ASU School of Molecular Sciences
Arizona State University

SMS Fall 2021 Seminar Series

Friday Oct 1 | 2:30pm | Virtual*

Dynamic Self-assembly of Encapsulated DNA Nanotubes

Biological cells adapt, replicate, and self-repair in ways that are unmatched by man-made devices. These processes are enabled by the interplay of receptors, gene networks, and self-assembling cytoskeletal scaffolds. Taking inspiration from this architecture, we follow a reductionist approach to build synthetic materials by interconnecting nucleic acid components with the capacity to sense, compute, and self-assemble. Nucleic acids are versatile molecules whose interactions and kinetic behaviors can be rationally designed from their sequence content; further, they are relevant in a number of native and engineered cellular pathways, as well as in biomedical and nanotechnology applications. I will illustrate our work on self-assembling DNA scaffolds that can be programmed to respond to environmental inputs and to canonical molecular signal generators such as pulse generators and oscillators. I will discuss recent work on the encapsulation of these dynamic scaffolds inside emulsion droplets serving as a mimic of cellular compartments. I will stress how mathematical modeling and quantitative characterization can help identify design principles, guide experiments, and explain observed phenomena.

Elisa Franco, PhD

Associate Professor, University of California Los Angeles

Dr. Elisa Franco received her Ph.D. from the California Institute of Technology (2012) and the University of Trieste (2008). She was an Assistant Professor at UC Riverside (2011-2018), and is currently Associate Professor at UCLA, Mechanical and Aerospace Engineering and Bioengineering. She was a Hellman Family Foundation Fellow (2013-2014), and a recipient of an NSF CAREER Award (2015).

Her research focuses on convergence of structural biology, dynamics and controls using specialized biomolecular frameworks.

*ZOOM: https://asu.zoom.us/j/87081218152