

MSE-Colloquium@NTU

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Lecture Theatre at The ARC (LHN-B1-15), Nanyang Technological University, Singapore



Chemical Nanoplasmonics for Surface Enhanced Spectroscopy and Nanobiotechnology

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Abstract

Designing, synthesising and controlling plasmonic metal nanostructures with high precision and yield are of paramount importance in areas, such as optics, nanoscience, chemistry, materials science, energy science and biotechnology. In particular, synthesising and utilising plasmonic nanostructures with ultrastrong, controllable and quantifiable signals is key to the wide and practical use of plasmonic enhancement-based spectroscopies, including surface-enhanced Raman scattering (SERS), metal-enhanced fluorescence (MEF) and Rayleigh scattering. Here, I will introduce the synthetic design strategies for molecularly tunable and structurally reproducible plasmonic nanostructures (particularly, plasmonically coupled structures with a nanogap) with strong, controllable and quantifiable SERS, MEF and dark-field light scattering signals. I will also show their potential in addressing important scientific challenges, for example, quantitative plasmonics, and discuss how these new plasmonic materials can lead to new breakthroughs in biotechnologies, including biosensing, bioimaging and theranostic applications and bio-computing.

Biography

Dr Jwa-Min Nam is a Professor at the Department of Chemistry, Seoul National University. He received his B.S. and M.S. degrees from Hanyang University in 1996 and 2000 respectively, working on computational chemistry and drug design. He received his Ph.D. from Northwestern University in 2004 under the supervision of Professors Chad Mirkin and Mark Ratner, where his research mainly focused on nanoparticle-based biosensors. He then moved to UC Berkeley and joined Professor Jay Groves' research group as a postdoctoral fellow working on supported lipid bilayer-based cancer cell interfacing platforms. He received the Chinese Academy of Sciences Fellowship for International Scientists in 2014, Distinguished Lectureship Award from the Chemical Society of Japan in 2013, the Presidential Young Scientist Award from the President of the Republic of Korea in 2012, the Young Inorganic Chemist Award from the Korean Chemical Society in 2012 and the Victor K. LaMer Award from the American Chemical Society in 2006. His major research interests include the design, synthesis and optics of plasmonic nanostructures, nanocarriers for bio-imaging, delivery and therapeutics, nanoprobe-tethered lipid bilayers, cell-nanostructure interfaces, and biosensors.