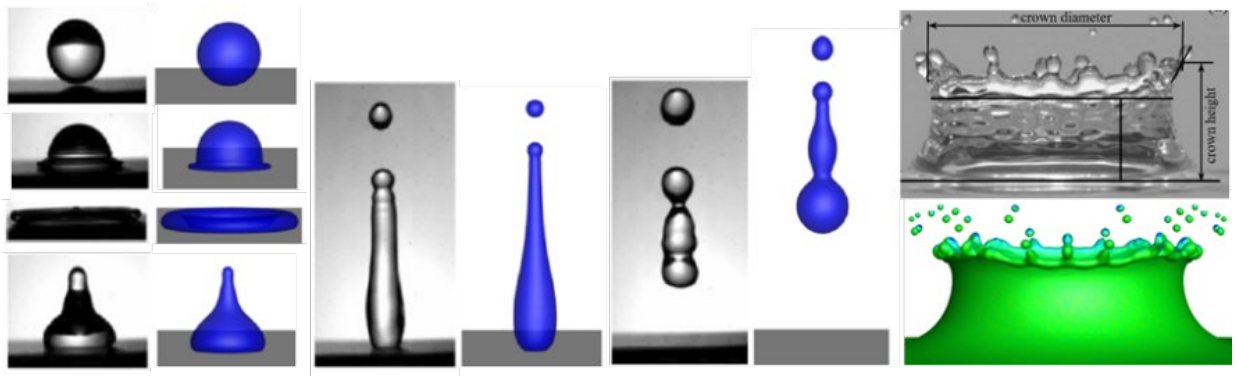
Large Droplet Impacts and Rebounds from Microwell Arrays

Yongsheng Lian

1PM, 12 April 2022
*Online **link here** via MS Teams*

The way droplets rebound from surfaces varies dramatically with the surface composition and structure. This range of behaviors is observed in nature and in everyday life, and the control of droplet rebounds is of immense significance to many commercial systems and



industrial processes. One such area where understanding and control of drop dynamics is crucial is in designing airplane surfaces that resist icing. Very large drops, known as supercooled large droplets (SLD), can freeze on contact with airplane wings. Sudden icing has caused several tragic crashes. In this talk we report on our recent computational studies on droplet impacts, which are directed at identifying surface structures that minimize icing through reducing droplet contact area and contact time. The numerical simulation uses a very sharp interface reconstruction method known as the moment-of-fluid method. The various surface conditions impacted include flat hydrophobic surfaces, textured dry and oil-filled surfaces, single microwells, and surfaces textured with dry and oil-filled microwells. The degree of surface or edge curvature is shown to greatly affect the rebound of droplets.

Yongsheng Lian, Professor of Mechanical Engineering, University of Louisville, holds the Ph.D in Aerospace Engineering from the University of Florida. After graduation he worked briefly at NASA Glenn Research Center and the University of Michigan. His research interests include computational fluid dynamics, fluid/structure interaction and multiphase flows. His work has been supported by NSF, NASA, AFOSR, General Electric and Cummins.

ERINC
ElectroOptics & Nanotechnology

*This seminar series is part of the **UofL Soft Matter Initiative** sponsored and organized by the ElectroOptics Research Institute and Nanotechnology Center* (**ERINC**).