Fall 2018 Joint Colloquium
Materials Department & Materials Research Laboratory

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11:00 am, ESB 1001

Making and Folding Colloidal Polymers

Traditionally, assembly lines to build machines, from electronic circuits to motor vehicles, follow specific instruction manuals, followed by robots or people. On the other hand, in biology, organisms self-assemble spontaneously according to instructions encoded in their genes - nonetheless following the laws of physics. Inspired by biology, we design and develop emulsion droplets with specific DNA interactions that guide their spontaneous assembly into linear or branched freely-jointed polymers. In addition, we introduce and trigger secondary DNA interactions along the polymer backbone to fold it into several simple yet distinguishable structures. This physical system demonstrates the possibility of controlling the self-assembly of monomer droplets into polymers, which in turn allows us to study their collapse and folding to explore the underlying free energy landscape. Unlike molecular polymers, colloidomers can be assembled and disassembled at will, giving rise to reconfigurable materials. The droplets can readily be solidified; therefore they offer a route to hands-off manufacturing of objects with inbuilt hierarchies.

Bio

Jasna Brujic is a Professor of Physics at New York University. She is one of the core faculty in the Center for Soft Matter Research. Brujic is an experimental physicist, who received her Ph.D. for work on the statistical mechanics of granular matter at the Cavendish Laboratory of the University of Cambridge, UK. She then conducted post-doctoral research at Columbia University in the area of single molecule proteins. Since 2007, Brujic has led a research group at the interface between soft matter physics and biophysics. The group uses biomimetic emulsion systems to study jammed matter, cellular organization in tissues in 3D, protein-protein adhesion, and programmable self-assembly of materials with custom designs.

https://wp.nyu.edu/brujiclab/

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