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Stochastic and PDE models of clustering in bacterial colonies

I will discuss a couple of models of pattern formation in bacterial colonies.

The first model is a stochastic agent-based model. Agents move partially at random, and partially towards random neighbours. The latter effect results in clusters. Its continuum limit leads to a 4th order PDE that exhibits a "cluster" steady state.

The second model is a reaction-diffusion system with state-dependent diffusion and results in interface-like solutions.

Joint works with Julien Smith-Roberge, David Iron and Paul Chavy-Waddy