Development of Automated Workflows and Data Processing to Enable the Conversion of Bioenergy Crops into Biofuels and Bioproducts

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Project Goals:

The development of cost-effective methods for the deconstruction of plant biomass and the subsequent microbial conversion thereof to biofuels and bioproducts is greatly enabled by robust automated workflows and rapid and flexible data acquisition and processing methodologies. The use of robotic platforms to perform labor-intensive multi-step biological tasks can increase research productivity and lower costs by reducing experimental error rates and providing more reliable and reproducible experimental data. Such biological tasks include (but are not limited to) screening ionic liquids for pretreatment efficiencies across feedstocks, screening feedstocks for sugar yields and conversion into bioproducts, and the construction and sequence validation of DNA molecules. Here, we present updates on several automated workflows under development for these types of biological tasks, which incorporate solid/liquid handling methods as well as data processing automation (via jupyter notebooks) that support the missions of the Joint BioEnergy Institute, Bioenergy Research Centers, and other DOE programs and projects.

JBEI Project Goals: Establish the scientific knowledge and new technologies to transform the maximum amount of carbon available in bioenergy crops into biofuels and bioproducts.