TUAT Fluid Dynamics Seminar

Controlling Emulsion, Slippage, Splashing, and Viscous-Fingering

Lecturer: Prof. Dr. Peichun Amy Tsai

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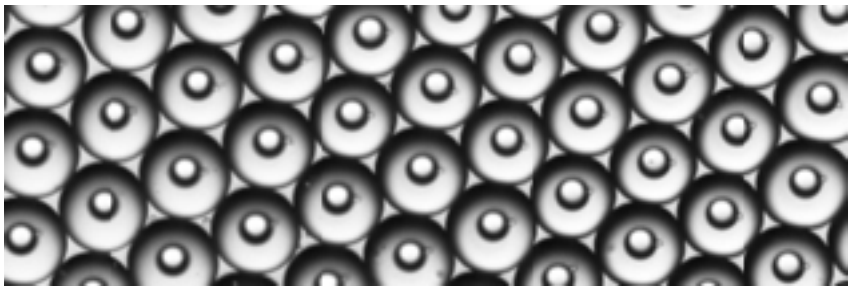
University of Alberta, Canada

Date: Wednesday, February 27th, 2019

Place: Building 6- Room 501

Time: 10:30 am - 11:30 am

Abstract



In this talk, I will demonstrate how to alter macroscopic flows via interfacial modifications at micro scales, highlighting associated energy, environmental, and technological applications. Several flow scenarios are scrutinized and presented, namely microfluidic flows, drop impact, and macroscopic fluid-fluid displacement. In microfluidic laminar flow, our pore-scale measurements reveal that the geometry of the liquid-gas interface strongly influences the hydrodynamic slippage, i.e., drag reduction, using hydrophobic micro-structures. In drop impact on a solid substrate, the impact outcomes can be tuned by varying the microstructures of the surface. In a large-scale flow configuration, a viscous-fingering in a Hele-Shaw cell–a convenient framework for modeling a homogeneous porous medium–can be controlled through a capillary effect. From these results, we learn that the interfacial conditions play an important role, thereby offering strategic controls of flow motion.

Biographical Sketch

Peichun Amy Tsai has received her Ph.D. degree from University of Toronto in Canada in 2007. She was a Post-doctoral Research Associate at Physics of Fluids Group in University of Twente (The Netherlands) with Prof. Detlef Lohse (2008-2010) and at Complex Fluids Group in Princeton University (USA) with Prof. Howard A. Stone (2010-2012). Dr. Tsai is currently Associate Professor (Research Chair in Fluids and Interface (Tier II)) in the Department of Mechanical Engineering at University of Alberta. Her research interest is in Applied Fluid Mechanics including nano/microfluidics, evaporation, electrokinetics, wetting, droplet impact dynamics, and proud media flow.