Modelling, analysis, and simulation of traffic jam in colonies of *Myxococcus xanthus*

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Myxococcus xanthus is a social bacterium that experiences a fascinating life cycle, with a transition from uni-cellular to multi-cellular stages. One step of this developmental transition has raised great modelling efforts, the so-called *rippling phase*, when the population of bacteria synchronizes in accordion waves with high activity, but very limited net motion of each individual (see, *e.g.* [2, 3] and more references therein). This fascinating pattern is results from repeated reversions of individual bacteria embedded in a dense population. The reversion events are known to be finely tuned by biochemical processes at the intra-cellular level [1]. However, the onset of collective motion is still the subject of current investigation.

The goal of the project is to revisit these previous modelling studies based on high-resolution data of collective motion of bacteria [4]. More precisely, we aim to investigate the relationship between modulation of cell reversion and local congestion among the population, following [5] with active particles.

References

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