# Hanwei Zhou

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## EDUCATION

**Purdue University**                                                                                                   West Lafayette, Indiana
- ❖ ***Doctor of Philosophy in field of Mechanical Engineering*** (In progress)                  Aug. 2019 - Present

**Carnegie Mellon University**                                                                                   Pittsburgh, Pennsylvania
- ❖ ***Master of Science in field of Mechanical Engineering***   GPA: 3.86/4.00         Aug. 2017 - May. 2019
- ❖ Coursework Selected:
  Fuel Cell Systems, Electrochemical Energy Storage Systems, Energy Transport and Conversion at Nanoscale,
  Fluid Dynamics, Molecular Simulation of Materials, Engineering Optimization
- ❖ Master's Degree Thesis:
  *In-operando* Imaging of Copper Dendrites Growth based on Planar Micro-cell
  Using Ultra-high Resolution X-ray Computed Tomography

**Zhejiang University**                                                                                                        Hangzhou, China
- ❖ ***Bachelor of Engineering in Energy & Environment Systems Engineering***   GPA: 3.70/4.00         Sep. 2013 - Jun. 2017
- ❖ Core Coursework Selected:
  Heat Transfer, Thermodynamics, Fluid Mechanics, Electrical & Electronic Engineering, Numerical Analysis
- ❖ Bachelor's Degree Thesis:
  Study on a Stirling/Pulse Tube Hybrid Cryocooler

## ACDEMIC PROJECTS

***In-operando* Imaging of Copper Dendrites Growth based on Planar Micro-cell**

**Using Ultra-high Resolution X-ray Computed Tomography**   Supervisor: Prof. *Shawn Litster*         Sep. 2017 - May. 2019

Carnegie Mellon University, *Laboratory for Transport Phenomena in Energy Systems*         Pittsburgh, Pennsylvania
- ➢ Fabricate a unique copper planar micro-cell for in-operando imaging.
- ➢ Investigate a wide range of separator materials and cell configurations.
- ➢ The transient process of the dendrite passage through the separators is visualized.
- ➢ Analyze in light of the separators mechanical properties and transport characteristics.

**Prediction of Thermal Conductivity Using MD Simulation Based on Green-Kubo Formation**         Sep. 2018 - Dec. 2018

Carnegie Mellon University, *Course Project*                     Supervisor: Prof. *Alan McGaughey*         Pittsburgh, Pennsylvania
- ➢ A molecular dynamics C++ code is compiled to model 256-atom liquid argon system.
- ➢ Cut-off radius, nearest images and periodic boundary conditions are implemented.
- ➢ Both *NVE Ensemble* and *NVT Ensemble* are simulated with Velocity Verlet Scheme and Nose-Hoover thermostat.
- ➢ Thermal conductivity of system is computed using Green-Kubo method under various temperature.

**Algorithm of Handwriting-recognition System Based on Neural Network**         Feb. 2018 - May. 2018

Carnegie Mellon University, *Course Project*                     Supervisor: Prof. *Jeremy Michalek*         Pittsburgh, Pennsylvania
- ➢ Define loss functions to measure effectiveness and precision of handwriting-recognition systems.
- ➢ Several optimization algorithms and routines are manipulated via Matlab to minimize loss functions.
- ➢ Stochastic Gradient Descent, Steepest Descent, BFGS method and Genetic Algorithm are realized.
- ➢ Merits and defects are interpreted in terms of each unique algorithm.

**Advanced Simulation towards Precise SOC & SOH Estimation of Commercial Li-ion Battery**         Sep. 2017 - Dec. 2017

Carnegie Mellon University, *Course Project*                     Supervisor: Prof. *Venkat Viswanathan*         Pittsburgh, Pennsylvania
- ➢ Simulate SOC status and SOH degradation of Panasonic NCR18650F Li-ion battery using AutoLion$^{ST}$.
- ➢ Analyze on various CC rates, cycle numbers, temperature, transference numbers and SEI layer growth rates.

- ➢ Create a mathematical model using non-linear regression to fit the data and predict battery life.
- ➢ New model possesses computational simplicity and maintains adaptability along with accuracy.

**Study on a Stirling/Pulse Tube Hybrid Cryocooler**    Supervisor: Prof. *Zhihua Gan*    Oct. 2016 - Jun. 2017

Zhejiang University, *Institute of Refrigeration and Cryogenics*    Hangzhou, China
- ➢ Harmonize discrepancy of phase angles between mass flow rate and dynamic pressure from Stirling stage.
- ➢ Maximize secondary refrigeration capacity in Pulse Tube stage based on thermo-acoustic theory.

## ACDEMIC PRESENTATIONS

**ASME International Mechanical Engineering Congress and Exposition (IMECE) 2018**    Pittsburgh, Pennsylvania

*Poster Presentation*    Nov. 2018

**CMU 4th Electrochemical Energy Symposium 2018**    Pittsburgh, Pennsylvania

*Poster Presentation*    Nov. 2018

Title: *In-operando* Imaging of Copper Dendrites Growth based on Planar Micro-cell

  Using Ultra-high Resolution X-ray Computed Tomography.    **IMECE2018-89462 (Abstract Accepted)**

Author: **Hanwei Zhou**, Tianwen Chen, Paul Choi, Bharathy Parimalam, Yubai Li and Shawn Litster[*].

## PUBLICATIONS

- ➢ Choi, P., Braaten, J., Li, Y., Chen, T., **Zhou, H.**, & Litster, S. (2018). Ultra-high Resolution In-operando X-ray Microscopy of Fuel cells and Batteries. *Microscopy and Microanalysis, 24*(S2), 420-423. doi:10.1017/S1431927618014368

## PROFESSIONAL EXPERIENCES

**CMU Graduate Course - 24642 Fuel Cell Systems in Mechanical Engineering**    Pittsburgh, Pennsylvania

*Course Assistant*    Jan. 2019 - May 2019
- ➢ Prepare and grade assignments, hold weekly office hour and recitations, administer mid-term and final examination.

**China Aviation Lithium Battery Co., Ltd**    Luoyang, China

Division of International Business & Department of Research and Innovation, *Intern*    Jun. 2018 - Aug. 2018
- ➢ Study and participate in manufacturing commercial Li-ion batteries at Industrial Plant.
- ➢ Study and participate in fabricating secondary Li-metal coin cells at Research Center
  and implementing experiments of electrochemical characterizations regarding battery life as well as performances.
- ➢ Participate in collaboration and negotiation conference with Daimler AG, German in terms of prospects of electric vehicles.

## SKILLS

**Lab Skills // Programming & Typesetting Language**
- ➢ SP-50 & VSP Potentiostat, EC-Lab Software, Glovebox (Learning), Electrochemical Characterizations //
- ➢ C, C++, Matlab, Python, LaTeX

**Application Software**
- ➢ Matlab, COMSOL Multiphysics, ANSYS Fluent, ANSYS ICEM CFD, AutoLion[ST], LabVIEW, AutoCAD, SolidWorks

## HONORS & LEADERSHIP

**Undergraduates Scholarship for Excellence in Research and Innovation**    2015 - 2016

**Undergraduates Scholarship for Cultural and Sports Activities**, *twice*    2013 - 2014 / 2014 - 2015

**University First Prize**, Undergraduates Competition of Energy Conservation & Emission Reduction    Jun. 2016

**Project Leader**, Undergraduates Research Training Program    Oct. 2015 - Jun. 2016

**Deputy Leader & Concertmaster**, Wenqin Symphony Orchestra of Zhejiang University    Sep. 2013 - Jun. 2017

**National First Prize**, *twice*

Division of Instruments, China National Art Exhibition & Competition of College Students    2014 - 2015 / 2015 - 2016