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Multiscale modeling of three-dimensional genome BIN ZHANG, PETER WOLYNES, Rice University — The genome, the blueprint of life, contains nearly all the information needed to build and maintain an entire organism. A comprehensive understanding of the genome is of paramount interest to human health and will advance progress in many areas, including life sciences, medicine, and biotechnology. The overarching goal of my research is to understand the structure-dynamics-function relationships of the human genome. In this talk, I will be presenting our efforts in moving towards that goal, with a particular emphasis on studying the three-dimensional organization, the structure of the genome with multi-scale approaches. Specifically, I will discuss the reconstruction of genome structures at both interphase and metaphase by making use of data from chromosome conformation capture experiments. Computationally modeling of chromatin fiber at atomistic level from first principles will also be presented as our effort for studying the genome structure from bottom up.

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