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Abstract for an Invited Paper  
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**Connecting Atomic Structures with Continuum Mechanics in Cytoskeletal Polymers<sup>1</sup>**

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The mechanics of the cytoskeleton, namely actin filaments and microtubules, are key to many of their cellular functions. These polymers have been extensively studied using a wide range of biophysical techniques, and we have sought to connect the dynamics we observe in all-atom molecular dynamics simulations with continuum mechanics properties. We have developed coarse-graining techniques that allow us calculate mechanical properties of these polymers using a simple mesoscopic description. Our findings match very well with experimental measurements and allow us to probe how the atomic level effects of small molecules and/or point mutations manifest themselves at the level of the polymer.

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