

The NSF-CREST Center for Cellular and Biomolecular Machines (CCBM) uses an interdisciplinary approach combining physical, biological and engineering methods to understand and control the functioning of multi-scale assemblies of biomolecules and cells, and to design and develop novel bio-inspired functioning machines ranging from designer cells and tissue to diagnostic and therapeutic devices. The center is also focused on enhancing biophysics, biochemistry and bioengineering graduate and undergraduate education, as well as leading K-12 STEM outreach activities in the Merced area for teachers and students.

Hosted by the NSF-CREST Center for Cellular and Biomolecular Machines at the University of California, Merced

SETH FORTUNA

a series of scientific sessions for the community

Using Light-based Communication to Address the Hidden Energy Cost of the Internet

Wednesday, June 26, 2019 | 3:00 PM – 4:00 PM, SE2, 224

Do we consider the energy consumed when we scroll through social media news feeds or stream video on our cell phone? Probably not. Indeed, the seemingly effortless transfer of content across the internet is a major technological achievement from which we all benefit. However, if we look deeper we observe a concerning trend: our increasing appetite for internet content is contributing to significant electricity usage. To serve content, the major internet companies rely on hyperscale data centers which use a remarkable 2% of the total electrical power consumed in the United States. In this talk, I will discuss how light-based communication is employed to help mitigate the rise in data center power usage and to handle increasing internet traffic. Today, light is primarily used for computer server-to-server communication. I will discuss emerging approaches to use light-based communication within the server and eventually within a computer chip. I will highlight our research at UC Berkeley where we are borrowing techniques used in radio communication to create nanometer-sized antennas to transmit light within a computer chip.

Seth A. Fortuna is currently a postdoctoral scholar at UC Berkeley in the NSF Center for Energy Efficient Electronics Science where he develops novel devices for energy efficient computing and communication. His recent dissertation research on nanoscale light emitting diodes was recognized with the Tucker Award which honors superior work and scholarship in the technology of materials used in semiconductor devices. Prior to receiving his PhD at UC Berkeley, he worked in the semiconductor industry as a reliability and failure analysis engineer.



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Open to all students, faculty, staff & local community. **Free** admission. Guest parking in **Bellevue Lot**. Permit-less parking dispenser; credit card only. Coffee, tea and snacks provided.

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