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ENGINEERING

MONASH University

Faculty of Engineering
Summer Research Program 2024-2025

Project Title: Additive Manufacturing of Advanced Alloys for High-Temperature Applications

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Objective

Metal additive manufacturing (AM) is a groundbreaking technology capable of fabricating almost any geometric part. Leading industries, such as space and aerospace, are expanding their AM capabilities to create components from superalloys due to their high-temperature mechanical properties and oxidation resistance. Nevertheless, most AM-fabricated metallic components currently lack the necessary properties for structural applications at elevated temperatures. The primary objective of this project is to fabricate high-quality refractory metals via laser powder bed fusion and explore their potential to achieve excellent elevated-temperature mechanical properties.

Project Details

1. Exploring the parameters of LPBF for printing Mo(Cr)-based refractory alloy. The fabrication process will rigorously control and optimize printing parameters to minimize printing defects and ensure the highest quality builds.
2. Room-temperature hardness and tensile tests. Samples will be tested against and along their build directions.
3. Preliminary microstructure characterization. Printing defects and grains will be characterised by optical microscopy (OM) and desktop scanning electron microscopy (SEM), offering a basic understanding of the effects of microstructure and defects 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.