Bichen Shang

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Education

Southeast University (SEU), School of Energy and Environment, Nanjing, China   09/2019 - 06/2022
MEng: Power Engineering and Engineering Thermophysics   **Thesis Score: 88%**

China University of Mining and Technology (CUMT), Xuzhou, China   09/2015 - 06/2019
BEng: Energy and Power Engineering   **GPA: 87% (Top 10%)**

Relevant Skills

CFD Technique: LBM, ANYSY (Fluent, CFD-Post), Tecplot, SolidWorks, Gambit, AutoCAD.
Experimental Skills: 3D printing, basic PIV method, nanofluid preparation.
Languages and Tools: Golang, C++, Python, Linux, basic Machine Learning (SVM).

Research Experiences

Project 1: Lattice Boltzmann Simulation for Phase Change Material (PCM)   03/2023 – 05/2024
Supervisor: Assoc. Prof. Yutao Huo,   School of Low-Carbon Energy and Power Engineering, CUMT.
Research Outcome: One SCI publication [1] in "*Journal of Energy Storage*" and one manuscript [2] publication in "*Journal of the Taiwan Institute of Chemical Engineers*" and one manuscript [3] publication in "*International Communications in Heat and Mass Transfer*".

❖ **Part One: Study on Circulation Characteristics**
➢ Applied **Lattice Boltzmann Method (LBM)** to explore **convective circulation characteristics** of PCM during melting process.
➢ Analyzed the **formation and variation of the eddies** under various input energy intensity and distribution.
❖ **Part Two: Enhanced Heat Transfer with Nanoparticles**
➢ Improved heat transfer performance of PCM through **strategic arrangement of Al_2O_3 nanoparticles**.

Project 2: Numerical Simulation and NOx Prediction of Coal-fired Unit   09/2020 - 06/2022
Supervisor: Prof. Lingling Zhao, National Engineering Research Center of Turbo-Generator Vibration, SEU.
Research Outcome: Grade 88, with **one SCI publication** [5] in "*Energies*" and **two granted patents** [10].

❖ **Part One: Batch Simulation of a Coal-fired Boiler**
➢ Constructed a full-scale 3D **physical model of the boiler**. Applied Ansys Fluent to simulate the **two-phase flow, coal combustion and NOx formation processes** in the furnace.
➢ Systematically analyzed NOx formation characteristics under various air rate and air temperature across different boiler loads.
❖ **Part Two: Novel NOx Prediction Method**
➢ Introduced a sectional **zoning strategy** for denitrification facility's inlet cross-section based on CFD results.
➢ Proposed zoning-based **NOx predictive method** utilizing **GA-SVM algorithm**.

Project 3: Experimental Study on Nanofluids Cooling for Battery   06/2018 - 06/2019
Supervisor: Assoc. Prof. Cong Qi, School of Low-Carbon Energy and Power Engineering, CUMT.
Research Outcome: Grade A with **one SCI publication** [4] in "*International Communications in Heat and Mass Transfer*".

➢ Conducted experimental investigations on **nanofluid flow dynamics** and **thermal characteristics** to enhance **battery thermal management** systems.
➢ Analyzed nanofluids performances across various nanoparticle mass fraction, vertical fin height and

Reynolds number to obtain the **optimal solution.**

Other Research Project

➤ **Bachelor's Group Projec**t: Experimental and Numerical Study on Enhanced Battery Thermal Management via Immersion Boiling.

➤ **Master's Group Project:** Numerical Simulation on NOx Reduction using Ammonia Injection.

➤ **Academic Training Project**: Velocity Field Identification Using Single-Frame Long Exposure Method.

➤ **Collaborate Project one:** Experimental and Numerical Investigation of Fire-Induced Smoke Control in an Underground Subway Station [7].

➤ **Collaborate Project two:** Experimental and Simulation Study on Space Heating Based on Waste Heat Recovery [8].

➤ **Collaborate Project three:** Data-driven optimization of NEPCM Configurations for battery thermal management system [9].

Other Experiences

Work Experience

➤ **Software Development Engineer** | Nanjing Zhongxing Software Co., Ltd.   08/2022 - 02/2023
Responsible for integrating network element version packages and testing specific functions.

Teaching Experiences

➤ **Teaching Project** | Development of Digitized Teaching Materials on the Course of Boiler Principles

➤ **Teaching Assistant** | The Course of Boiler Design in SEU   03/2021 - 09/2021

Academic Activities

➤ Bilateral Academic Seminar on Green Energy, Carbon Capture, Utilization and Storage   06/2023

➤ The 5th Young Scholars Forum of the School of Energy and Environment   11/2021

Selected Publications and Patents

Journal Articles

[1] **B Shang**, L Zhang, B Li. Thermal energy storage system based on nanoparticle distribution optimization for enhanced heat transfer. *Journal of Energy Storage*. DOI: 10.1016/j.est.2023.110075

[2] L Zhang, **B Shang,** B Li. Heat transfer investigation of solid-liquid phase change with divided heat flux. *Journal of the Taiwan Institute of Chemical Engineers.* DOI: 10.1016/j.jtice.2024.105480

[3] B Li L, Zhang, **B Shang.** Numerical investigation on heat transfer characteristics in battery thermal management. *International Communications in Heat and Mass Transfer*. DOI: 10.1016/j.icheatmasstransfer.2024.107414

[4] C Qi, K Li, C Li, **B Shang**. Experimental study on thermal efficiency improvement using nanofluids in heat sink with heated circular cylinder. *International Communications in Heat and Mass Transfer*. DOI: 10.1016/j.icheatmasstransfer.2020.104589.

[5] B Zhu, **B Shang**, X Guo, etc. Study on Combustion Characteristics and NOx Formation in 600 MW Coal-Fired Boiler Based on Numerical Simulation. *Energies*. DOI: 10.3390/en16010262.

[6] **B Shang,** L Zhao, X Shu. Effects of Fire Hydrant Layout and Valve Position on Flow Characteristics. *Fire Science and Technology*, 40(7):4, 2021. (**Chinese Core**)

[7] X Li, L Zhang, **B Shang**, etc. Study on Full-Scale Experimental and Numerical Investigation of Fire-Induced Smoke Control in an Underground Double-Island Subway Station, *Tunnelling and Underground Space Technology*. (**Under Review**)

[8] X Li, L Zhang, **B Shang**, etc. Thermal, Energy, and Thermo-Economic Analysis of PCM-TES for Space Heating Based on Low-Temperature Waste Heat: An Experimental and Numerical Study, *Energy*. (**Under Review**)

[9] L Zhang, **B Shang**, W Sun, etc. Data-Driven Optimization of Nano-PCM Arrangements for Battery Thermal Management Based on Lattice Boltzmann Simulation, *Energy*. (**Under Review**)

Patents (2 Invention Patents and 8 Utility Patents in Total)

[10] L Zhao, **B Shang**. A Computational Approach and System for NOx Prediction at Furnace Outlet using Numerical Simulation Data. Chinese Patent, CN114239430A. Granted on March 25, 2022.

[11] R Di, **B Shang**, T Zhang. Advanced Combustor with Flue Gas Recirculation for Nitrogen Emission Reduction. Chinese Patent, CN109578987A. Granted on April 5, 2019.

[12] **B Shang**, R Di, T Zhang. Enhanced Energy-Efficient Integrated Drying Chamber with Superior Heat Transfer Performance. Chinese Patent, CN209310092U. Granted on August 27, 2019.

Selected Honors

- **SEU**: Graduate Scholarship, 2021; Graduate Scholarship, 2020; Second-class Scholarship, 2019.
- **CUMT:** Excellent Graduates, 2019; Outstanding Student Scholarship, 2019; **National Inspirational Scholarship**, 2018; Undergraduate Academic Scholarship, 2017; First-class Scholarship, 2016.