

Thursday, September 22nd, 2022

Refreshments at 3:45pm in PSF 186
Colloquium from 4:00 PM – 5:00 PM in PSF 101

Do bacterial engines have automatic gearshifts?

Professor Navish Wadhwa

Arizona State University



Abstract:

Living organisms adapt to changes in their environment. This is a core feature that distinguishes living from non-living matter. While biological adaptation to chemical changes is well-studied, how cells adapt to their mechanical environment is poorly understood. I will discuss our attempts to address this gap by studying the flagellar motor, a molecular machine that powers swimming in bacteria. This biological nanomachine autonomously adapts to changes in mechanical load by adding or removing the “pistons” that generate torque. We are working on revealing the physical and molecular mechanisms underlying this mechano-adaptation by combining single-motor experiments with theoretical modeling. Mechano-adaptation of the motor takes place within seconds, making it a highly responsive autonomous control mechanism.

Biography:

Navish Wadhwa is an Assistant Professor in the Department of Physics and the Biodesign Center for Mechanisms of Evolution at Arizona State University (ASU). Before coming to ASU, he was a postdoctoral fellow in the Department of Molecular and Cellular Biology (MCB) at Harvard. He is the recipient of a Pathway to Independence Award from NIH, a Meselson Prize for the most beautiful experiment of the year from MCB Harvard, and a Young Scientist Award from the European Mechanics Society.

Wadhwa’s research investigates how mechanical forces influence the behavior of living matter. Current projects include how bacteria detect mechanical cues from their environment and how these cues are transduced into biochemical signals to modulate behavior.

Host: Prof. Rizal Hariadi

View our Fall 2022 Physics Colloquium schedule at <https://physics.asu.edu/colloquia>