Carnegie Mellon
Materials Science and Engineering Seminar Series

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"Superlattice and Quasi-3D Plasmonic Crystals"

Friday, November 12, 2010
10AM Seminar in Baker Hall 136A

Breakthroughs in photonics and optoelectronics demand actively controlled materials that are inexpensive, robust, and scalable. This talk will describe how superlattices and low symmetry plasmonic lattices provide an important first step to meet these goals. First, we will introduce soft nanolithography tools for plasmonics that use nanoscale molding to achieve arrays of 50-nm features simultaneously over 6-in^2 areas without needing electron, ion, or photon-based lithographies. Next, we will discuss how the optical properties of the plasmonic crystals can be engineered by clever nanopatterning and then manipulated by external factors to produce large optical responses. Finally, we will describe how the measured dispersion properties can provide new insight into enhanced optical transmission and other light-surface plasmon coupling mechanisms.

Teri W. Odom is an associate professor and Dow Chemical Company Research Professor in the Department of Chemistry and Materials Science and Engineering at Northwestern University. She received her B.S. degree from Stanford University in 1996 and her Ph.D. from Harvard University in 2001. Odom's research focuses on controlling materials at the 100-nanometer scale and investigating their size and shape-dependent properties. She has developed multi-scale nanopatterning tools that can generate noble metal (plasmonic) structures with exceptional optical properties. For example, arrays of nanoholes and nanopyramids are new plasmonic metamaterials also capable of ultra-sensitive molecular detection. Pyramidal nanoparticles can be used in imaging and therapeutic applications. Odom has also pioneered an approach for assembling functional nanomaterials, called chemical nanofabrication. Odom has received numerous awards and honors, including an NIH Director's Pioneer Award from the National Institutes of Health; the Materials Research Society Outstanding Young Investigator Award; the National Fresenius Award from Phi Lambda Upsilon and the American Chemical Society; the Rohm and Haas New Faculty Award; an Alfred P. Sloan Research Fellowship; a DuPont Young Investigator Grant; a National Science Foundation CAREER Award; a Dow Teacher-Scholar Award; the ExxonMobil Solid State Chemistry Faculty Fellowship; and a David and Lucile Packard Fellowship in Science and Engineering.