

Research capability
delivering value

A close-up photograph of a hand holding a white, 3D-printed, textured object. The object has a grey mesh band wrapped around its middle. The background is blurred, showing what appears to be a laboratory or workshop setting. The image is overlaid with a large magenta circle on the left and a large blue cross-like shape on the right.

Advanced Manufacturing and Fabrication

Enabling Capability Platform

Contact us to partner for a better future

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[www.rmit.edu.au/research/research-expertise/
our-focus/enabling-capability-platforms](http://www.rmit.edu.au/research/research-expertise/our-focus/enabling-capability-platforms)

Catching the wave of a revolution

Our world is in the midst of the Fourth Industrial Revolution.

Rapid developments in fields like 3D printing, nanotechnology, artificial intelligence and machine learning, genetics and biotechnology are disrupting business practices and labour markets across the globe.

RMIT University is harnessing our research excellence, diverse capabilities and technical resources to better support manufacturers during this time of rapid transformation.

RMIT's **Advanced Manufacturing and Fabrication Enabling Capability Platform (ECP)** brings together hundreds of experts across the University's multiple research disciplines specialising in a wide range of areas including aerospace, electrical and electronic, mechanical and materials engineering; condensed matter physics; physical chemistry; and environmental science and management. These research affiliates are passionate about using their expertise to help Australian industries shift into advanced manufacturing and develop innovative solutions to their most complex problems.



Applied research for our partners' needs

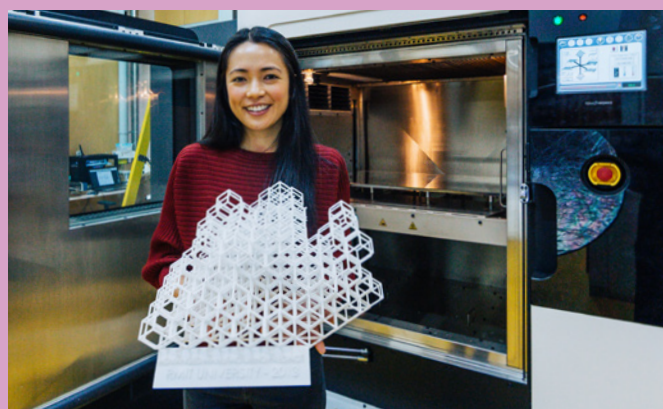
RMIT has a long history of aligning our research and educational programs with the practical needs of Australian industry.

The creation of the Advanced Manufacturing and Fabrication ECP and seven other Enabling Capability Platforms that span the University's centres of excellence, research disciplines and teaching schools, marks a new era of inter-disciplinary collaboration, partnership and co-creation between our research community and the private and public sectors.

This ECP serves as a streamlined, single point of contact within the University for research projects and partnerships that focus on advanced manufacturing and fabrication. We work closely with the other ECPs, supporting their activities and drawing on their expertise to deepen our research collaborations.

We are making the research and innovation priorities of our external partners, and society as a whole, our own priorities. Our research endeavours will continue to advance knowledge. However, we will go a step further by ensuring RMIT also helps our partners to achieve their economic, social and environmental objectives, through the effective translation of research.

A Sector Expert Research Advisory Group of manufacturing industry leaders and stakeholders will help shape the future direction and priorities of this ECP.



Our vision

Ivan Cole, Director,
RMIT Advanced Manufacturing and Fabrication ECP



We will partner with industry to drive the next wave of manufacturing excellence in Australia.

We will enable manufacturers to shift into making customised products, digitise their production processes, establish international supply chains, and make their supply chains and components truly multifunctional.



Examples of Advanced Manufacturing and Fabrication ECP collaborative research projects

Type 1 diabetes, which destroys insulin-producing islet beta cells, affects over 120,000 Australians and is a disease of national priority.

Being able to create insulin-producing cells, rather than relying on the very limited supply from human donors, is the 'holy grail' of diabetes research. However, cross-disciplinary research to find a solution has been limited.

In partnership with other major health research organisations and laboratories, RMIT is bringing together experts across multiple research disciplines to take a deep dive into this issue.

The PRINT-Cell initiative team are developing and testing soft tissue (islet) scaffolds using additive manufacturing (3D printing), tissue engineering and nanobiotechnology tools. Their focus is on assessing the feasibility of 3D-printing replacement islet cells and developing a research plan and funding application for intensified cross-disciplinary research in this area.

This project is funded through RMIT's ECP Activity Support Initiative Fund.



Finding better ways to manage and re-purpose polluting biosolids, sewage sludge from wastewater, is a pressing issue for the water industry. Current management processes are labour intensive, take up large amounts of land and risk polluting adjacent land and water tables.

RMIT is partnering with two water authorities to tackle this problem. The partners will design, construct and commission a pilot PYROCO processing plant capable of converting 75kg/hr of biosolids into value-added smart carbon materials (biochar).

RMIT's interdisciplinary team of engineers, scientists, social scientists and economists will assist in trialling the social and commercial viability of this disruptive conversion technology.

This partnership has the potential to yield far-reaching social, environmental and economic benefits, including:

- > cutting the energy needed to manage biosolids by up to 85 per cent
- > reducing capital and operating costs by up to 40 per cent, and
- > reducing overall biosolids management costs by over 30 per cent.

This project is being funded by RMIT's ECP Opportunity Fund and our project partners.

Key capabilities

Hundreds of expert research affiliates in disciplines ranging from engineering and science to design, business, communication and social studies

Internationally recognised areas of research excellence in:

- > aerospace, electrical and electronic, mechanical and materials engineering
- > condensed matter physics
- > physical chemistry
- > environmental science and management

Additional research strengths in:

- > nano and micro manufacturing
- > component and additive manufacturing
- > systems integration and engineering

Research facilities and centres include:

An Advanced Manufacturing Precinct with:

- > state-of-the-art additive and subtractive process manufacturing technologies
- > high-speed multi-axis machining centres
- > reverse engineering
- > automation robotics to simulate manufacturing production lines

A new NanoMicro Research Facility with nine high-tech laboratories

Close relationships with:

- > federal and state governments
- > Industry Growth Centres
- > peak industry organisations
- > major industries and research institutions and networks in Australia, Asia and Europe

Research and innovation priorities

Manufacturing across scale and function

RMIT will add value to:

- > designing and manufacturing products and components at the nano, micro, millimetre, object and systems scale, and
- > manufacturing components and systems that integrate features across these scales

Advanced automation and sensor networks

We will enable industry to:

- > automate and integrate systems
- > apply advanced sensor network technologies, and
- > improve the productivity, quality control and flexibility of manufacturing processes

We will add to and improve sensing devices available on the Internet of Things.

Developing Industry 4.0 in the Australian context

We will focus on:

- > digitising products and services offered by Australian manufacturers, and
- > perfecting the interfaces between digital instructions and physical objects

Key application areas



RMIT'S ENABLING CAPABILITY PLATFORMS (ECPs)

- > Advanced Materials
- > Biomedical and Health Innovation
- > Advanced Manufacturing and Fabrication
- > Design and Creative Practice
- > Global Business Innovation
- > Information and Systems (Engineering)
- > Social Change
- > Urban Futures