CABBI Progress in 2018-19

Funded by the U.S. Department of Energy as one of four national Bioenergy Research Centers, the Center for Advanced Bioenergy and Bioproducts Innovation (CABBI) officially started in December 2017. Between July 2018 and June 2019, the $115M center led by the University of Illinois at Urbana-Champaign:

- Added two new partners, making the total number of partner institutions 19: Texas A&M University (and Co-PI William Rooney); and Archbold Biological Station in Florida.
- Completed its Year 1 DOE external review in February 2019.
- Brought together its First Governance Board meeting in November 2018. This group is chaired by Illinois Vice Chancellor for Research, Susan Martinis
- Hosted its second retreat, attended by more than 200 people including members of other BRCs and the Strategic Advisory Board (representatives from the other BRCs as well as academic, government, and industry experts in the bioenergy and bioproducts), which held its first meeting.
- Hired a data manager in April 2019 to oversee storage and management of all research data.

Research progress in the Sustainability Theme included:

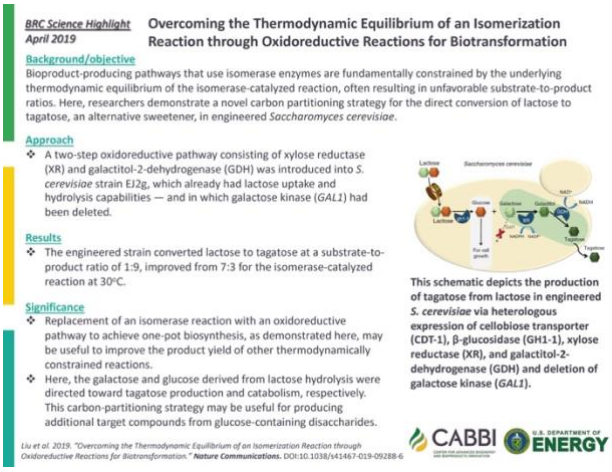
- A new Florida field site added at Archbold to collect data in sugarcane.
- Hosting a BRC modeling workshop in May in Chicago. CABBI brought 60 researchers from across the four BRCs together to discuss approaches to sustainability modeling and develop collaborations.
- Improvements to field sites run by partner Iowa State University.

Research progress in the Conversion Theme included:

- Nearly complete upgrades to the Illinois Biological Foundry for Advanced Biomanufacturing (iBioFAB) — thus allowing more techniques for high-throughput phenotyping such as rapid screening and improved enzymes.
- A growing toolbox for novel yeasts such as *Rhodosporidium toluroides*, *Issatchenkia orientalis*, and *Yarrowia lipolytica*.
- Metabolomics work at Princeton that opens the possibility for metabolome annotation of less-studied microbes that might have unique properties amenable to industrial bioproduct and biofuel production.

Research progress in the Feedstock Production Theme included:

- Advances in the ability to engineer sorghum strains (high-efficiency edits using CRISPR) and further understanding of gene regulatory networks.
- Miscanthus genome work, including an updated release of the *Miscanthus sinensis* genome on Phytozome, along with research into improving winter hardiness and flood tolerance.
- Evaluation of ozone tolerance for sorghum and other C4 (warm-season) grasses.
- Enhancements in genome editing efficiency in sugarcane.



CABBI has more than doubled in size in the last year. As of mid-June, the Center now employs 285 people: 62 co-PIs, 63 postdocs, 60 graduate students, 33 undergraduate hourlies, seven support staff, and 60 other research staff.

CABBI scientists published 41 papers in the last fiscal year, and the Center was well represented at the DOE Genomic Science Meeting in February with 20 posters and plenary presentations by Director Evan H. DeLucia and Co-PI Angela Kent. DeLucia also participated in congressional visits with other BRC members in February. Additionally, Co-PI Tom Clemente presented to U.S. Sen Deb Fischer's (R-Neb.) staff on aspects of CABBI and its transdisciplinary approach to develop a sorghum feedstock for the bioeconomy.

In addition, CABBI scientists disclosed three new inventions in early 2019:

- On April 18 — "Methods for High-Throughput Evaluation of Ligase Fidelity and Design Scheme for Highly Efficient, Scar-less Golden Gate Assembly and Point Mutation" by Mohammad HamediRad, Scott Weisverg, Ran Chao, Jiazhang Lian, and CABBI co-PI Huimin Zhao, University of Illinois at Urbana-Champaign.
- On Jan. 25 — "A CRISPR/Cas9-Based Tool for Genome Editing in *Issatchenkia orientalis*" by Vinh Tran, Mingfeng Cao, Zia Fatma, and CABBI co-PI Huimin Zhao, University of Illinois at Urbana-Champaign.
- On Jan 16 — "A High-Efficiency CRISPR/Cas9 Genome Editing System in *Rhodosporidium toruloides*" by John Carl Schultz, Mingfeng Cao, and CABBI co-PI Huimin Zhao, University of Illinois at Urbana-Champaign.