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A mean-field internal tension accounts for the elasticity of ssDNA
OMAR A. SALEH, University of California, Santa Barbara — Single-stranded DNA (ssDNA) is a highly-charged biopolymer whose flexibility permits strong interactions between monomers well-spaced along the backbone. The configuration of any given subunit of the chain is thus sensitive to the position of many monomers, creating a complex set of interactions that have resisted simple conceptualization. I will discuss progress in understanding ssDNA configuration using a classic mean-field approach, in which long-range interactions are approximated by an intrinsic tension that locally straightens the chain. This approach works surprisingly well in describing two sets of single-molecule stretching data: the salt-dependent elasticity of ssDNA (in which the internal tension arises from electrostatic repulsions between monomers), and the elastic response of an ssDNA backbone with grafted side chains (in which the internal tension arises from steric repulsions between side chains).

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