

270-ISMS-PL02 **Interfacing Nanomaterials with Biology: From Delivery of siRNA and CRISPR Machinery to Rapid Cell Phenotyping**

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A key issue in the use of nanomaterials is controlling how they interact with themselves and with the outer world. Our research program focuses on the tailoring of nanoparticles of surfaces for a variety of applications, coupling the atomic-level control provided by organic synthesis with the fundamental principles of supramolecular chemistry. This talk will focus on the interfacing of nanoparticles with biosystems, and will present the creation of self-assembled systems that deliver proteins and nucleic acids directly to the cytosol, completely avoiding endosomal pathways. We will demonstrate the delivery of siRNA for in vivo immunomodulation, and the delivery of CAS9/SgRNA for protein-based CRISPR genome editing. Finally, this presentation will also feature the use of nanoparticles for diagnostic applications, focusing on using selective nanoparticle-protein interactions to generate array-based ("chemical nose") sensors. These sensors provide rapid and highly specific tools for cell phenotyping, including rapid (minutes) determination of drug mechanism.