JIHYUK JEONG

Ottawa, Ontario, Canada jihyuk.jeong.k@gmail.com jihyukjeong.github.io/

EXPERIENCE

Postdoctoral Research Fellow

University of Michigan - Dearborn **06/2024 – Present, United States**

- Created and developed a 3D CAD model of the JSO-II Oven and a compressible, k-e turbulent Computational Fluid Dynamics (CFD) model to accurately predict the air flow, heat and mass transfer between the substrate (food item) and the oven.
- The fan and the heat exchanger were modelled via User-Defined Functions (UDF), where the fan was treated as a momentum sink term and the heat exchanger was modelled as a porous medium to reduce the computational requirement of the CFD model.
- Created a CFD simulation to establish a Full Order Model (FOM) of the food drying process, facilitating comparison with the ROM in terms of performance and efficiency.
- Supervised an undergraduate research assistant.

Ph.D. – CFD modeling of the heat and mass transfer in a refrigerated truck trailer

LMFTEUS, Université de Sherbrooke **09/2020 – 09/2021 & 09/2022 – 04/2024, Canada**

- Conducted Computational Fluid Dynamics (CFD) simulations and analyzed heat transfer dynamics within a refrigerated truck trailer equipped with eutectic plates.
- Employed the ANSYS CFX - URANS model to resolve conjugated heat transfer within the trailer in a 2D framework, employing the k-w Shear Stress Transport turbulence model during the door opening phase.
- Devised an ANSYS FLUENT Eulerian-Eulerian multiphase model to forecast frost development on a eutectic system.
- Integrated a solidification and melting model via a UDF in C/C++ to explore heat transfer interactions with the Phase Change Material (PCM).
- Leveraged High-Performance Computing (HPC) through MobaXterm for all simulations, utilizing resources from Calcul Quebec and Compute Canada.

Ph.D. – CFD modeling of the heat and mass transfer in a refrigerated truck trailer

CETHIL, INSA Lyon **09/2021 – 09/2022, France**

- Executed and organized experimental investigations into humidity diffusion during the infiltration period for a refrigerated truck trailer.
- Developed the experimental setup and implemented the data acquisition system.
- Collaborated closely with electrical and mechanical engineering technicians to design and refine the experimental setup.

M.Sc. - Data Driven Analysis and 3D Visualization of a Turbulent Bluff-Body Using Optimal Mode Decomposition

Imperial College London **05/2018 – 09/2018, United Kingdom**

- Examined experimental Particle Image Velocimetry (PIV) data comprising 100 million data points to isolate the primary modes from consistent center of pressure locations, employing Optimal Mode Decomposition through MATLAB.
- Processed and filtered the extracted 2D modes, subsequently interpolating them within a 3D cylindrical coordinate framework to generate a three-dimensional representation of the dominant modes within the turbulent wake.
- Leveraged High-Performance Computing (HPC), utilizing resources from Imperial College London's HPC cluster.

Undergraduate Research Assistant

Aerodynamics Research Group, McGill University **05/2015 – 05/2016, Canada**

- Organized and executed aerodynamic experiments within wind and water tunnels, including: Force balance experiments involving the NACA0012 airfoil, delta, and reverse delta wing.
- Conducted surface pressure measurements and smoke-wire flow visualizations of the NACA0012 airfoil under the influence of the ground effect.
- Implemented dye-flow visualizations of the delta wing with different configurations.
- Analyzed and modeled the experimental data using Excel, MATLAB, C++, and LabView.

Undergraduate Research Assistant

Shockwave Physics Group, McGill University **05/2014 – 09/2014, Canada**

- Organized and conducted constant volume combustion experiments aimed at determining the laminar burning velocities of methane and vinyl chloride.
- Developed and examined the ignition system along with the PVC tube gas setup system.
- Employed Fortran-based CEAgui to ascertain the stoichiometric ratio of vinyl chloride and air required for the experiment..

EDUCATION

Ph.D. Mechanical Engineering

Université de Sherbrooke • Canada • 09/2020 – 05/2024

Ph.D. Thermique - Energétique
Institut National des Sciences Appliquées de Lyon • France • 09/2020 – 05/2024

M.Sc. Advanced Aeronautical Engineering
Imperial College London • United Kingdom • 09/2017 – 09/2018 • 4.00/4.00
• Distinction (4.00/4.00 Equivalent).

B.Eng. Mechanical Engineering
McGill University • Canada • 09/2012 – 05/2016 • 3.42/4.00

PUBLICATIONS

- Jeong J., Poncet S., Michel B., Bonjour J. Combined Eulerian-Eulerian Multiphase Frost Model and Solidification and Melting Model to Predict the Cooling Performance of Subcooled Eutectic Plates, International Journal of Thermal Sciences, under review.
- Jeong J., Poncet S., Michel B., Bonjour J. (2023, August). Numerical simulation of the frost formation on a flat plate cooled by a phase change material, 26th International Congress of Refrigeration (ICR23).
- Jeong, J., Poncet, S., Michel, B., & Bonjour, J. (2022, April). Eulerian-Eulerian Multiphase Frost Model Based on Phase Change Driving Force. In 7th IIR International Conference on Sustainability and the Cold Chain.
- Jeong, J., Benchikh Le Hocine A. E., Croquer, S., Poncet, S., Michel, B., & Bonjour, J. (2022). Numerical analysis of the thermoaeraulic behavior of air during the opening of the door of a refrigerated truck trailer equipped with cold plates. Applied Thermal Engineering, 206, 118057.
- Jeong J., Benchikh Le Hocine A. E., Croquer S., Poncet S., Bonjour J., & Michel B. (2021, May). Numerical Simulation of the Heat Transfer in a Refrigerated Trailer Equipped with Eutectic Plates for Frozen Food Delivery.18th International Refrigeration and Air Conditioning Conference, Lafayette, USA.

CERTIFICATIONS

Bourse Eurêka de la Faculté de Génie
Université de Sherbrooke • 2021

Médaille du mérite Léonard de Vinci
Université de Sherbrooke • 2021

NSERC Undergraduate Student Research Award
McGill University • 2016

NSERC Undergraduate Student Research Award
McGill University • 2014

SKILLS

MATLAB, Fortran, CEAgui, Excel, LabView

English, Korean, French (intermediate)

Computer Aided Design (CAD), SolidWorks, ANSYS SpaceClaim, FreeCAD

High-Performance Computing (HPC)

Heat and Mass Transfer, Multiphase Models, Turbulent Models, Phase Change Material (PCM), Experimental and Numerical Simulations

Computational Fluid Dynamics (CFD), ANSYS CFX, ANSYS FLUENT, User-Defined Functions (UDF), C/C++