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PDE models of chemically induced biofilm detachment

Bacterial biofilms are microbial depositions on immersed surfaces that have been characterized both as spatially structured microbial populations and as complex fluids that can be modeled by a highly nonlinear system of diffusion-reaction equations. In this talk we will extend the prototype biofilm model to include a phenomenon that we vaguely call "chemically induced detachment" (to distinguish it from mechanical detachment), i.e. the release of cells from the biofilm phase into the aqueous phase triggered by chemical signals. We will comment on well-posedness, numerical methods, and explore the behavior of model solutions in computer simulations. This is joint work with Blessing Uzor (Guelph), Burkhard Hense (Helmholtz Munich) and Christina Kuttler (TU Munich).