

Microfluidics for Energy Applications

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Keywords: Microfluidics, optics, bioenergy, carbon management

Microfluidic methods developed primarily for medical applications have much to offer energy applications. This talk will describe my group's recent work in two such areas: (1) microfluidics and optics for bioenergy and (2) microfluidics for carbon management. Within the bioenergy theme, we are developing photobioreactor architectures that leverage micro-optics and microfluidics to cater both light and fluids to maximize productivity of microalgae. Within the carbon management theme we are developing a suite of methods to study pore-scale transport and reactivity in carbon sequestration and enhanced oil recovery. Results indicate potential for order of magnitude gains in photobioreactor technology and a 100-fold improvement over current subsurface fluid transport analysis methods.