

Accelerated Discovery of Thermal Fluids: High-throughput Microfluidic Testing and Computation

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The Thermal Fluid Discovery Project focuses on the development of next-generation thermal fluids through the integration of advanced experimentation and machine learning (ML). The goal is to establish a fully autonomous experimental platform that accelerates the optimization of thermal fluids, with an emphasis on high-performance cooling solutions for electric vehicles (EVs) and other emerging energy applications.

This project provides MEng students with the opportunity to engage in interdisciplinary research at the interface of materials science, fluid mechanics, mechatronics, and artificial intelligence. Students will contribute to both the experimental and computational aspects of fluid discovery, gaining hands-on experience in laboratory experimentation, automation, and ML-driven data analysis.

Research Objectives

- Develop and apply automated experimental techniques for thermal fluid property measurement and performance characterization.
- Advance experimental workflow automation to enhance research efficiency and reproducibility.
- Collaborate with academic and industry partners to validate methodologies and ensure high data integrity.
- Communicate research outcomes through reports, technical documentation, and presentations.

Learning Outcomes for MEng Students

- Acquire practical skills in thermal-fluid experimentation and property characterization.
- Gain experience in data management, analysis, and visualization.
- Work within a multidisciplinary team environment, bridging engineering and data science.
- Contribute to innovations supporting clean energy and sustainable transportation.

This project offers a unique opportunity for MEng students interested in data-driven research, automation, and clean technology innovation.