**Resolving the Structure of Viral Genomes Using a Computational Microscope**

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Notwithstanding dramatic advances in experimental characterization of nanoscale systems, some of the nanoscale processes are simply too fast to register by experimental approaches or involve displacements at scales too fine for direct experimental observation. Microscopic simulations have emerged as a kind of a computational microscope that can characterize processes inaccessible to experimental techniques, revealing not only the sequence of events underlying an experimental measurement but also the forces and energies involved. This lecture will highlight our recent applications of multi-resolution simulation methodology to obtain complete all-atom structures of fully packaged viral particles. The lecture will provide a forward-looking perspective on modeling an entire biological cell at all-atom resolution.