PHYSICS AND BIOENGINEERING COLLOQUIUM:
How Cells Cope with Stress and Handle COVID-19

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Date:
1/29/2021

Time:
10:30 AM-11:50 AM

Link:

Please contact snsgradstaff@ucmerced.edu for the Zoom link and passcode.

About The Speaker:

Alison's research interests include problems in cell motility and active living matter. Her research aims to identify how cells navigate and respond to the physical features of their environment (mechanical properties, presence of boundaries, and cell-cell contacts) to achieve important biological functions, such as cancer metastasis, wound healing, and biofilm formation. Her research program employs microfluidic technology, single-molecule experiments, knock-out cell models, and concepts from non-equilibrium statistical physics to investigate the dynamics of swimming bacteria and mammalian cell motility. Recent research contributions include identifying novel functions of vimentin intermediate filaments in securing the mechanical stability of the nucleus, as well as developing new models of active fluids flows generated by swimming bacterial suspensions, which was awarded the American Physical Society Statistical and Nonlinear Physics Dissertation Award.

Abstract:

Cell migration is a critical process underlying proper tissue maintenance. While a soft nucleus allows a cell to squeeze through small pores, the resulting physical stress can lead to nuclear damage and genomic variability. We have shown that the cytoskeletal intermediate filament protein vimentin protects against DNA damage during migration. We present a mechanical model in which vimentin modulates force transmission and nuclear deformability, which becomes especially evident under conditions of extreme, yet physiologically-relevant cellular deformations. Finally, new results will be presented on how vimentin is exploited by SARS-CoV-2 to invade host cells and perpetuate COVID-19.

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