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EDUCATION

- Ph.D.** Mechanical Science & Engineering Aug. 2021 - present
University of Illinois at Urbana-Champaign, Urbana, IL
Dissertation (tentative): Flow boiling and pool boiling heat transfer enhancement as well as the scalable tube-fin joining techniques.
Advisor: Prof. Nenad Miljkovic
- M.E.** Power Engineering Sep. 2018 – Jun. 2021
Zhejiang University, Hangzhou, Zhejiang, China
Dissertation (tentative): Experimental study of pool boiling heat transfer during quenching of modified superhydrophilic metallic surfaces in water
Advisor: Prof. Li-Wu Fan
- B.E.** Energy and Environment System Engineering Sep. 2014 – Jun. 2018
Zhejiang University, Hangzhou, Zhejiang, China

RESEARCH EXPERIENCE

Graduate Research Assistant, Mechanical Science & Engineering, University of Illinois at Urbana-Champaign Sep. 2021 – present

Elimination of tube expansion through scalable tube-fin joining techniques

- Applied electrochemical methods for tube-fin joining in heat exchangers instead of traditional tube expansion methods and brazing methods.

Experimental study of transient flow boiling during pipe chilldown

- Designed and constructed a new terrestrial setup for understanding the mechanisms of transient flow boiling heat transfer during the chilldown process in horizontal tubes.
- Designed a new test module and experimental concept for transient flow boiling experiments that will be conducted on International Space Station.

Graduate Research Assistant, Institute of Thermal Science and Power Systems, Zhejiang University Jul 2018 – Jun. 2021

Study of mechanisms of pool boiling heat transfer on microporous superhydrophilic surfaces during quenching

- Revealed different mechanisms that affect critical heat flux by wickability on microporous superhydrophilic wicking surfaces during regular boiling and quenching boiling.
- Fabricated microporous superhydrophilic wicking surfaces with various wickabilities using the nanoparticle coating method and electrochemical deposition method.
- Analyzed the synergistic contribution of surface roughness and wickability to critical heat flux on wicking surfaces during quenching boiling.
- Explored the mechanism of transition boiling heat transfer on a superhydrophilic surface by in situ characterization on the solid-liquid contact via electrochemical impedance technique.
- Investigated the effect of dilute aqueous saline solutions at various concentrations and ions compositions on pool boiling heat transfer enhancement of superhydrophilic surfaces during consecutive quenching.
- Designed and constructed a new setup for investigating pool boiling heat transfer by heating up surfaces.

PUBLICATIONS

Peer-Reviewed Journal Papers

- J1. **Jia-Yi Zhang**, Li-Wu Fan, Jia-Qi Li, Zi-Tao Yu, [Surface-roughness-boosted critical heat flux enhancement during quenching boiling on wicking surfaces](#), *International Journal of Heat and Mass Transfer*, **162**, 120364 (2020).
- J2. **Jia-Yi Zhang**, Li-Wu Fan, Jia-Qi Li, Le-Yi Jiang, Zi-Tao Yu, [Mechanisms for enhanced transition boiling during quenching on a superhydrophilic surface as revealed by in situ characterization on the solid-liquid contact using](#)

- [electrochemical impedance technique](#), *International Journal of Heat and Mass Transfer*, **148**, 119030 (2020).
- J3. **Jia-Yi Zhang**, Jia-Qi Li, Le-Yi Jiang, Li-Wu Fan, Zi-Tao Yu, [Pool boiling heat transfer during quenching on a superhydrophilic surface in dilute aqueous saline solutions: Effects of the solution concentration and type of salts](#), *International Journal of Heat and Mass Transfer*, **138**, 1117-1127 (2019).
- J4. Qiu-Yan Yang, Yan-Qiu Jiang, Dong-Yu Fan, Kan Zheng, **Jia-Yi Zhang**, Zhen Xu, Wei-Quan Yao, Qing-Xu Zhang, Yi-Hu Song, Qiang Zheng, Li-Wu Fan, Wei-Wei Gao, Chao Gao, [Nonsphere drop impact assembly of graphene oxide liquid crystals](#), *ACS Nano*, **13(7)**, 8382-8391 (2019).
- J5. Jia-Qi Li, **Jia-Yi Zhang**, Lin-Wei Mou, Yu-Hong Zhang, Li-Wu Fan, [Enhanced transitional heat flux by wicking during transition boiling on microporous hydrophilic and superhydrophilic surfaces](#), *International Journal of Heat and Mass Transfer*, **141**, 835-844 (2019).
- J6. Tian-Yu Zhang, Lin-Wei Mou, **Jia-Yi Zhang**, Li-Wu Fan, Jia-Qi Li, [A visualized study of enhanced steam condensation heat transfer on a honeycomb-like microporous superhydrophobic surface in the presence of a non-condensable gas](#), *International Journal of Heat and Mass Transfer*, **150**, 119352 (2020).
- J7. Lin-Wei Mou, Tian-Yu Zhang, **Jia-Yi Zhang**, Jia-Qi Li, Li-Wu Fan, [Realization of coalescence-induced condensate droplet jumping on a hierarchical porous superhydrophobic surface over a wide range of subcooling up to 20 K](#), *AIP Advances*, **9**, 045125 (2019).
- J8. Jia-Qi Li, Lin-Wei Mou, **Jia-Yi Zhang**, Yu-Hong Zhang, Li-Wu Fan, [Enhanced pool boiling heat transfer during quenching on superhydrophilic porous surfaces: Effects of the surface wickability](#), *International Journal of Heat and Mass Transfer*, **125**, 494-505 (2018).

Refereed Conference Papers

- C1. **Jia-Yi Zhang**, Jia-Qi Li, Li-Wu Fan, [Enhanced pool boiling heat transfer during quenching on micro/nanostructured wicking surface: Effects of submicron-scale substructures](#), Paper No. HT2020-8929, *Proceedings of the ASME 2020 Heat Transfer Summer Conference*, July 13-15, 2020, Virtual, Online.

Patents filed in China

- P1. Li-Wu Fan, **Jia-Yi Zhang**, Jia-Qi Li, Yu-Hong Zhang, Le-Yi Jiang, Meng-Li Jin, [The experimental system and method of characterization on the solid-liquid contact using electrochemical impedance technique during quenching](#), application number 201910080458.5, 2019 (issued).

AWARDS AND HONORS

- **National Scholarship (top 5%)**, Zhejiang University, 2020
- **Graduate of Merit/Triple A Graduate**, Zhejiang University, 2019, 2020
- **Award of Honor for Graduate**, Zhejiang University, 2019, 2020
- **Zhejiang Province Government Scholarship**, Zhejiang Province, 2016, 2017
- **Scholarship for Outstanding Students**, Zhejiang University, 2015, 2016, 2017
- **Scholarship for Outstanding Merits**, Zhejiang University, 2015, 2016, 2017.