

DISTINGUISHED LECTURE SERIES



APRIL 22, 2015

Naomi HalasSTANLEY C. MOORE PROFESSOR IN ECE
RICE UNIVERSITY*“Plasmon-enabled Processes: New Opportunities
in Cross-cutting Science and Emerging Technologies”*

Metallic nanoparticles, used since antiquity to impart intense and vibrant color into materials, have more recently become a central tool in the nanoscale manipulation of light. This interest has led to a virtual explosion of new types of metal-based nanoparticles and nanostructures of various shapes and compositions, and has given rise to new strategies to harvest, control, and manipulate light based on these structures and their properties. By assembling metallic nanoparticles into useful building blocks, a striking parallel between the plasmons of these structures and wave functions of simple quantum systems is universally observed. Clusters of metallic nanoparticles behave like coupled oscillators or antennas, introducing coherent effects such as Fano resonances and electromagnetically induced transparency, originally the domain of atomic physics, into designable, light-driven nanoscale structures. Their unique light-controlling properties can be put to use in a multitude of ways: for generation of hot electrons for color-specific photodetection, for photothermal cancer therapy, currently in clinical trials, and most recently, for high-efficiency solar steam generation poised to tackle our planet's energy and sustainability challenges.

Naomi Halas is the Stanley C. Moore Professor in Electrical and Computer Engineering, Professor of Biomedical Engineering, Professor of Chemistry, Professor of Physics and Astronomy, and founding director of the Laboratory for Nanophotonics at Rice University. Dr. Halas is a pioneer in the field of plasmonics, creating the concept of the “tunable plasmon” and inventing nanoparticles with resonances spanning the visible and infrared regions of the spectrum. She is author of more than 250 refereed publications, has more than fifteen issued patents, and has been cited more than 30,000 times. She is co-founder of Nanospectra Biosciences, developing photothermal therapies for cancer and other diseases, and co-founder of Eureka Sun, commercializing nanoparticle-based solar steam generation. Dr. Halas is a member of the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences. She is a recipient of the APS 2014 Frank Isakson Prize for Optical Effects in Solids. She is a Fellow of six professional societies: OSA, APS, IEEE, AAAS, SPIE, and MRS.

3:30 PM, Mitchell Hall, reception in DuPont Hall Lobby