Wenge Huang

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EDUCATION

Virginia Tech, Blacksburg, USA   January 2020 – January 2025 (expected)
Ph.D. student (4th year) in Mechanical Engineering

Xi'an JiaoTong University, Xi'an, China   August 2015 – June 2019
B.E. in Energy and Power Engineering

COMPLETED GRADUATE COURSEWORK AT VIRGINIA TECH

1. Interfacial Fluid Mechanics, 2. Fluid Dynamics, 3. Math Fluid Dynamics, 4. Advanced Topics in Thermodynamics, 5. Near Surface Sensing, 6. Modeling MEMS and NEMS
7. Statistical Mechanics, 8. Applied Partial Differential Equations, 9. Finite Element Method.

RESEARCH EXPERIENCES

Research Assistant & **Teaching Assistant**   January 2020 – now
Virginia Tech, Blacksburg, VA   Advisor: Dr. Jiangtao Cheng

Project: Sessile Droplet Jumping Behaviors on Hot Substrates: From Vibration to Explosion

➢ Discovered a large-scale mode of vapor bubble growth on superheating engineered substrates that was controlled by inertia.

➢ Observed and analyzed the self-vibration phenomenon of droplets on hot micro-structured surfaces.

➢ Built comprehensive numerical models to describe the expansion of vapor bubbles and the vibration of droplets.

➢ Investigated the capillary wave generation mechanism on boiling droplets and established a correlation between the capillary wave's amplitude and wavelength, and the height of the substrate's micropillars.

➢ Constructed an equivalent mass-spring system to quantitively explain the droplet vibration phenomenon.

Project: Liquid Droplet Evaporation on Hot Microstructured Superhydrophobic Surfaces

➢ Developed a comprehensive thermal analysis model to differentiate the evaporation heat transfer rate from droplet cap surface and base surface

➢ Calculated the temperature difference between the droplet base and the substrate surface and predicted the evaporation ratio for droplet evaporation in constant contact angle mode and constant contact radius mode.

PUBLICATIONS

1. **Wenge Huang,** Jiangfeng Wang, Jiaxi Xia, Pan Zhao, and Yiping Dai. Performance Analysis and Optimization of a Combined Cooling and Power System Using Low Boiling Point Working Fluid Driven by Engine Waste Heat. *Energy Conversion and Management* 180: 962-976, 2019. (Impact factor: 9.709)

2. **Wenge Huang**, Jiangfeng Wang, Zhijian Lu, and Sheng Wang. Exergoeconomic and Exergoenvironmental Analysis of a Combined Heating and Power System Driven by Geothermal Source. *Energy Conversion and Management* 211: 112765, 2020. (Impact factor: 9.709)

3. **Wenge Huang**, Xukun He, and Jiangtao Cheng. Thermal Circuit Analysis of Droplet Evaporation on Hot Micro-Structured Superhydrophobic Surfaces. *ASME International Mechanical Engineering Congress and Exposition*, 2021 Online.

4. **Wenge Huang**, Xukun He, Cong Liu, Xiaojie Li, Yahua Liu, C Patrick Collier, Bernadeta R Srijanto, Jianhsheng Liu, and Jiangtao Cheng. Droplet Evaporation on Hot Micro-Structured Superhydrophobic Surfaces: Analysis of Evaporation from Droplet Cap and Base Surfaces. *International Journal of Heat and Mass Transfer* 185: 122314, 2022. (Impact factor 5.584)

5. **Wenge Huang**, Xukun He, C.Patrick Collier, Zheng Zheng, Jiansheng Liu, Jiangtao Cheng. Manipulating droplet jumping behaviors on hot substrates with surface topography by controlling vapor bubble growth: from vibration to explosion. https://arxiv.org/abs/2212.07334

6. **Wenge Huang**, Jiangtao Cheng. Capillary Wave Generation on The Surface of Boiling Water Droplet. *International Mechanical Engineering Congress and Exposition*, October 30-November 3, 2022, Columbus, Ohio.

PRESENTATIONS

1. **Wenge Huang**, Xukun He, and Jiangtao Cheng. Thermal circuit analysis of droplet evaporation on hot microstructured superhydrophobic surfaces, *ASME Summer Heat Transfer Conference* (SHTC2021), June 16-18, 2021.

2. Weifeng Cheng, Xukun He, **Wenge Huang**, and Jiangtao Cheng. Partial Leidenfrost evaporation assisted fast enrichment of trace analytes in water microdroplet on nano-plasmonic surfaces, *NSF workshop: New Frontiers of Thermal Transport*, December 14-16, 2020.

HONORS

➢ Macromolecules Innovation Institute Fellowship, Virginia Tech   2021-2022
➢ Excellent Student Award in Xi'an JiaoTong University, China   2016, 2017, 2018, 2019

SKILLS

➢ Programming Languages: C, Fortran, Python.
➢ Opensource software: Basilisk-CFD solver
➢ Business software: Mathematica, MATLAB, LAMMPS, AutoCAD, ANSYS, COMSOL
➢ MEMS fabrication in a cleanroom: photolithography, PVD, PECVD, e-beam evaporator, mask aligner, DRIE