Defining the Nanomanufacturing Techniques for the Fabrication of Plasmonic Surfaces for Photovoltaic, Catalytic and Sensing Applications
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Abstract: The intense interactions between light and metal particles with nanoscale dimensions provide the foundation for transformative sensing, catalytic and photovoltaic technologies. Even though many such devices have been successfully prototyped from these so-called plasmonic nanomaterials, the fabrication techniques currently utilized, while well-suited to a research intensive environment, are incompatible with a manufacturing setting where scalability, throughput, yield and synthetic simplicity are key requirements. This talk will describe our efforts to re-define the synthetic practices needed to fabricate organized photoactive surfaces of complex 3-dimensional plasmonic nanostructures. The three-stage fabrication process being advanced aims to (i) lithographically define nanostructured precursors at site-specific locations, (ii) use directed assembly to transform them into nanostructured templates with high crystallinity and pristine surfaces, and (iii) then use solution-based syntheses to sculpt these templates into the intricate nanostructures which express the tailored plasmonic resonances and near-fields needed to enable a wide range of potential applications.

Bio: Dr. Svetlana Neretina is an Associate Professor in the Department of Mechanical Engineering at Temple University. She received her Ph.D. from McMaster University (Hamilton, Canada) in Engineering Physics in 2007. She then worked as a postdoctoral researcher (2007-2009) in the School of Chemistry and Biochemistry at the Georgia Institute of Technology under the supervision of Dr. Mostafa El-Sayed. She is currently the PI for the Renewable Energy Laboratory, a materials preparation facility dedicated to the fabrication of functional nanomaterials of relevance to energy applications. Since joining Temple University she has received four NSF awards as a PI from the following programs: (i) Electronic and Photonic Materials (EPM, CAREER Award), (ii) Nanomanufacturing (NM), (iii) Solid State and Materials Chemistry (SSMC), and (iv) Nanotechnology Undergraduate Education (NUE).

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