



JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

SPRING 2021 CEAFM VIRTUAL SEMINAR

“Control and Modelling of Transport Phenomena using Surface Engineering”

Presented by Prof. Shervin Bagheri

KTH Royal Institute of Technology

Abstract: Engineered surfaces with texture, chemical contrasts, pores, and compliance may significantly modify transport processes. In this talk, I give a few examples of our work focusing on how complex surfaces and flowing fluids interact at different length scales. We demonstrate; (i) how very small changes in either surface texture or chemistry modify lubrication forces, resulting in non-trivial trajectories of particles traveling parallel to surfaces; ii) how liquid-infused surfaces modify turbulent friction drag, in particular, when capillary waves develop on trapped lubricant; iii) how to accurately model transport processes between free flows and porous/rough materials using effective boundary conditions, that is, without resolving every microscopic feature of the surface. These problems illustrate the potential of surface engineering for control of transport phenomena and our ability to efficiently model flows over complex surfaces.

Bio: Shervin Bagheri is a Professor at the Royal Institute of Technology, KTH in Stockholm. He is a Wallenberg Academy Fellow and one of the 20 recipients of the Future Research Leaders grant awarded by the Swedish Foundation for Strategic Research. His research group (www.bagherigroup.com) focus on understanding how flowing fluids and surfaces behave and interact across length scales, including modelling moving triple-phase moving contact lines, lubrication forces, transport in porous media and wall-bounded turbulent flows. His group uses mainly numerical simulations in combination with multiscale, data-driven and/or modal techniques for analyzing and controlling fluid-surface interaction.

SPECIAL TIME

Friday, April 9, 2021 at 12:00 PM (EDT)

<https://wse.zoom.us/j/93762992307>