Canadian Association of Physicists
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Contribution ID: **152** Type: **Poster Competition (Graduate Student) / Compétition affiches (Étudiant(e) 2e ou 3e cycle)**

(G*) POS-D24 – Simulation of collective motion in surface colonies of twitching bacteria using a dynamical self-consistent field theory for self-propelled rods

Wednesday 9 June 2021 13:59 (2 minutes)

We use dynamical self-consistent field-theory simulations of interacting, self-propelled rods to study the fascinating time-dependent, inhomogeneous structures observed during the growth of a colony of twitching *Pseudomonas aeruginosa* bacteria confined at the interface between a glass substrate and agar. These collective patterns in colony growth are relevant to early-stage biofilm formation, to the spread of infection, and to our understanding of the surface-motility mechanism of these bacteria. Our focus is on colony *fingers*, which are long-lived, compact, dense domains of aligned bacteria which form at, and grow out from, the leading edge of the growing bacteria colony. We investigate how the strength of the self-propulsion and the density of bacteria affect the shape and speed of the fingers, as well as the degree of bacteria alignment within the fingers. In the presence of self-propulsion, a perturbation of an initially flat colony edge will evolve into a long finger. By introducing a random spatial variation of the glass-agar adhesion strength into the simulation, we produce finger structures and dynamics similar to what is seen in experiment.

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