PHYSICAL MATHEMATICS SEMINAR

BIOPHYSICAL STUDIES OF A FAST SWIMMING, CHEMOTACTIC, AND SUPER STICKY BACTERIUM

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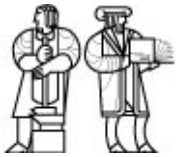
ABSTRACT:

We have recently initiated a biophysical study of a common water-born bacterium called *Caulobactor cresentus. C. cresentus* has a distinctive life cycle, and is extensively studied as a model system for developmental biology. The younger cell has a single flagellum and is a fast swimmer, thus called a swarmer cell. When aged, the cell loses its flagellum and replaces it with a thin stalk tipped with an adhesive holdfast, thus allowing itself to firmly attach to a solid surface. We recently measured the flagellar motor torque and swimming speed for the *C. cresentus* swarmer cells and found them with much higher feul efficiency than other species such as *E. coli* and *V. alginolyticus*, attributable to the different environments they evolve in. We also studied the statistical property of switching of the flageller motor of *C. cresentus*, defining key features relevant to its chemotactic behaviour. Under a separate theme, we have determined the elastic coupling and the adhesive force as the *Caulobacter* stalked cells attach to a solid surface, using techniques coupled with optical microscopy such as analysis of thermal fluctuations and micromanipulation. The unifying theme of this diverse range of projects is innovative application of fundamental physics and applied mathematics, involving random walk, Brownian motion and hydrodynamic analysis at the low Reynolds numbers.

TUESDAY, SEPTEMBER 19, 2006
2:30 PM
Building 4, Room 270

Reception at 3:30 PM in Building 2, Room 349
(Applied Mathematics Common Room).



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