

## **SESSION 6**

### **Bioprocess Research and Development**

## **Introduction to Session 6**

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Bioprocess research and development seeks to translate laboratory results into practical industrial processes. Fundamental issues that must be addressed include mass transfer, reactions at liquid gas interfaces, use of solid phase catalysts to carry out rapid conversion of oligosaccharides to fermentable sugars, and bioreactor design for the conversion of fermentable sugars to ethanol and other value-added products. This session addressed key developments in these areas, with presentations highlighting some of the critical challenges and exciting advances that are occurring to develop bioprocess-related approaches for transforming renewable resources into various fuels and chemicals products. Several new bioprocessing concepts were also proposed—such as enzymatic production of biodiesel—to better exploit the ever-increasing power of biocatalysis (both enzymatic and microbial).

This session's oral paper and poster presentations provided timely examples of how bioprocess engineering and bioprocess engineering principles are being applied across a wide range of applications. Although many of the papers and posters concerned processes to produce liquid transportation fuels products, most notably ethanol and biodiesel, a large number addressed issues related to producing or recovering a variety of non-fuel products, including: polyhydroxyalkonates (PHAs) and other biopolymers; hydrolytic enzymes; vitamins/vitamin precursors; and organic acids, especially lactic acid. The preponderance of proceedings papers discussing non-fuel bioproducts reflects the importance of such products in today's

marketplace, as well as the fact that such products will likely represent important value-added coproducts in future biorefineries in which fuels will be the primary product, at least on a volumetric basis. An emerging theme that came out of this session is that efficient separations technologies are required to be able to develop cost effective processes to produce (and recover) new bioproducts.