

Matthew Wood

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Education

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- Purdue University** – PhD in Mechanical Engineering Aug 2024 – May 2029
- GPA: 3.78/4.00
 - Studied graduate-level Fluid Mechanics, Heat Transfer, and Advanced Scientific ML
- University of Waterloo** – BAsC in Mechanical Engineering, Co-op Sep 2019 – May 2024
- GPA: 91/100
 - Graduated with distinction (Dean's Honours)

Research Experience

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- Graduate Research Assistant, Purdue University** – West Lafayette, IN Aug 2024 – Present
- Designed 3D topology-optimized solid copper and vapor chamber heat sinks for immersion cooling using MATLAB, targeting 10 kW heat dissipation at an 85°C junction temperature
 - Collaborated with ACT and Modine to develop CAD models for vapor chambers and 3D-printed solid copper heat sinks for demonstration with ThermalPixels TTV as part of the ARPA-E COOLERCHIPS 1.5 program
 - Modified an immersion cooling chamber to test solid copper and vapor chamber heat sinks at heat loads up to 5 kW and characterize boiling performance
 - Developed a framework for predicting and optimizing pin-fin array heat sink performance for impingement cooling, achieving a predicted 15% increase in CHF
 - Optimized finned heat sinks for distilled-water cooling and evaluated their performance in a boiling chamber
- Undergraduate Research Assistant, University of Waterloo** – Waterloo, ON Sep 2023 – Aug 2024
- Led the development of MATLAB scripts with the University of Waterloo Fluid Physics Pan-Lab and identified efficient algorithms for reconstructing pressure fields from particle image velocimetry (PIV) data using the Navier-Stokes equations
 - Identified and tested the effect of the number and placement of pressure transducers within the domain on the accuracy of the pressure field reconstruction
 - Developed additional MATLAB scripts for visualizing sloshing dynamics in a right-angled cone

Mechanical Design Experience

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- Mechanical Design Engineer Intern, Tesla** – Sparks, NV May 2023 – Aug 2023
- Led mechanical redesign of Megapack 2 XL charging system to increase charging capacity from 150 A to 400 A
 - Improved charging-system ergonomics to enable a safer manufacturing layout and support a targeted production increase to 200 units/week
 - Used SolidWorks FEA and DFM/DFA principles to design an aluminum test cart
- Mechatronics Design Engineer Intern, ATS** – Cambridge, ON Sep 2022 – Dec 2022
- Led the complete design of an aluminum test fixture to test encoder pallets at supplier locations prior to shipment using SolidWorks
 - Assisted in redesign of next-generation Symphoni automation product by reworking pneumatic design to increase the maximum part volume

Technical Skills

Design & Analysis: SolidWorks, Onshape, AutoCAD, finite element analysis, DFM/DFA
Programming & Numerical Methods: MATLAB, VBA, Python, JAX, topology optimization
Thermal & Experimental: Immersion cooling, boiling heat transfer, heat sink design