BIOMOLECULAR MACHINES
Proteins are true cellular nanomachines that perform sophisticated biological functions by self-assembling into dynamic 3D structures that use thermal energy to change shape in response to specific stimuli. Amid their many functions, proteins make for excellent nanoscale instruments.

MACROMOLECULAR ASSEMBLIES AND HYBRID DEVICES
The high rate of discovery in nanotechnology is permitting us to realize nanomaterials with interesting new properties that can be used for building hybrid devices in conjunction with biomolecules. We focus on several of these applications including novel therapeutic delivery systems and nanoparticle based biosensors.

CELLULAR AND MULTICELLULAR SYSTEMS
Large scale assemblies composed of multiple cells are ubiquitous, ranging from tissue to biofilms, and exhibit striking emergent behaviors controlled by cell mechanics and cell-cell interactions. We are developing new methods to study and guide the development of bacterial communities and differentiating tissue.

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