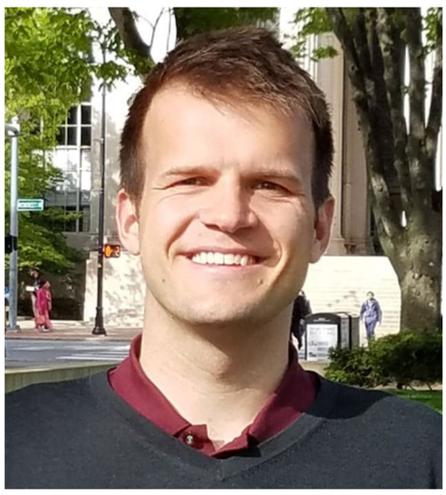
PHYSICAL MATH SEMINAR

How encounters at the microscale prime microbial interactions



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ABSTRACT:

Microbial interactions often critically depend on the rate of physical cell-cell or cell-resource encounters. In a liquid environment, many prominent examples include encounters among phytoplankton in the ocean that lead to the formation of marine snow, bacterial encounters with sinking marine snow particles that bacteria degrade, the formation of living aggregates by cyanobacteria, bacterial chemotaxis towards leaky phytoplankton, and horizontal gene transfer between bacteria. Microscale encounters are nearly always quantified as encounters between inanimate spheres, borrowing from the physics of gases, coagulating colloids, and rain formation. However, these classical approaches often fail to account for important traits of microorganisms, such as cell elongation, motility, or gradient sensing. Even more importantly, experimental assays typically do not control cell-cell encounters. In my talk, I will outline how more realistic models of encounters at the microscale can contribute to our understanding of fundamental ecological processes controlled by microbes, from aggregation through colonization and chemotaxis to gene exchanges. I will close by presenting our recent experimental evidence that encounters driven by fluid shear strongly control the rates of horizontal gene transfer between bacteria.

TUESDAY, MAY 21, 2024
2:30 PM – 3:30 PM
Building 2, Room 449

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