



# Capability Statement

## Advanced Alloys

### About us

The Advanced Alloys group at Deakin University's Institute for Frontier Materials (IFM) combines world-leading research in the development of new high-performance alloys, metal forming processes and lightweight design initiatives.

Our research is leading to development of high-performance materials with extraordinary properties, as well as the re-design of materials for a circular economy. We have a strong focus on developing greener materials and more sustainable technologies for the metals industry of the future.

As well as traditional techniques, our research also incorporates cutting-edge technologies such as artificial intelligence and machine learning to rapidly predict and optimise the extremely complex and multi-faceted system that is alloy and process design.

Our team is highly multi-disciplinary, consisting of metallurgists, engineers, physicists, biologists and data scientists, combining thought-processes from a wide range of specialties to develop new materials and engineering solutions.

### Core Competencies

#### Alloy design

The IFM alloy design group combines a knowledge of fundamental metallurgy with advanced characterization and processing techniques in the design of new and enhanced alloys. Our research includes ultrahigh-strength steels, wear resistant materials for the mining sector, advanced lightweight magnesium and aluminium extrusion alloys and upcycled titanium made from scrap.

#### Metals forming

The IFM metals forming group focuses on developing advanced material models and innovative and flexible manufacturing technologies for the forming of current and future sheet materials.

#### Lightweight design

The lightweight design team uses research in advanced material and process development, material characterisation and modelling to establish advanced and low-cost lightweight structural solutions for the automotive sector.

### Differentiators

#### Focus on developing materials for a circular economy

One of our primary research pillars is the development of alloys and metals repurposing, processing and recycling technologies with a circular philosophy. Our goal is the re-design of traditional alloys and processes to create products with multi-life functionality and retained value over multiple life cycles.

#### Breadth of scale

Our state of the art facilities and laboratories allow us to process and characterize metals across a vast range of scale lengths, from manipulation of elements at the atomic level to the production and assessment of industrial sized castings and wrought products.

### Research Leaders

**Professor Matthew Barnett,**  
Director, Institute for Frontier Materials  
**Associate Professor Daniel Fabijanic,**  
Associate Professor (Research) IFM

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