University of Rochester
Department of Electrical and Computer Engineering
Colloquia Series

Nanophotonics for Solar Energy Harvesting

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Wednesday, May 2nd
11:00 AM – 12:00 PM
Computer Studies Building (CSB) 209

Abstract: Nanophotonics is an exciting new field of science and technology that is directed towards making the smallest possible structures and devices that can manipulate light. Until recently, it was thought that the fundamental laws of diffraction would preclude much further miniaturization of the micron-scale photonic devices we have today. In this presentation, I will show how semiconductor and metallic nanostructures can mold the flow of light in unexpected ways and well below the diffraction limit. As light plays an important role in a wide variety of technologies, it is a worthwhile exercise to explore the many opportunities that this newly found ability might bring. In this talk, I will focus on illustrating the use of plasmonic and high refractive index semiconductor nanostructures for solar energy harvesting. I will also discuss several exciting new hybrid semiconductor/plasmonic devices that capitalize on the relative strengths of each of the constituent materials to obtain new functionalities.

Bio: Mark Brongersma is an Associate Professor and Keck Faculty Scholar in the Department of Materials Science and Engineering at Stanford University. He leads a research team of ten students and four postdocs. Their research is directed towards the development and physical analysis of new materials and structures that find use in nanoscale electronic and photonic devices. His most recent work has focused on Si-based light-emitting materials, light sources, modulators, detectors, and metallic nanostructures that can manipulate and actively control the flow of light at the nanoscale. Brongersma has given over 50 invited presentations in the last 5 years on the topic of nanophotonics and plasmonics. He has also presented 4 tutorials at International conferences on these topics. He has authored\co-authored over 100 publications, including papers in Science, Nature Photonics, Nature Materials, and Nature Nanotechnology. He also holds a number of patents in the area of Si microphotonics and plasmonics. He received a National Science Foundation Career Award, the Walter J. Gores Award for Excellence in Teaching, the International Raymond and Beverly Sackler Prize in the Physical Sciences (Physics) for his work on plasmonics, and is a Fellow of the Optical Society of America, the SPIE, and the American Physical Society. Dr. Brongersma received his PhD in Materials Science from the FOM Institute in Amsterdam, The Netherlands, in 1998. From 1998-2001 he was a postdoctoral research fellow at the California Institute of Technology.

Light refreshments will be provided.