



RENEWABLE AND SUSTAINABLE ENERGY INSTITUTE

BIG energy seminar series

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Scale-up of a One-pot Biomass Conversion Technology Based on Ionic Liquids

Dr. Blake Simmons

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Chief Science and Technology Officer
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Date: Friday, October 16th from 2pm – 3pm

Please join by Zoom: Join Zoom Meeting

<https://cuboulder.zoom.us/j/4367455612>

Abstract:

This project successfully developed, optimized and scaled an innovative “one-pot” ionic liquid pretreatment technology to convert waste woody biomass to fermentable sugars at 83% yields. The hydrolysate was then converted into cellulosic ethanol by *Saccharomyces cerevisiae* with an overall fermentation efficiency exceeding 90% and achieved overall carbon conversion efficiency from biomass to fuel of nearly 80%. Scale-up from prior lab scale (~2 liters) to a working volume of 680 liters in a 1600 liter industrial-level fermenter is an important validation of commercial feasibility and scalability. Engineering a yeast strain to make advanced automotive and aviation biofuels (e.g., isoprenol) builds on this project’s accomplishments to establish the foundation for a broad variety of advanced biofuels made using the same woody biomass feedstock and processing technologies. Paths forward to continue developing these biomass conversion approaches are identified, with a pilot plant based on this conversion technology being the next major step to commercializing new advanced biofuels made from California’s waste woody biomass.

Bio:

Dr. Blake Simmons currently serves as the Chief Scientific and Technology Officer and Vice President of the Deconstruction Division at the US Department of Energy’s Joint BioEnergy Institute (JBEI www.jbei.org) located in Emeryville, CA. After earning his BS in chemical engineering from the University of Washington, Dr. Simmons continued his studies at Tulane University and received his doctorate in the same field. Dr. Simmons worked as part of the Senior Management team at Sandia National Laboratories for 15 years, most recently serving as the Senior Manager of Advanced Biomanufacturing as well as the Biomass Program Manager. He joined Lawrence Berkeley National Laboratory (LBNL) in February of 2016 as the Division Director of Biological Systems and Engineering. He has recently led an effort in the development of mobile biorefineries that can assist in wildfire risk reduction by converting woody biomass into biofuels, biopower, and biochar. In addition to his role at LBNL, he is an Adjunct Professor at the University California-Berkeley and the University of Queensland in Australia. His expertise includes advanced biofuels, renewable chemicals, biomanufacturing, ionic liquids, abiotic-biotic interfaces, biomass pretreatment, enzyme engineering, biofuel cells, templated nanomaterials, microfluidics, desalination, and biomineralization. He has over 300 publications, book chapters, and patents. His work has been featured in the New York Times, the BBC, the Wall Street Journal, the San Francisco Chronicle, CNN, Fast Company, and the KQED televised science program Quest.

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