Contribution ID: **367** Type: **Oral Presentation**

Life in a tight spot: How bacteria move in porous media

Monday, 31 May 2021 15:40 (15 minutes)

Bacterial motility is central to processes in agriculture, the environment, and medicine. While motility is typically studied in bulk liquid or on flat surfaces, many bacterial habitats—e.g., soils, sediments, and biological gels/tissues—are complex porous media. Here, we use studies of *E. coli* in transparent 3D porous media to demonstrate how confinement in a heterogenous medium fundamentally alters motility. In particular, we show how the paradigm of run-and-tumble motility is dramatically altered by pore-scale confinement, both for cells performing undirected motion and those performing chemotaxis, directed motion in response to a chemical stimulus. Our porous media also enable precisely structured multi-cellular communities to be 3D printed. Using this capability, we show how spatial variations in the ability of cells to perform chemotaxis enable populations to autonomously stabilize large-scale perturbations in their overall morphology. Together, our work thus reveals new principles to predict and control the behavior of bacteria, and active matter in general, in complex environments.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

Acceptance of Terms and Conditions

Click here to agree

Newsletter

Student Poster Award

Primary authors: DATTA, Sujit (Princeton University, USA); Dr BHATTACHARJEE, Tapomoy (Andlinger Center, Princeton University); Mr AMCHIN, Daniel (Princeton University); OTT, Jenna (Princeton University)

Presenter: DATTA, Sujit (Princeton University, USA)

Session Classification: MS5

Track Classification: (MS5) Biochemical processes and biofilms in porous media