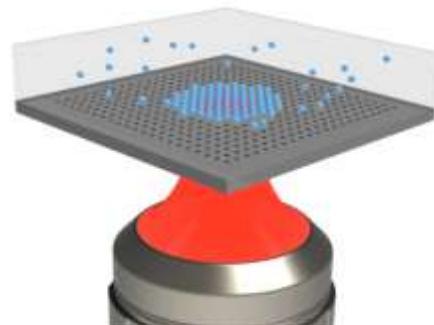


April 10, 2013

Light Interaction with Nanostructured Materials: Photovoltaics and Self-Assembly

Dr. Michelle Povinelli
University of Southern California

Abstract: In the first part of the talk, I will discuss how nanostructure can be used to improve the efficiency of solar cells. For silicon solar cells, we have shown that patterning a material in the form of nanowires yields higher total absorption than a thin film of the same height. This effect is due to an optical antenna effect in the nanowires, as well as resonant absorption. Moreover, the deliberate use of disordered structures can increase the absorption by as much as 200%. For III-V solar cells, nanowire geometries allow greater choice of material than traditional lattice-matched cells. We provide design guidelines for obtaining III-V nanowire cells with efficiencies close to the Shockley-Queisser limit.



In the second part of the talk, I describe the use of optical forces to assemble nanomaterials. Our approach, which we call light assisted templated self-assembly (LATS), uses the near field of a photonic crystal to reconfigurably assemble and disassemble 2D arrays of nanoparticles. Our technique can form nanoparticle arrangements not possible to make via traditional colloidal self assembly, which is limited by free energetic constraints. We demonstrate the formation of a square array of 500-nm diameter polystyrene spheres containing over 180 particles.

About our speaker: Dr. Michelle Lynn Povinelli is the WiSE Gabilan Assistant Professor in the Ming Hsieh Department of Electrical Engineering at the University of Southern California. She is the recipient of an NSF CAREER Award, Army Research Office Young Investigator Award, Presidential Early Career Award for Scientists and Engineers (PECASE), and a TR35 Award for innovators under age 35 from MIT's Technology Review magazine. She received a BA from the University of Chicago, an MPhil from the University of Cambridge, and a PhD from MIT, all in Physics. She was a postdoctoral researcher in Electrical Engineering at Stanford University, where she won a L'Oréal For Women in Science Postdoctoral Fellowship. She has co-authored more than fifty journal articles, three book chapters, and three US Patents.



Wednesday, April 10, 2013

Reception: 6:00; Dinner: 6:45; Talk: 7:30

Meal: Family-Style

Cost: \$30 (OSSC Student Members are Free!)

[Empress Pavilion](#)

[988 N. Hill St., Los Angeles, CA 90012](#)

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On-line Registration: www.osscc.org or

Contact: [Joseph Diep](#), OSSC Arrangements

Chair, Events@osscc.org, 951-926-2994

Please Register by April 8, 2013