Mechanical & Industrial Engineering
UNIVERSITY OF TORONTO

MIE498H1: Research Thesis 2025-2026

Supervisor	Patrick Lee
Supervisor email	patricklee@mie.utoronto.ca
Number of Positions	1
Open to	Mechanical Engineering Students
Term Offered	Full-Year (Y)
Research Area	Materials
Research Topic	Micro-structuring of Artificial Nacre Structures via Laser-induced Graphene

Project Description

Laser-induced graphene (LIG) is a versatile and promising technique for fabricating graphene directly on various substrates using laser irradiation. On the other hand, nacre, also known as mother-of-pearl, is a natural composite material found in the shells of mollusks, known for its exceptional mechanical properties, including high strength and toughness. Combining laser-induced graphene with a nacre-like structure involves using the LIG technique to create graphene patterns that mimic the layered structure of nacre. The combination of laser-induced graphene with a nacre-like structure holds promise for applications such as flexible electronics, energy storage devices, sensors, and composite materials. The unique properties of graphene, along with the enhanced mechanical characteristics derived from the nacre-like structure, can lead to improved performance and functionality in various technological fields.

Additional Information	N/A
Application Instructions	Please submit CV, unofficial transcript, to Prof. Patrick Lee (patricklee@mie.utoronto.ca)