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Defect Induced Morphologies of Biopolymer Bundles AJAY GOPINATHAN, Department of Phyics, University of California, Santa Barbara, MARK HENLE, Department of Chemistry and Biochemistry, University of California, Los Angeles, URI RAVIV, Materials Research Laboratory, University of California, Santa Barbara, DANIEL NEEDLEMAN, Department of Systems Biology, Harvard University — Bundles of stiff biopolymers, such as actin and microtubules, form important structural elements in the cell, including filopodia, microvili, cilia and contractile rings. These structures perform specific functions that rely crucially on their mechanical properties, which in turn depend on the internal organization of the bundles. Recent experiments on microtubule bundle formation in the presence of multivalent counterions [D. J. Needleman, *et. al*, *Proc. Natl. Acad. Sci.*, **101** 16099 (2004)] have observed that the bundles adopt static curved configurations whose wavelengths are several orders of magnitude less than their persistence length. In this talk, we show that these severe distortions can be explained by the presence of edge dislocation and twist defects, indicating that these defects could play a significant role *in vivo*.

Mark Henle
Department of Chemistry and Biochemistry, University of California, Los Angeles

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