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Two-Phase Interactions on Hydrophobic Surfaces

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ABSTRACT:

Superhydrophobic surfaces have gained attention for their potential in number of applications, including the creation of self-cleaning, drag-reducing, ice-inhibiting, and anti-microbial surfaces. The discovery of the coalescence-induced droplet jumping phenomenon created a resurgence of interest in condensation on superhydrophobic surfaces. Thermal and momentum transport during condensation on superhydrophobic surfaces will be discussed, including how the presence of a superhydrophobic boundary condition causes a departure from classical behavior in adiabatic two-phase flows. An approach for predicting condensation heat transfer rates during on hydrophobic surfaces in the absence of non-condensable gases will be presented. This approach offers a link between macro- and microscale heat transfer measurements.

BIOGRAPHY:

Dr. Kimberly Stevens is currently a Lillian Gilbreth Postdoctoral Fellow at in the Waldon School of Biomedical Engineering and the School of Mechanical Engineering at Purdue University. She received her Ph. D and M.S. degrees in Mechanical Engineering Department from Brigham Young University in 2018 and 2015, respectively. Her doctoral work explored the fundamentals of condensation on superhydrophobic surfaces, and her Master's degree focused on the fluid-structure interactions of human vocal folds. At Purdue she is working with clinicians, physicists, and engineers to apply engineering principles to build patient-specific cardiovascular models by fusing traditional computational fluid mechanics with various medical imaging technologies. Her research interests include fluid dynamics, multiphase heat and mass transfer, and cardiovascular biomechanics.