

# Hongliang Qian

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105 S Mathews Avenue, Urbana, IL

## SUMMARY

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- 5-year experience in design, simulation, analysis, and test of thermal systems with several publications
- Very familiar with thermal simulation using ABAQUS, Fluent, Icepak
- Abundant skills in mechanical design with SOLIDWORKS, AutoCAD

## EDUCATION

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- Ph.D. in Mechanical Engineering, University of Illinois at Urbana-Champaign** 12/2017 - 05/2021
- GPA 3.97/4.0
  - Central Illinois-ASHRAE scholarship, David Hinde Memorial Award
- M.S. in Mechanical Engineering, University of Illinois at Urbana-Champaign** 08/2015 - 12/2017
- GPA 3.97/4.0
- B.S. in Thermal Engineering, Zhejiang University** 09/2012 - 07/2015
- GPA 3.92/4.0, Ranking 4/155
  - National Scholarship from Ministry of Education of China
  - Zhejiang Outstanding Graduates (The highest honor for graduates in Zhejiang)
  - Zhejiang Electrical Power Corporation engineering intern

## PROFESSIONAL EXPERIENCE

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- Thermal Engineer Intern** 05/2020 - 08/2020  
**Tesla, Palo Alto, CA**
- Test design, hands-on experiments, and modeling of refrigerant charge and pressure drop in the automobile HVAC system
- Created test matrix and planned experiments based on practical conditions
  - Conducted hands-on experiments and implemented data analysis with Python and MATLAB
  - Developed comprehensive refrigerant charge models for different heat exchangers under both AC and HP modes with Python
  - The proposed models facilitate the design procedure of optimizing component size in the system
  - Final intern presentation was reported to a 10-people team
- Research Assistant with a focus on Capacitive Sensors Applied in Thermal Systems** 01/2016 - Present  
**Air Conditioning and Refrigeration Center, University of Illinois, Urbana, IL**
- Developed and calibrated capacitive sensors to measure void fraction and characterize flow regimes with refrigerant in smooth tubes and headers of microchannel heat exchangers
- Managed 2 industrial sponsored research projects, monthly reported to 50+ engineers from 20+ companies in the automotive/refrigeration/home appliance industry
  - Designed test section and capacitive sensor with AutoCAD and SOLIDWORKS
  - Conducted FEM simulation of the magneto-static field within the capacitive sensor
  - Performed CFD simulation of pressure drop of single-phase flow in the test section with Ansys Fluent
  - Conducted hands-on experiments, including thermal system operation, fluid machinery control optimization, flow visualization with a high-speed camera, and image processing
  - Developed test bench and building, including component selection, piping, wiring, power control, sensor instrumentation, and data acquisition
- Independent study with a focus on Condensed Droplets Size Distribution on Surfaces** 10/2015 - 01/2016  
**University of Illinois, Urbana, IL**
- Experiments on the distribution of droplets condensed on lubricant-infused (super-hydrophobic) surfaces
- Conducted hands-on experiments, including test bench operation, visualization with a DSLR camera, and data acquisition
  - Processed and analyzed Image/video with MATLAB
- Independent study with a focus on Heat Transfer and Pressure Drop in Coolers** 06/2014 - 07/2015  
**Institute of Thermal Science & Power System, Zhejiang University, Zhejiang, China**

Experiments on heat transfer and pressure drop in vertically arranged sinter coolers

- Conducted CFD simulations of heat transfer and pressure drop in the test sections with Ansys Fluent
- Performed 3D scanning of real-world porous media and data analysis
- Conducted hands-on experiments, including thermal system operation, fluid machinery control optimization, and data acquisition

## PUBLICATIONS and ACADEMIC ACHIEVEMENTS

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### Journal Articles

- **Qian, H.**, & Hrnjak, P. “*Void Fraction in Vertical Intermediate and Inlet Headers of Microchannel Heat Exchangers: Experiments and Models*”, in submission
- **Qian, H.**, & Hrnjak, P. “*Design and Calibration of Capacitive Sensors for Measuring Void Fraction in Vertical Headers of Microchannel Heat Exchangers*”, in submission
- **Qian, H.**, & Hrnjak, P. “*Characterization of R134a two-phase flow regimes in horizontal and vertical smooth tubes with a capacitive sensor*”, International Journal of Refrigeration (2021). doi.org/10.1016/j.ijrefrig.2021.01.015
- **Qian, H.**, & Hrnjak, P. “*Mass measurement based calibration of a capacitive sensor to measure void fraction for R134a in smooth tubes*”, International Journal of Refrigeration (2020). doi.org/10.1016/j.ijrefrig.2019.10.019
- **Qian, H.**, & Hrnjak, P. “*Void fraction measurement and flow regimes visualization of R134a in horizontal and vertical ID 7 mm circular tubes*”, International Journal of Refrigeration (2019). doi.org/10.1016/j.ijrefrig.2019.04.018
- Weisensee, P. B., Wang, Y., **Qian, H.**, Schultz, D., King, W. P., & Miljkovic, N. “*Condensate Droplet Size Distribution on Lubricant-Infused Surfaces*”. International Journal of Heat and Mass Transfer (2017), 109, 187-199. doi.org/10.1016/j.ijheatmasstransfer.2017.01.119
- Tian, F.-Y., Huang, L.-F., Fan, L.-W., **Qian, H.-L.**, & Yu, Z.-T. “*Wall effects on the pressure drop in packed beds of irregularly shaped sintered ore particles*”. Powder Technology (2016), 301, 1284-1293. doi.org/10.1016/j.powtec.2016.07.073
- Tian, F.-y., Huang, L.-f., Fan, L.-w., **Qian, H.-l.**, Gu, J.-x., Yu, Z.-t., Cen, K.-f. “*Pressure drop in a packed bed with sintered ore particles as applied to sinter coolers with a novel vertically arranged design for waste heat recovery*”. Journal of Zhejiang University-SCIENCE A, 17(2), 89-100. doi.org/10.1631/jzus.A1500088

### Conference Proceedings

- **Qian, H.**, & Hrnjak, P. “*Flow patterns and pressure drop of vertical upward flows in a tube with header-like protrusions with R134a*”. The 25<sup>th</sup> IIR International Congress of Refrigeration (2019). Paper 844.
- **Qian, H.**, & Hrnjak, P. “*Signal analysis and mass measurement based calibration of capacitive sensors for void fraction and flow regimes in horizontal and vertical round tubes using R134a*”. The 25<sup>th</sup> IIR International Congress of Refrigeration (2019). Paper 839.
- **Qian, H.**, & Hrnjak, P. “*Void Fraction and Flow Regimes of R134a in Horizontal and Vertical Round Tubes in Developed Adiabatic Conditions*”. The 17<sup>th</sup> International Refrigeration and Air Conditioning Conference (2018). Paper 2222.
- **Qian, H.**, & Hrnjak, P. “*Void Fraction and Flow Regimes Determined by Visualization, Mass Measurement, and New Capacitance Sensor*”. The 17<sup>th</sup> International Refrigeration and Air Conditioning Conference (2018). Paper 2223.

### Paper Review

- Has been invited to review paper from International Journal of Refrigeration

## SKILLS

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- CAD: AutoCAD, Solidworks, PTC Creo
- Simulation & Computation: Matlab, EES, Abaqus, FEMM, Fluent, ANSYS Icepak
- Program: Python, C, Linux bash
- Other: Microsoft office, Origin

## AFFILIATION

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- American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) From 2016