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Jia Zhao*, Department of Mathematics, Columbia, SC 29208, and **Qi Wang**, Dept of Math, Columbia, SC 29208. *A Multiphasic Complex Fluids Model for Cytokinesis of Eukaryotes.*

Cell Mitosis is a fundamental process in eukaryotic cell reproduction, during which parent cell's nucleus first disassembles leading to DNA and chromosome replication, then chromosomes migrate to new locations within the parent cell to form offspring nuclei which triggers cytokinesis leading to the formation of two offspring cells eventually. In this presentation, we develop a full 3D multiphase hydrodynamic model to study the fundamental mitotic mechanism in cytokinesis, the final stage of mitosis. The model describes the cortical layer, a cytoplasmic layer next to the cell membrane rich in F-actins and myosins, as an active liquid crystal system and integrate the extra cellular matrix material and the nucleus into a multiphase complex fluid mixture. With the novel active matter model built in the system, our 3D simulations show very good qualitative agreement with the experimental obtained images. The hydrodynamical model together with the GPU-based numerical solver provides an effective tool for studying cell mitosis theoretically and computationally. (Received August 11, 2015)