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Bruce P Ayati* (ayati@smu.edu) and **Isaac Klapper**. *A Multiscale Model of Biofilm as a Senescence-Structured Fluid.*

We present a physiologically structured multiscale model for biofilm development. The model has components on two spatial scales, which induce different time scales into the problem. The macroscopic behavior of the system is modeled using growth-induced flow in a domain with a moving boundary. Cell-level processes are incorporated into the model using a so-called physiologically structured variable to represent cell senescence, which in turn affects cell division and mortality. We present computational results for our models which shed light on modeling the combined role senescence and the biofilm state play in the defense strategy of bacteria. (Received September 20, 2006)