# Jingwei Zhu

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## Summary

1. Actively seeking a full time position starting from the Spring/Summer of 2019
2. 5+ years' hands-on experience in thermal system instrumentation, design of experiment and data acquisition/processing
3. 4+ years' experience in CFD: Commercial (Fluent, CFX, and Icepak) and in-house (MATLAB)
4. Deep understanding of thermodynamics, heat transfer and fluid mechanics with 12 relevant publications

## Education

**2013.8--2019.5 Ph.D. Mechanical Engineering University of Illinois at Urbana-Champaign, IL GPA: 3.94/4.0**

- Courses Included: Numerical Thermo-Fluid Mechanics, Computational Multi-Phase Flow, Convective Heat Transfer, Intermediate Thermodynamics, Intermediate Gas Dynamics, Refrigeration and Cryogenics, Control System Theory & Design, Advanced Motion Control
- Recipient, Illinois Chapter ASHRAE Scholarship Award; Graduate College Travel Award

**2009.9--2013.6 B.S. Mechanical Engineering Shanghai Jiao Tong University, China GPA: 3.76/4.3**

- Recipient, Academic Excellence Scholarship of Shanghai Jiao Tong University; Undergraduate Research Internship Awards

## Working Experience

**2013.8--pres. Graduate Research Assistant, Air Conditioning and Refrigeration Center, UIUC**

- Facility construction: Built test facility for HVAC system and component testing, including piping, wiring, instrumentations (temperature, pressure, and mass flow rate) and data acquisition
- 3D modeling and rapid prototyping: Designed and built a transparent nozzle (for tests using R134a as the working fluid) with pressure measurement channels using SolidWorks and rapid prototyping machines
- Simulation: Performed 3D CFD simulation (CFX, Fluent) for initially subcooled vortex flashing flow in nozzles with user-defined bubble nucleation and growth models
- Experiment: Proposed a novel two-phase flow control mechanism: vortex control; characterized the influence of inlet vortex on the nozzle restrictiveness on flashing refrigerant flow; measured the pressure profile in vortex nozzles; investigated the oil circulation rates in ejector cooling cycles; optimized the performance of a transcritical R744 ejector cooling cycle under various operating conditions with vortex control
- Control algorithm: Implemented reinforcement learning on air source heat pump defrost control

**2016.5--2016.8 Advanced Technology Intern, Daikin/Goodman Manufacturing, Houston, TX**

- Design Failure Mode and Effect Analysis (DFMEA) of residential microchannel heat exchanger
  - Major investigated failure modes: leakage; frosting; inefficient defrost; charge sensitivity
- Compiled design and manufacturing guideline for residential microchannel heat exchanger
  - Key issues: microchannel tube and fin design to achieve optimal heat transfer, pressure drop and water drainage performance; microchannel heat exchanger brazing
- Transient air conditioning system modeling using Simulink; microchannel & round tube heat exchanger and air conditioning system simulation with CoilDesigner and VapCyc

## Core Technical Skills

- Computer Skills: Python, LabVIEW, MATLAB, EES, R, LATEX, Excel, PowerPoint, Visio
- Software: SolidWorks, Unigraphics, ANSYS softwares (Fluent, CFX, ICEM, Icepak)
- Certified LabVIEW Associate Developer

## Leadership

- ASHRAE Student Branch at UIUC
  Secretary/Vice President/President March 2014-Aug. 2017
- Graduate Research Mentor (Undergraduate Research Apprenticeship Program) Sept. 2016-May 2017

## Journal Publications

1. Zhu, J., Botticella, F., Elbel, S., 2018, Experimental investigation and theoretical analysis of oil circulation rates in ejector cooling cycles, Energy 157: 718-733.

2. Zhu, J., Elbel, S., 2018, Experimental investigation of a novel expansion device control mechanism: Vortex control of initially subcooled flashing R134a flow expanded through convergent-divergent nozzles, International Journal of Refrigeration 85: 167-183.

3. Zhu, J., Elbel, S., 2017, Influence of nozzle divergent part length and throat diameter on vortex control of initially subcooled flashing flow, SAE Int. J. Passeng. Cars - Mech. Syst. 10(1): 121-127.

4. Zhu, J., Elbel, S., 2016, A new control mechanism for two-phase ejector in vapor compression cycles for automotive applications using adjustable motive nozzle inlet swirl, SAE Int. J. Passeng. Cars - Mech. Syst. 9(1): 44-51.

## Conference Publications

1. Zhu, J., Elbel, S., 2018, Measurement of pressure profile of vortex flashing flows in convergent-divergent nozzles, International Refrigeration and Air Conditioning Conference, Paper 2414.

2. Zhu, J., Elbel, S., 2018, CFD simulation of vortex flashing flows in convergent-divergent nozzles, International Refrigeration and Air Conditioning Conference, Paper 2147.

3. Zhu, J., Botticella, F., Elbel, S., 2018, Oil circulation rate in ejector cooling cycles, SAE Technical Paper 2018-01-0077.

4. Zhu, J., Elbel, S., 2018, Application of vortex control to an automotive transcritical R744 ejector cycle, SAE Technical Paper 2018-01-0060.

5. Zhu, J., Elbel, S., 2018, Implementation of reinforcement learning on air source heat pump defrost control for full electric vehicles, SAE Technical Paper 2018-01-1193.

6. Zhu, J., Elbel, S., 2016, A new control mechanism for two-phase ejector in vapor compression cycles using adjustable motive nozzle inlet vortex, International Refrigeration and Air Conditioning Conference, Paper 1594.

7. Zhu, J., Elbel, S., 2016, Modeling of initially subcooled flashing vortex flow in the nozzle for possible applications in the control of ejector cooling cycles, International Refrigeration and Air Conditioning Conference, Paper 1720.

8. Zhu, J., Elbel, S., 2016, Vortex tube heat booster to improve performance of heat driven cooling cycles for automotive applications, SAE Technical Paper 2016-01-0245.