MONASH
ENGINEERING

MONASH University

Faculty of Engineering
Summer Research Program 2024-2025

Project Title: Development of superior copper alloys with high strength and excellent conductivity

Supervisor(s): Dr. Yuman Zhu; Dr. Yunlong Tang

Department: Materials Science & Engineering

Email: yuman.zhu@monash.edu

Website profile of project supervisor:

https://www.monash.edu/engineering/yumanzhu

Objective

Copper and its alloys are extensively utilized in electronics, aerospace components, and heat exchangers. However, current Cu-alloy components produced via conventional fabrication often exhibit large grain sizes, resulting in a low strength and limiting their widespread application for structural components. Hence, the objective of this project is to investigate effective fabrication methods for producing robust Cu-alloy components with enhanced strength and sufficient thermal conductivity. This research aims to enable high-precision and rapid manufacturing of more compact and efficient heat dissipation solutions.

Project Details

1. Using machine learning tools to help design the compositions of copper alloys specific for conventional thermomechanical and additive manufacturing
2. Exploring the parameters of extrusion and additive manufacturing for building high-performance copper alloys.
3. Room-temperature hardness and tensile tests.
4. Preliminary microstructure characterization providing a basic understanding of the effects of microstructure on the room-temperature mechanical properties.

Prerequisites

Knowledge about alloys and relevant experiment experience for basic microstructure and property studies.

Additional Information

applicants may be required to attend an interview.