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**Coupled biopolymer networks** J.M. SCHWARZ, TAO ZHANG, Syracuse University — The actin cytoskeleton provides the cell with structural integrity and allows it to change shape to crawl along a surface, for example. The actin cytoskeleton can be modeled as a semiflexible biopolymer network that modifies its morphology in response to both external and internal stimuli. Just inside the inner nuclear membrane of a cell exists a network of filamentous lamin that presumably protects the heart of the cell nucleus—the DNA. Lamins are intermediate filaments that can also be modeled as semiflexible biopolymers. It turns out that the actin cytoskeletal biopolymer network and the lamin biopolymer network are coupled via a sequence of proteins that bridge the outer and inner nuclear membranes. We, therefore, probe the consequences of such a coupling via numerical simulations to understand the resulting deformations in the lamin network in response to perturbations in the cytoskeletal network. Such study could have implications for mechanical mechanisms of the regulation of transcription, since DNA—yet another semiflexible polymer—contains lamin-binding domains, and, thus, widen the field of epigenetics.

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