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Shape Remodeling Assemblies in Biologically Inspired Materials[1]

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Much of our research is inspired by, and directed at, understanding the formation of novel structures (both relatively static and highly dynamic) with distinct shapes and morphologies observed in charged biological systems. The structures, in turn, often correlate to specific functions. For example, charged nanoscale tubules and rods and their assemblies are of interest in a range of applications, including as templates for hierarchical nanostructures, encapsulation systems, and biosensors. A series of studies will be described on charged biological assemblies exhibiting "molecularly-triggered" dynamical shape changes. In particular, we will focus on protein and lipid based nanotubule formation through small molecule stimuli-induced shape remodeling events. The systems include invertible protein nanotubes from two-state tubulin-protein building blocks and lipid nanotubes and nanorods from curvature stabilizing lipids (mimicking membrane curvature generating proteins).

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