Faculty of Engineering Sciences
Ben-Gurion University of the Negev
Beer-Sheva, 84105, Israel

הפקולטה למדעי ההנדסה
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Department of Mechanical Engineering Seminar
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Zoom link:
https://us02web.zoom.us/j/89135443578?pwd=a1RnTU1vSzM3Qy9vK2tFVEYybG13QT09

Active or electrophoretic particles in shear flow

Prof. Aditya S. Khair

Dept. Chemical Engineering, Carnegie Mellon Univeristy, Pittsburgh PA 15213 USA
(Hosted by: Dr. Yoav Green)

Abstract: I shall discuss two pieces of recent work from my group. First, I present a model for the linear viscoelasticity of a dilute suspension of active (self-propelled) particles. Notably, the model predicts the particles to cause a negative increment to the suspension viscosity. Through a comparison with experiments on suspensions of Escherichia coli, I will demonstrate that biophysical parameters of these microorganisms can be inferred from our model. Second, I will discuss the dynamics of an electrophoretic particle in an ambient shear flow. This work is motivated by several experiments reporting cross-streamline migration of charged particles undergoing electrophoresis in Poiseuille microchannel flow. Specifically, I will demonstrate that the observed migration arises from the interaction of the electrophoretic particle with the weak inertia of the shear.

Bio: Aditya Khair is a Professor of Chemical Engineering at Carnegie Mellon University (CMU). He obtained an MEng in Chemical Engineering from Imperial College London in 2001. He received a Certificate of Advanced Study in Mathematics from the University of Cambridge in 2002. Later that year, he began a Ph.D. in Chemical Engineering at the California Institute of Technology, under the supervision of John Brady. In 2007 he began a postdoc in Chemical Engineering at UC Santa Barbara, working with Todd Squires. In 2010 he joined CMU. His research utilizes applied mathematical techniques to investigate problems in fluid mechanics, rheology, colloid science, electrokinetics, and electrochemistry. His work has been recognized by the Metzner Early Career Award from the Society of Rheology; the Camille Dreyfus Teacher-Scholar Award; the NSF CAREER Award; the Charles Kaufmann Foundation New Investigator Research Grant; and the Frenkiel Award of the APS Division of Fluid Dynamics.

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Speaker contact infromation:
Email: akhair@andrew.cmu.edu
Phone number: +1-412-268-4393