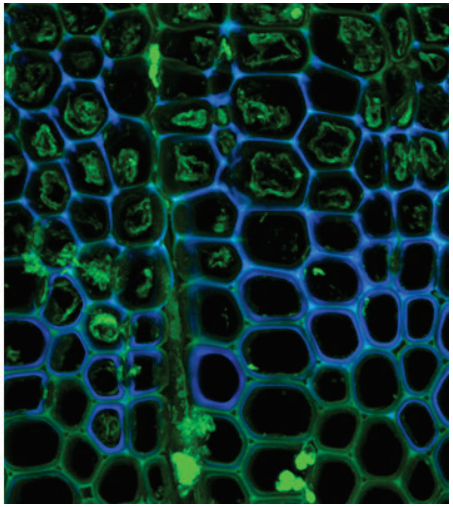




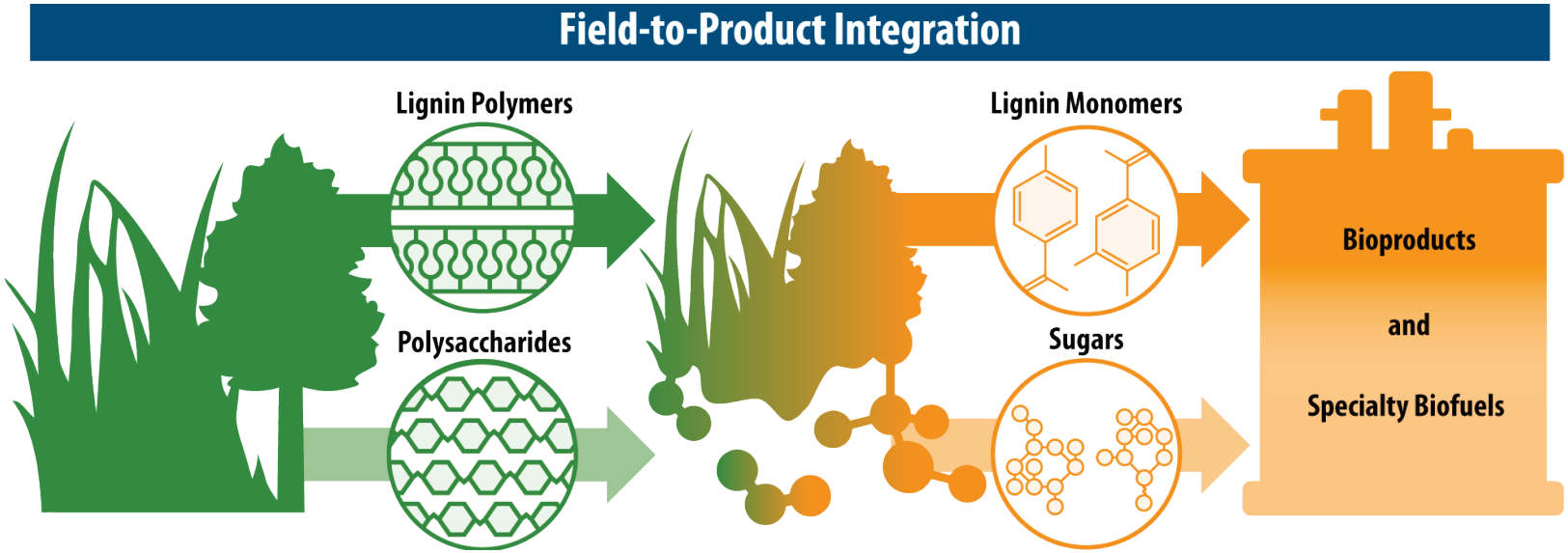
- Mission
- Partners
- Advancing BRC Program Goals

Mission

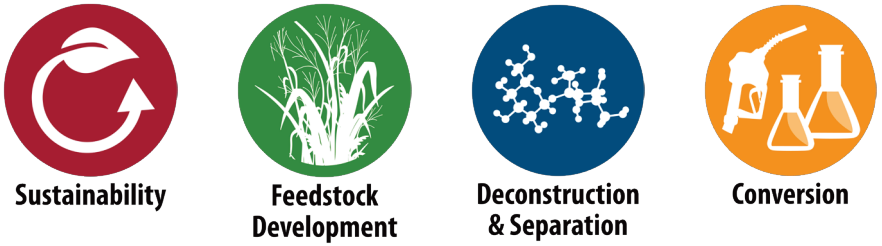





Generate the knowledge needed to sustainably produce specialty biofuels and bioproducts from lignocellulosic bioenergy crops

Great Lakes Bioenergy Strategy



To achieve our mission, we will assemble research teams that cut across all four BRC-defined focus areas



Partners

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

MICHIGAN STATE
UNIVERSITY

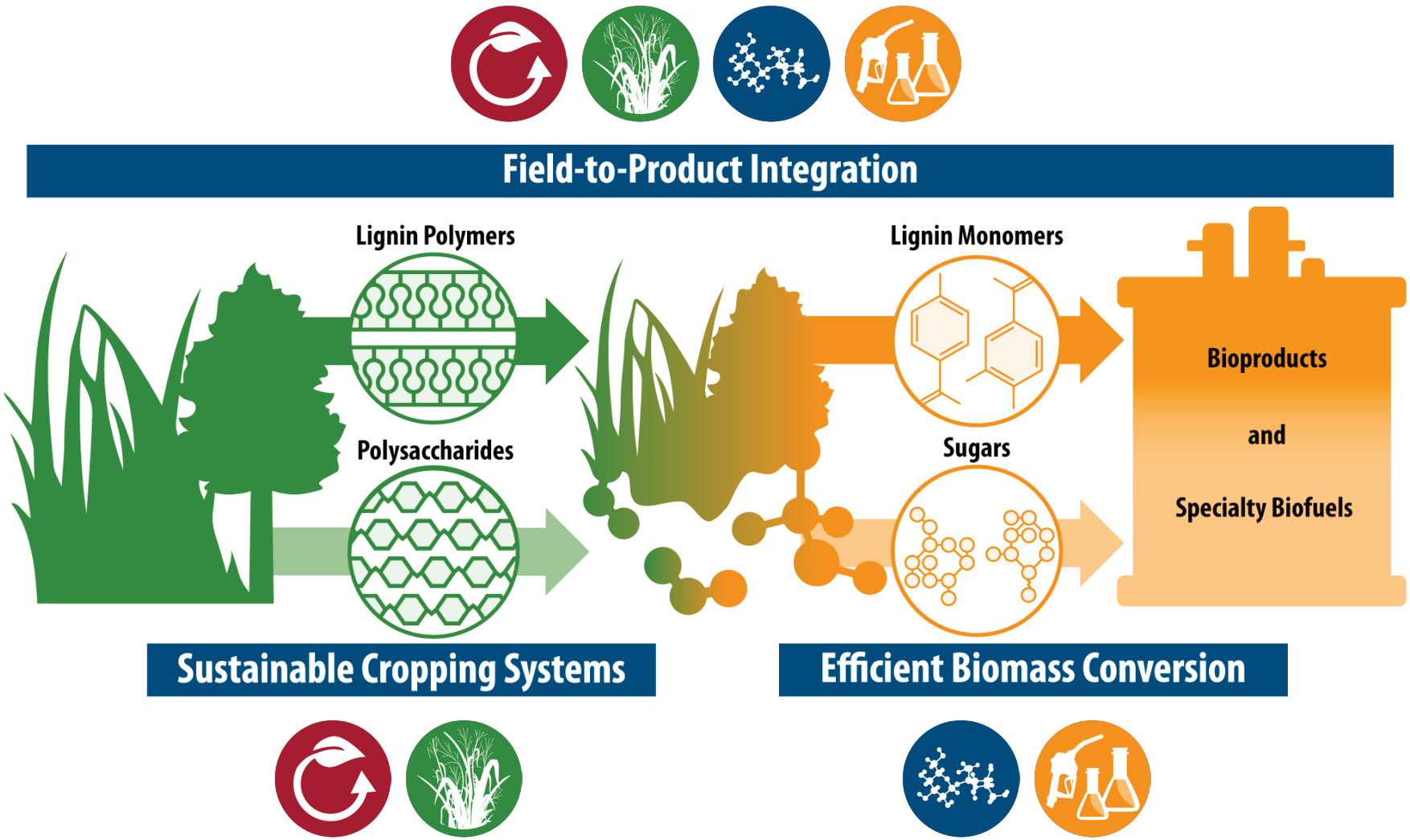
Michigan
Technological
University

TEXAS A&M
UNIVERSITY

THE UNIVERSITY
OF BRITISH COLUMBIA

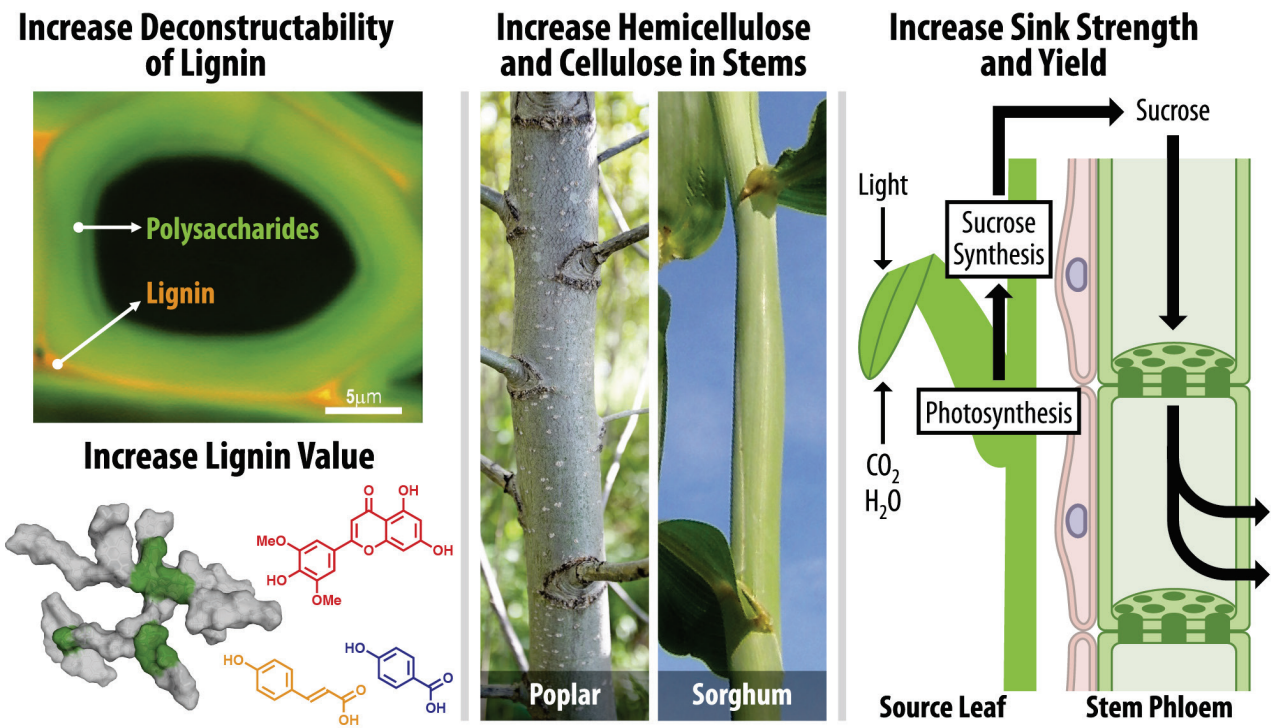
Anchored by two Great Lakes institutions
UW-Madison lead, **MSU** major partner
Partners chosen for expertise, history & interest in collaboration

Great Lakes Bioenergy Strategy



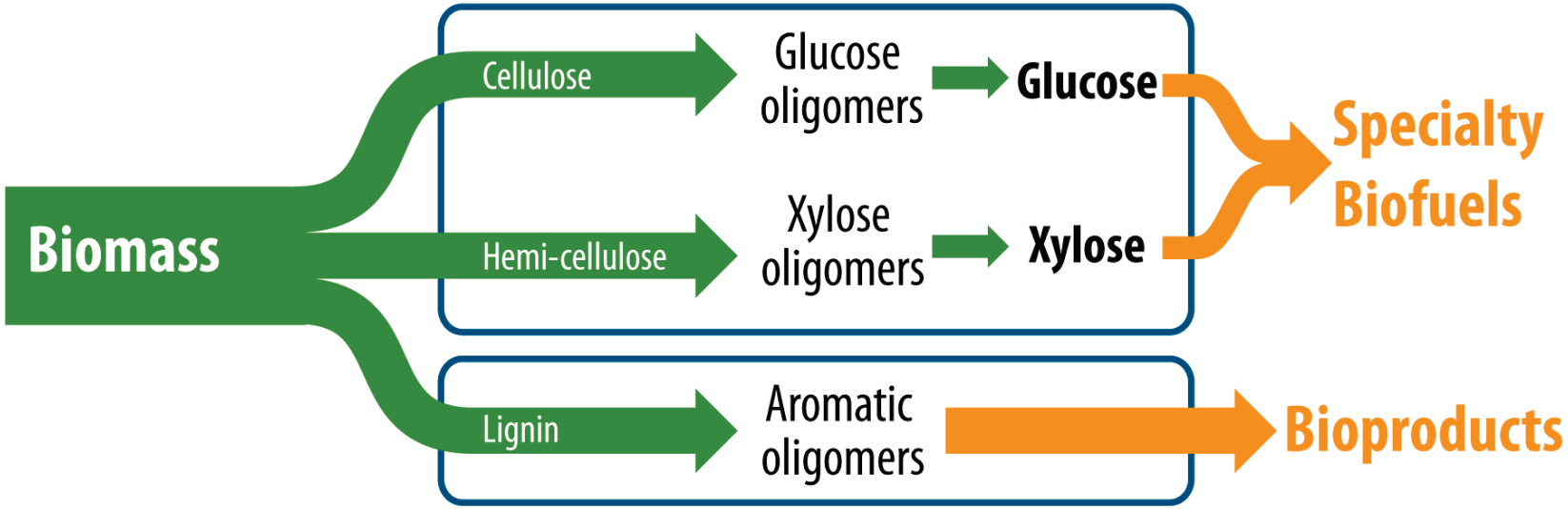
Sustainable Cropping Systems

- Maximize crop performance on marginal lands
- Increase yield & quality of dedicated bioenergy crops
- Understand plant-soil-microbiome interactions to improve switchgrass productivity

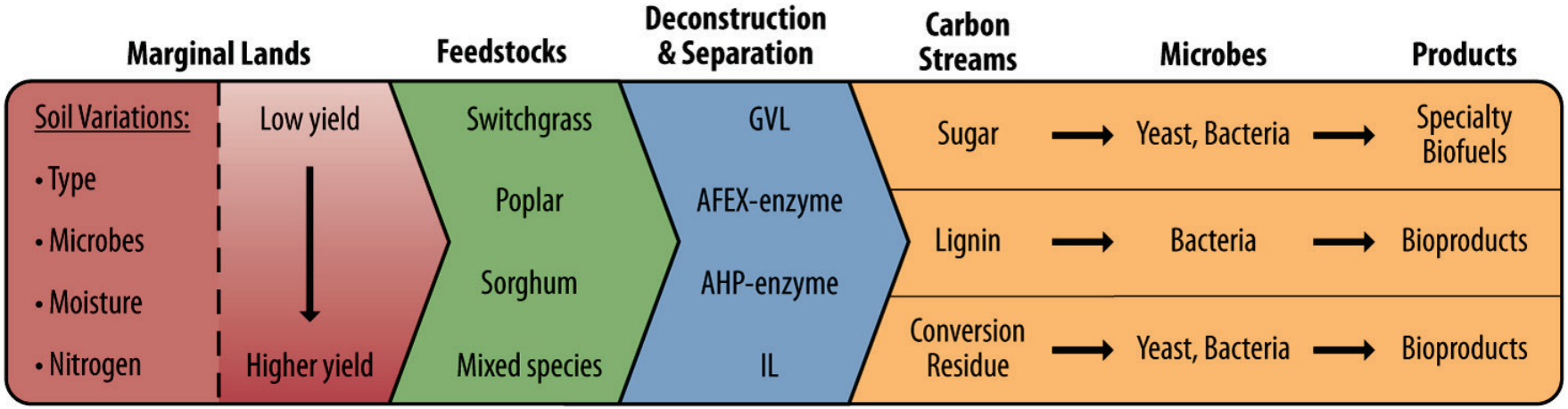


Efficient Biomass Conversion

- Cost- and atom-economical deconstruction (GVL, CMX enzymes) & fractionation techniques
- Reprogram microbes to produce industry-ready specialty biofuels (isobutanol, etc)
- Produce valuable products from conversion residue



Field-to-Product Integration



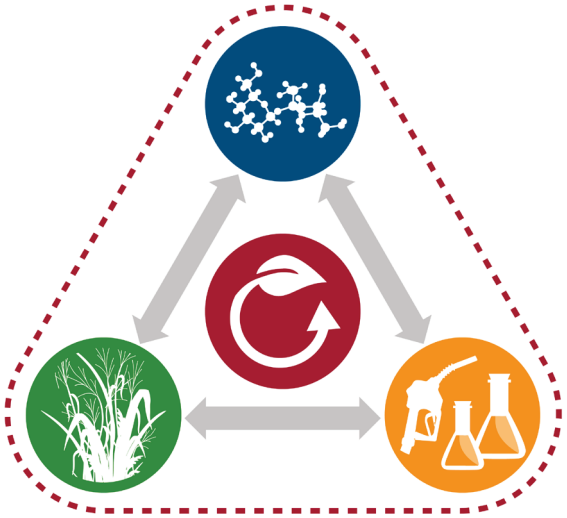
- Understand & mitigate the impact of biomass variability on conversion
- Cross-cutting activities to create products from lignin
- Optimize plant and microbial production of terpenoid fuels & products
- Model & optimize field-to-product activities

Great Lakes Bioenergy Strategy

Marginal Lands		Feedstocks	Deconstruction & Separation	Carbon Streams		Microbes		Products
Soil Variations: • Type • Microbes • Moisture • Nitrogen	Low yield ↓ Higher yield	Switchgrass Poplar Sorghum Mixed species	GVL AFEX-enzyme AHP-enzyme IL	Sugar	→	Yeast, Bacteria	→	Specialty Biofuels
				Lignin	→	Bacteria	→	Bioproducts
				Conversion Residue	→	Yeast, Bacteria	→	Bioproducts

Integrated & **iterative** activities

Knowledge to help a sustainable bioindustry convert lignocellulosic biomass into specialty biofuels and bioproducts



Coordination to Advance the BRC Mission

Four BRCs, One Program

- Membership on GLBRC SAB
- Participate in GLBRC annual scientific meeting
- Joint workshops, collaborative products

DOE Partners

- JGI – projects, methods & products
- KBase – access to data & tools
- User facilities

Host Institutions