

MICRO/MACRO SCALE TWO-PHASE FLOW HEAT TRANSFER

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Venue: Faculty of Engineering Bldg. 2, Room 31A

ABSTRACT

Utilizing flow phase change requires fine manipulation of interfacial transport. Field synergy indicates the mechanism of single phase convective. Fundamental understanding during liquid-vapor flow phase change remains limited to date as it is generally challenging to characterize convective at the interface. At macro scale, development of novel enhanced surface tubes is an important way to advance two-phase flow heat transfer; to make correlations of in enhanced tubes with acceptable prediction has been a challenge for many years. At micro scale, the effects of gravitational, inertia, viscous, and surface-tension forces on flow boiling in micro channels are presented. A combination of the non-dimensional numbers and threshold values, $BoRe_l^{0.5} = 200$ and $Bo = 4$, are introduced as the new macro-to-micro scale transition criterion. The talk covers experimental study, modeling development, and numerical simulation for Micro/macro Scale Two-phase Flow Heat Transfer as presented in a Key Note in the 34th International Symposium on Transport Phenomena (ISTP-34) held in Taiwan in November in 2024.



Professor Wei Li
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BIOGRAPHY

Dr. Wei Li, professor and Fellow ASME has published 250+ journal papers as the corresponding author in prestigious journals such as five *ASME journals*, *Int. J. Heat Mass Tran.*, *Energy*. His research includes experimental, numerical, and theoretical studies. His group leverages state-of-the-art micro/nanofabrication and synthesis, unique measurement and simulation, and model prediction capabilities to perform in-depth studies and enable mechanistic insights into complex fluidic and thermal transport processes. His correlations on micro flow boiling have been adopted in "*ASHRAE Handbook - Fundamentals*" since 2012 and in "*Two-Phase Flow, Boiling and Condensation in Conventional and Miniature Systems*" published by the University of Cambridge Press in 2017. Dr. Li wrote the final chapter along with other five chapter writers (John R. Thome, Catherine Colin, Kenneth E. Goodson, Horst-Michael Prasser, and Anthony M. Jacobi) in the final volume of the "Encyclopedia of Two-phase Heat Transfer and Flow" (5000 pages, 16 volumes) published worldwide. He has served as Associate Editors for six SCI journals including four ASME journals. He is an AE for ASME *Journal of Electronic Packaging* and *Open Journal of Engineering*.

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