

## **Optofluidic Innovation in Global Health, Carbon Conversion, and Nanomanipulation**

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**Sibley School of Mechanical and Aerospace Engineering**

**Cornell University**

**Faculty host: Nicole Hashemi**

**Seminar on October 3<sup>rd</sup>, 2023 at 11:00 AM in 2004 Black Engr.**

### **Abstract**

Optofluidics is the study of the synergies between optics and fluid mechanics and how these synergies they can be used to drive technological innovation. In this talk, I will describe several of the ways we have been able to use optofluidics to address practical problems in global health, carbon conversion, and nanomanipulation. I will describe our recent efforts on the development of TINY - a solar-thermal powered diagnostic system for the diagnosis of Kaposi's Sarcoma – and its current state of deployment in east Africa. Our efforts to show how optimizing the interactions between light, catalyst and flow can be used to enhance the efficiency of photothermal CO<sub>2</sub> conversion reactors will also be discussed, along with how the reactor technology was upscaled through the Carbon X-Prize competition. I will also discuss some of our efforts on manipulating fluidic systems and nanoparticles using both free space optics and chip-based photonics. In addition to covering the basic engineering science advancements that led to the development of these technologies, I will also discuss our strategies for deployment and commercialization.

**Prof. David Erickson** is the SC Thomas Sze Director and Sibley College Professor in the Sibley School of Mechanical and Aerospace Engineering at Cornell University. He is also a joint Professor within the Division of Nutritional Sciences. His research focuses on: mobile and global health technology, medical diagnostics, microfluidics, photonics, and nanotechnology. Prior to joining the faculty, he was a postdoctoral scholar at the California Institute of Technology and he received his Ph.D. degree from the University of Toronto. Research in the Erickson lab is or has been primarily funded through grants from the NIH, NSF, ARPA-E, ONR, DOE, DARPA, USAID, USDA, Nutrition International, and Global Alliance for Improved Nutrition (GAIN). Prof. Erickson has helped to found numerous start-up companies commercializing: high-throughput pharmaceutical instrumentation, biomedical diagnostics, and energy technologies including Halo Labs (<http://halolabs.com>), VitaScan (<http://vitascan.me>) and Dimensional Energy (<https://www.dimensionalenergy.net/>). Dr. Erickson has received the DARPA-MTO Young Faculty Award, the NSF CAREER Award, the Department of Energy Early Career Award, among others. In 2011 he was awarded the Presidential Early Career Award for Scientist and Engineers (PECASE) by President Obama. Erickson has been named a fellow of the Optical Society of America, the American Society of Mechanical Engineers, and the Canadian Academy of Engineering.

***This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.***

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