Title: 2D Swimming at Low Reynolds Number

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Abstract:

(This is an extension of the minisymposium 25: Multiscale modeling of cell movement, organized by Chuan Xue and Qixuan Wang.) Cell migration is crucial for many biological processes. To date, a lot have been done for cells crawling. We are interested in another mode of migration—self-propelled swimming at low Reynolds number, in which both inertia and the interaction between the cell and the extracellular matrix are absent. In such environment, the cell's migration relies only on appropriate sequencial shape changes of the cell body. By mathematically generating general shape deformations of planar Stokes flow swimmers, we study the interaction between the cell body and the surrounding fluid, discover those factors that play crucial roles in the swimming process and prescribe what kind of shape deformations may lead to more efficient swimming.