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Session 6B

Plant Biotechnology and Feedstock Genomics

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Plant biotechnology utilizes functional genomics and other molecular, cellular, and whole organism approaches to elucidate processes and mechanisms in plants important for agriculture, fuels, and chemicals. The advent of high throughput genome mapping and microarray analysis of gene/protein expression has provided a veritable scientific breakthrough in the potential understanding of structure and function in plant systems for fuel and chemical production. In the post-genomic world, plant biotechnology is a key to discovering the functions of newly mapped genes in plants, integrating these functions into cellular and higher level plant systems, and applying this technology to the production of fuels and chemicals in plants.

In the following papers, Vermerris describes enhanced ethanol production from maize and sorghum with modified lignin composition, Simpson summarizes recent progress in designing a profitable lignocellulosic feedstock for ethanol production in *Salix* species, and Lanahan outlines the development of corn varieties with built-in starch hydrolyzing enzymes for improved corn processing. Lee then describes an application of genomic biotechnology to the development of designer algae for enhanced hydrogen production, Schnable outlines genetic, molecular and biochemical analyses of the cuticular wax biosynthetic pathway in maize, and Kurek describes the use of directed evolution to improve Rubisco activase thermostability in *Arabidopsis.*