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**Exploring the Interplay between DNA Sequence, Histone Tails and Nucleosome Dynamics** JOSHUA LEQUIEU, ANDRES CORDOBA, JUAN DE PABLO, University of Chicago — The dynamics of individual nucleosomes are influenced by both the underlying DNA sequence, as well as remodeling proteins that actively reposition nucleosomes along the genome. These remodeler proteins extract positioning information from the histones themselves, where certain histone modifications facilitate the remodeling of nearby chromatin regions. Recent work suggests that both of these processes occur simultaneously, with both DNA sequence and histone modifications thought to play different but complementary roles, yet the details of these processes are still poorly understood. In this work, we examine the interplay between DNA sequence and histone modifications using a detailed molecular model of the nucleosome. We demonstrate that DNA sequence plays an important role in the dynamics of nucleosome repositioning and that different DNA sequences reposition via different mechanisms. We then show that certain histone tails play important roles in this process by stabilizing metastable states, thereby encouraging specific rearrangements within the nucleosome and not others. Curiously, these histone tails are the same ones known to recruit remodeler proteins, suggesting a mechanism by which DNA sequence, histone tails and chromatin remodeling are coupled.

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