

Biofuels: Past, Present and Future

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Abstract. In an effort to increase the sustainability of our energy supply and secure our energy future, the federal government passed the Energy Independence and Security Act (EISA) in 2007. The EISA set aggressive targets for renewable fuels production, calling for an increase in renewable fuels from 9 billion gallons in 2008 to 36 billion gallons in 2022. In order to achieve these goals without disrupting other markets (like food and feed), new and reliable sources of advanced biofuels need to be developed. In this talk, I will review the development of first and second generation biofuels which are currently being produced at commercial scale. A major limitation of these early generation biofuels however, is that they still compete with the food or feed supply. Therefore, it is imperative that we develop the next generation of biofuels. I will discuss technological advances, such as DNA sequencing, synthetic biology and metabolic modeling which have enabled production strains to be developed in a faster and more efficient way. Finally, I will discuss the application of these techniques to develop next generation biofuels in photosynthetic micro-organisms, which are capable of direct conversion of carbon dioxide to biofuel molecules.

Biography. *Nanette Boyle received her Ph.D. in chemical engineering from Purdue University in 2009; here thesis was focused on metabolic modeling of a mode green alga, Chlamydomonas reinhardtii. After her Ph.D., she joined Sabeeha Merchant's laboratory at UCLA as a postdoctoral researcher in biochemistry to focus on the production of algal-based biodiesel. Before joining Mines as an assistant professor in 2013, she also completed a postdoctoral fellowship at CU Boulder in the area of synthetic biology.*

