

Seminar

Modelling suspensions of swimming cells

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Suspensions of swimming microorganisms behave differently to standard fluids, with the cells providing an internal source of energy that can drive flows. The microorganisms, such as algae and bacteria, typically attempt to swim in directions that improve their environment (for example, against gravity, biased by shear or towards nutrients or light). This biased swimming behaviour together with differences in physical properties can initiate large scale flows, sometimes resulting in cells accumulating in counter-intuitive regions. For instance, up-swimming cells often find themselves at the bottom and in a flow disperse differently to nutrients. Here, I shall describe experiments that aim to disentangle some of the mechanisms and explain how to scale up from the hydrodynamics of individuals to models of dilute suspensions. I shall introduce applications from the dispersion of swimming cells in shear and the non-intuitive transport of swimming cells in oscillatory flows due to helical resonant alignment.

Wednesday, Mar 20th 2019

4:00 PM (Tea/Coffee at 3:30 PM)

Auditorium, TIFR-H