

UC SAN DIEGO NANOENGINEERING SEMINAR

Wednesday, April 18, 2018

Seminar Presentation: 11:00am - 12:00pm

ASML Conference Center (SME 248)

“Genetically Encoded Functional Materials”

Jennifer Martinez

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Abstract: Controlling the interface between hard and soft (biological) moieties can produce functional materials and assemblies for imaging and sensing, regenerative medicine, and optoelectronics. Vignettes of our work utilizing biological templates to produce molecular-like fluorescent metal nanoclusters, metal- and conjugated oligomer- polymer composites, and libraries of polymers utilized for regenerative medicine will be presented. Briefly, fluorescent metal nanoclusters are gaining much interest because of their desirable photophysical properties, smaller size than quantum dots, and biocompatibility. As a compliment to quantum dots and molecular fluorophores, fluorescent metal nanoclusters have been produced using templates of dendrimers and polymers, small molecular ligands, or within biological materials of interest, such as DNA. We exploit the chemical and structural specificity of DNA to not only template fluorescent nanoclusters and understand their photophysics, but to also enable their use in medical diagnostics and in the bottom-up assembly of heterostructures. Likewise, exploiting the exacting nature of biological synthesis, we create polymers *in vivo* and functionalize and select for those polymers with new optical and biological reactivity.

Biosketch: Dr. Martinez is a Technical Staff Member in the Center for Integrated Nanotechnologies and the Deputy Director of the Institute for Materials Science at Los Alamos National Laboratory. She received a B.S. in Chemistry from the University of Utah and a Ph.D. in Chemistry from the University of California Santa Barbara. Dr. Martinez and her colleagues have developed biosensors, fluorescent metal nanoclusters, genetically encoded polymers and their subsets for regenerative medicine and optoelectronics. Professional honors include AAAS and Kavli Fellow; Presidential Early Career Award for Science and Engineering (2008); Outstanding Mentoring Awards (2007, 2011), Directors Postdoctoral Fellowship, and graduate of the Leadership Development Initiative.