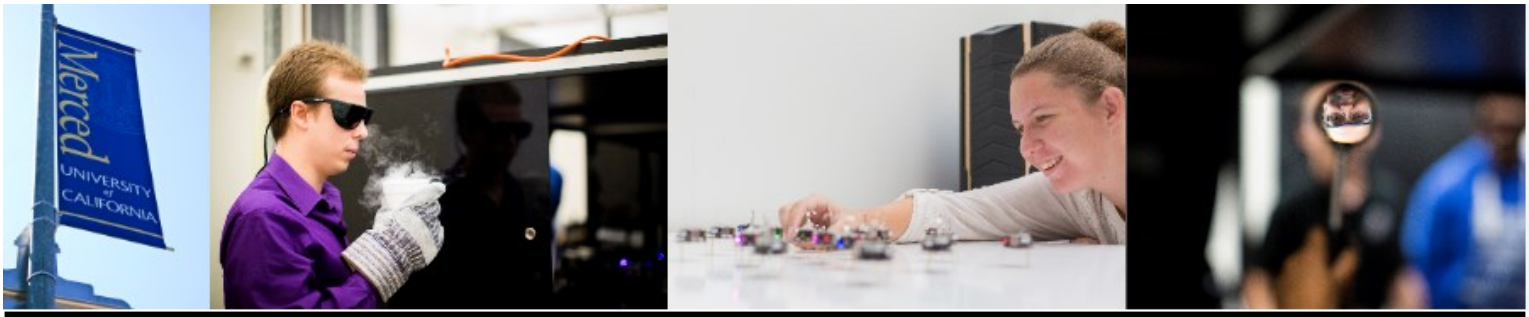

PHYSICS COLLOQIUM:

Force From Non-Equilibrium Fluctuations in QED and Active Matter

Date: **9/27/19** Time: **10:30 AM** Location: **COB2 140**	**Mehran Kardar** Department of Physics Massachusetts Institute of Technology	For more information, contact : **Daniel Beller** **dbeller@ucmerced.edu**

Abstract

The pressure of a gas, the van der Waals attraction between molecules, and the Casimir force in quantum electrodynamic (QED) are classical examples of forces resulting from equilibrium (thermal or quantum) fluctuations. Current research on “Active Matter” studies collective behaviors of large groups of self-driven entities (living or artificial), whose random motions superficially resemble thermally fluctuating particles. However, the absence of time reversal symmetry leads to unusual phenomena such as directed (ratchet) forces, and a pressure that depends on the shape and structure of the confining wall.

Some manifestations of QED fluctuations out of thermal equilibrium are well-known, as in the Stefan-Boltzmann laws of radiation pressure and heat transfer. These laws, however, acquire non-trivial twists in the near-field regime of sub-micron separations, and in the proximity of moving surfaces. I will discuss dissipation in moving steady states, and the non-Gaussian fluctuations of a particle in a quantum bath.