PHYSICAL MATHEMATICS SEMINAR

Motion of uni-flagellated bacteria at interfaces and in complex media

JAY X. TANG

Brown University

ABSTRACT:

Microbes inhabit planet earth over billions of years and have adapted to diverse physical environments, particularly at or near interfaces. A uni-flagellated bacterium, *Caulobacter crescentus*, is a species of choice by microbiologists to study cell differentiation and genetic regulation. From the perspective of fluid and surface physics, I will discuss our study on the motility of *C. crescentus* swarmer cells in both viscous and visco-elastic media, their accumulation and motility near solid surfaces, and their behavior at an air/water interface. Specifically, I will describe both physical effects and surface chemistry that cause the motile cells to get trapped near the air/water boundary, and strategies the cells can employ to free themselves. I will also highlight the complex fluid mechanics required to predict the bacterial swimming speed in viscoelastic media. The broader goal of our study is to elucidate interfacial microbial functions through microscopic imaging, data analysis, and mathematical modeling and computer simulations based on fluid physics. By understanding the mechanisms diverse species of motile bacteria have adopted through the course of evolution, we seek to gain insights useful towards environmental and biomedical applications.

TUESDAY, OCTOBER 20, 2015
2:30 PM
Building E18, Room 466A

Reception following in Building E17, Room 401A
(Math Dept. Common Room)

http://math.mit.edu/pms/

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