HAOTIAN JIA

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Experience

Nokia Bell Labs, Optical Systems and Device Research Lab — Murray Hill, NJ
Thermal Management Research Co-op — May 2024 – Aug 2024

- **Data Center Thermal Management** (funded by ARPA-E COOLERCHIPS)
  Characterized the thermal behavior and fluid dynamics of two-phase cold plates using a pump-driven cooling test system, developed LabVIEW code for system steady-state detection, and standardized test operation procedures, reducing test time per data point by 25%. Post-processed data using Python to generate plots that served as control parameters for a state-of-the-art AI data center Thermal Testing Vehicle. Created schematics and data visualizations, was selected to present findings to the entire Nokia Bell Labs, and contributed to a journal publication.

Imperial College London, Department of Mathematics — London, UK
Awarded Visiting Research Assistant — Jun 2022 – Aug 2022

- **Microchannel Flow Lubrication Enhancement** (funded by NSF award 2140033)
  Designed superhydrophobic microchannels, fabricated it in cleanroom and conducted micro-PIV flow analysis using MATLAB, reproducing literature results. Investigated photoisomerization and adsorption kinetics of a shape-changing photosurfactant to determine optimal surface tension isotherms under varying light profiles.

Tufts University, Department of Mechanical Engineering — Medford, MA
Research Assistant — Sep 2019 – Present

- **Internal Flow Modeling of Heat Pipe**
  Reduced-order modeling of two-phase flow in the adiabatic sections of axial-grooved heat pipes with varying liquid-vapor interface shapes using advanced applied mathematics techniques. Developed a numerical solver using MATLAB PDE Toolbox to compute the heat pipe's flow field and capillary limits.
- **Aerogel Permeability Measurement under Supercritical CO_2 Flows** (funded by NSF award 1530603)
  Developed an experimental apparatus and measured aerogel permeability under supercritical CO_2 flows. Wrote complete LabVIEW and MATLAB programs for data acquisition and post-processing. Invented an inverse experimental approach using Duhamel's theorem to eliminate the sample sealing requirement in conventional methods.
- **Jet-impingement Enhanced Aerogel freeze drying** (funded by NSF STTR award 2014881)
  Design, build, and optimize a jet-impingement drying system with integrated data acquisition and control. Collaborated with Aerogel Technologies, LLC., reduce freeze-drying aerogel production process time by 75%. Developed dehumidification process enabling the supply of ultra-dry compressed air with -40°C dew point at 12.7 SCFM to impinging jet stream.

Education

Tufts University — Medford, MA
Ph.D. Mechanical Engineering (GPA: 3.82/4.0) — Sep 2020 – Present
M.S. Mechanical Engineering — Sep 2018 – Present

Beijing Forestry University — Beijing, China
B.E. Mechanical Design, Manufacturing, and Automation — Sep 2014 – Jun 2018

Skills

Programming language: MATLAB, LaTeX, Python, LabVIEW, Arduino, C, HTML, HPC environment
CFD/FEM Software: Ansys Fluent, Ansys Workbench, MATLAB PDE Toolbox,COMSOL, SolidWorks Simulation
CAD Software: SolidWorks, Inkscape, Adobe Illustrator, AutoCAD, Mastercam, G-code

Graduate Level Courses

Fluid Mechanics & Heat Transfer: Thermal Fluid Transport I & II, High Reynolds Number Flow, Microfluidics, Thermal Management of Electronics, Analytic Transport Phenomena, Thermal Fluid Systems II (TA)
Math & Simulation: Numerical Analysis, Applied Mathematics for Engineers, Simulation for Mechanical Engineer
Design, Ctrl & Optics: Inventive Design, Assistive Design, Digital Control of Dynamic Systems, Optics & Wave Motion

Publications

- **Jia, H.**, Karamanis, G., Dinh, H., Diorio, M., Mayer, M., and Hodes, M., "Dual Apparatuses and Methods to Measure Permeability of Nanoporous Aerogels." **In progress for submission** to *Review of Scientific Instruments.*
- Apigo, D., Parbat, S., **Jia, H.**, Roy, R., Bongarala, M., Faisal, S., Qiu, H., Kabirzadeh, P., Miljkovic, N., and Salamon, T., "Thermofluidic design and characterization of microchannel evaporators in a two-phase low global warming potential refrigerant pump loop." **In progress for submission** to the *Applied Thermal Engineering.*
- Hodes, M., Daetz, A., **Jia, H.**, and Kirk, T., "Adiabatic-section flow resistance of axial-groove heat pipes for slowly-varying meniscus curvature." **In progress for submission** to the *Journal of Fluid Mechanics.*

Conference Talks & Presentations

- **10th International Congress on Industrial and Applied Mathematics (ICIAM 2023)** Talk in Minisymposia titled *"Inertial Effects on the Adiabatic-Section Flow Resistance of Axial Groove Heat Pipes"*
- **The Red Lotus Project** Presented a series of talks at video-conference events and mini-symposia to mathematicians at Imperial College London, promoting interdisciplinary collaboration in the field of surface engineering, with a focus on microfabrication and photochemistry applications.
- **Online Aerogel Seminar 2020** Presented talk titled *"Permeability of Aerogels under Supercritical CO_2 Conditions"*

Awards

Outstanding Innovation Award
Nokia Bell Labs, Global Student Program 2024 — Aug 2024

Dean's Fellowship
Tufts University, School of Engineering — Jan 2024 - Jun 2024

Global Research Assistant Program Award (GRAP)
Tufts University, Global Tufts — Jun 2022