

Submission to the Australian Government

## University Research Commercialisation Consultation Paper

9th April 2021



Australian Government  
Department of Industry, Science,  
Energy and Resources

**AusIndustry**  
Cooperative Research  
Centres Program





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## Introduction

The future of Australian industry depends on innovation and technology development, which can only be achieved through the effective commercialisation of research. Critical to this process is the involvement of our world class universities and scientific research organisations.

The Department of Education, Skills and Employment is seeking views on the development of a model for university research commercialisation and possible mechanisms to incentivise and increase partnerships between businesses and universities.

IMCRC is pleased to offer this submission, which considers the areas of **mission-driven research, stage-gated design, incentives for participation, industry-university collaboration, and governance**. It also offers recommendations for a national, industry-led model based on IMCRC's experience, learnings and success, particularly in removing barriers for SMEs to collaborate with Australian universities and other scientific research organisations.



\* Please note that IMCRC's submission to the discussion questions in the University Research Commercialisation Consultation Paper comprises pages 3 - 10 (word count: 1351). The supporting quotes as well as the additional information about our organisation have been excluded from the word count.

## Mission-driven science and research

Since its launch in 2016, IMCRC has implemented an industry-led framework that has allowed it to purposefully invest \$31 million of Commonwealth and other funding into industry and research collaborations, with more than a quarter of Australian universities and other scientific research organisations such as St Vincent's Institute of Medical Research and the CSIRO, that have advanced Australian manufacturing. Using this framework, IMCRC has achieved greater than a 5x multiplier on project investments (from a taxpayer perspective), proving to be one of the key success stories of Australia's exemplary 30-year CRC program.

In IMCRC's view, Australia similarly requires a national, industry-led framework that allows for multiple organisations, across research and industry, to work towards a common mission and set of challenges. Such an overarching framework would seek to scale up established models that have proven successful, reduce duplication of effort and increase efficiency amongst universities and other scientific research organisations.

In terms of identifying an overall mission and key challenges, IMCRC endorses those outlined in the [Australia National Outlook 2019](#) report from the CSIRO, NAB and more than 20 partnership organisations.

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**To build a strong, modern and resilient Australian economy, we need to strengthen industry-led research collaborations through frameworks, like IMCRC's, that spark innovation and help businesses compete, scale-up their operations and embrace new market opportunities.**

”

**The Hon Ian Macfarlane**  
Chief Executive,  
Queensland Resources Council and IMCRC Chair

# Stage-gate design

Critical to the success of IMCRC's projects with Australian research organisations has been a well-considered program that, by design, removes barriers to participation and collaboration.

The stage-gated design of IMCRC's research projects ensures all parties are aligned at each step of a project before proceeding onto the next, especially regarding research and commercial outcomes, including return on investment (ROI). With milestones described in terms of technology readiness levels (TRLs), as well as quarterly and annual assessments, the IMCRC model creates meaningful and transparent structures that are agreed to in advance and build trust and accountability among research and industry participants. One of the key benefits of the stage-gated design is that it allows industry to decide whether they will continue investing in a project at each stage gate, enabling only those projects with innovation and commercial potential to advance.

IMCRC assists with the curating of eligible project ideas, to ensure they deliver wider benefits to the manufacturing innovation ecosystem in addition to the benefits to the parties who are collaborating. When applications for research projects are assessed, IMCRC's independent Innovation Investment Committee (made up of relevant industry, research and commercialisation expertise) assesses the risks, readiness and potential of

a project before funds are allocated. While projects will not be funded unless an ROI can be described, IMCRC does not stipulate how the ROI must be calculated, allowing for some flexibility at the planning and assessment stage. Once a project is approved, IMCRC's team of industry-led experts put in place a framework for the collaboration. All IMCRC research contracts are administered to common and general terms and conditions (in addition to set guidelines, meeting schedules, reporting cadences and gated reviews) to drive transformative research and outcomes. Rather than creating a linear pathway from laboratory to market, the IMCRC framework sees the development of innovation ecosystems with both technology and non-technology sources of value, including design, business model innovation, and 'absorptive capacity' for enterprises.

This proven process has been critical to safeguarding government and industry funding and a similar approach is recommended for a national model, with projects assessed by an assembled group of independent individuals with recognised skills in industry, research and leadership from cross-disciplinary environments.

“

**Industry-research collaboration is a two-way street built on accountability. We need to be accountable to our research partners as much as they need to be accountable to us.**

”

**Dr Greg Whiteley**  
Executive Chairman,  
Whiteley Corporation and IMCRC Industry Partner





“

A large contributor to the IMCRC's success to date has been its governance model. For example, from the beginning, IMCRC has been very much industry-led and we made a deliberate decision to set up an investment committee. While it added an extra layer to the traditional CRC application process, it also brought a significant amount of industry expertise and rigour at a critical juncture. I believe one of the reasons we have had such a low project attrition rate, even in such challenging times, is because applications that are approved have been thoroughly vetted which means we are able to maximise the return from every dollar we invest.

”

Innes Willox, AM  
Chief Executive,  
AI Group and IMCRC Director

# Incentives for participation

Increasing demand for mission-driven research will require incentivising industry to put forward ideas for transformative research collaborations with research organisations. Universities must also look beyond purely academic objectives and towards partnering with industry in order to build capacity of Australia's research commercialisation ecosystem to generate more innovation.

Motivating factors for industry include access to relevant research capabilities (including trained professionals with skills to solve their problems) and infrastructure (which allows industry to de-risk innovation from a cost and operations perspective when compared to funding and completing the research in-house). Universities might look to participate in applied research that is appropriately recognised as HERDC income, translates into social and economic impact, leads to staff development and advancement and has an impact from an academic and teaching point of view. For investors, value might be placed on access to pipelines of emerging opportunities potentially suitable for early-stage investment.

In IMCRC's view, a national model cannot depend solely on government funding. Rather, this funding should be used to co-fund with industry to catalyse and de-risk investment in transformative research projects.

In terms of additional requirements of universities and businesses to participate in a national scheme, universities should be incentivised to place more value on the income that comes with conducting the research and in turn focus on collaborations that create intellectual property (IP) that can be commercialised by industry and also by the partner university.

IMCRC's model provides a precedent for this; its commercially led approach looks for IP agreements favouring those who are funding the work and able to commercially utilise the technology within specific fields within Australia, without impeding further research and education outcomes central to the university's operational models. At the same time, any commercial returns can serve to fund new research and lead to the development of personnel, workforce pollination and more participation. Importantly, IMCRC owns none of the IP created through its projects.

“

**IMCRC has worked to level the playing field for industry and universities to come together in the spirit of true R&D collaboration. Each project is fully focused on the delivery of its anticipated commercial outcomes, ensuring a fair and equitable balance is struck between all parties' interests. In these respects, I believe the IMCRC goes above and beyond the traditional CRC model.**

”

**Emeritus Professor Roy Green**  
Chair of the ARM Hub and IMCRC Director

# Industry-university collaboration

It has been IMCRC's experience that Australian universities tend to have excellent examples of industry and research collaboration, although these are not widely known or acknowledged.

The challenge is to increase the number and frequency of these examples and remove barriers to participation.

This can be achieved through the permeation of people across the industry-university divide to increase experience and knowledge of each other, supporting understanding and development of collaboration culture. Under the IMCRC model, university participants are encouraged to gain commercial exposure by working hand in glove with their industry counterparts and being required to set and agree to commercial objectives. IMCRC's partnership with APR.Intern is an example of the ways manufacturers can connect and collaborate with researchers, with IMCRC providing eligible SMEs and larger businesses with subsidies of up to \$10,000 to help drive advancement by providing manufacturers with access to PhD-level research talent.

Similarly, there is a need to increase skills of industry to maximise the success of collaborations with universities. IMCRC has reviewed and assessed hundreds of manufacturing project ideas to determine their suitability for project funding, research collaboration and commercialisation. Over the years patterns have emerged, indicating that business leaders with industry experience and an appreciation for research are most likely to succeed. In IMCRC's experience, finding a combination of willing, ambitious and open-minded business leaders who can work with equally willing universities can lead to superior outcomes.



**Academia and industry approach research and development (R&D) from different sides. While academia is interested in creating knowledge through the discovery of new information, industry is looking for solutions to a specific problem – a new product that creates value for the business, for example. To establish effective research collaborations both need to acknowledge their cultural differences, approach and overarching objectives.**



**Hervé Harvard**  
Executive Director, Engineering & IT Solutions,  
Faculty of Engineering and Information Technology (FEIT),  
University of Technology Sydney (UTS) and IMCRC Research Partner

## Governance arrangements

With more than \$200 million in research investment catalysed since 2016, the industry-led model used by IMCRC has been effective in establishing successful collaborations between Australian research organisations and SMEs.

This success, which has spanned a variety of industry sectors across manufacturing, has depended on the skills and experience of its team, which is independent from government but trusted to safely manage government funding in order to catalyse commercialisation industry-led research.

The industry-led CRC model could be scaled up nationally through the creation of a national network of technology, innovation, and collaboration hubs, at scale, with both multinationals and SMEs working alongside researchers. In manufacturing, such examples include the Manufacturing USA Institutes, the UK's High Value Manufacturing Catapult centres and Germany's Fraunhofer Institutes. All have spearheaded long-term national industrial and manufacturing strategies, and incentivised significant research and investment well beyond the initial government support. IMCRC has developed the design and funding blueprint for a new Australian model, which could be applied to sectors outside manufacturing and is available on request.







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From my experience with taking innovation through the manufacturing process to commercialisation, the IMCRC industry-led model is not just distinct from a traditional CRC, but it is unique from a global perspective. This IMCRC has strong governance and organisational structures that focus on commercial outcomes with consideration of efficiency of decision making and industry engagement. This IMCRC is a true benchmark for engendering R&D collaboration between universities and manufacturers.

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**Robert Cohen**  
Vice President and Chief Technology Officer,  
Global Research & Development of Stryker's Orthopaedic  
Joint Replacement Division and IMCRC Director





## Conclusion

With a proven model for creating university and business partnerships that lead to successful collaborative research endeavours with commercial outcomes, IMCRC has been privileged to safeguard and catalyse Commonwealth funding into more than \$200 million in manufacturing innovation and education across Australia since 2016.

It is recommended that the research commercialisation learnings gained from IMCRC's success are considered and applied to a national model for the benefit of both Australian research organisations and industry.

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Additional information to the  
University Research Commercialisation Consultation Paper

## **The Innovative Manufacturing CRC (IMCRC)**

# About IMCRC

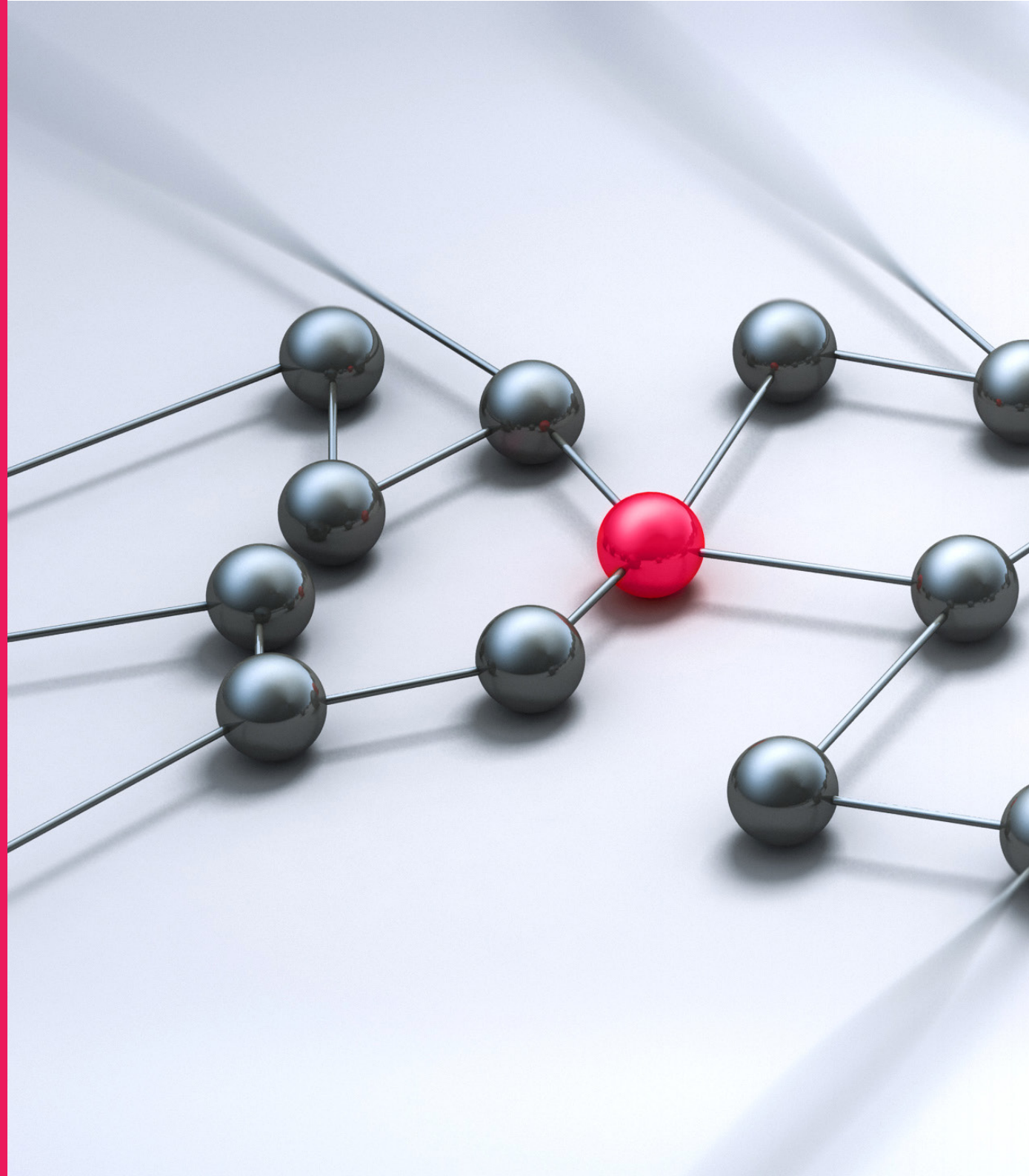
The Innovative Manufacturing CRC Limited (IMCRC) is an independent, not-for-profit Cooperative Research Centre that helps Australian businesses increase their global relevance through research-led innovation in manufacturing products, processes and services.

In collaboration with businesses, research organisations, industry associations, and government, we

- co-fund, on a dollar-for-dollar matched basis, broad, multidisciplinary and industry-led manufacturing research projects that deliver commercial outcomes
- advance the wider cause of manufacturing transformation through industry education and public advocacy.

Manufacturing has entered a fourth industrial revolution. This offers vast opportunities for Australian companies to create new products and services, expand into new supply chains and markets in Australia and around the world, and attract and develop a new generation of skilled employees.

We aim to encourage and help manufacturers invest in collaborative research to exploit innovative technologies. We want to see the public perception of a capital- and labour-intensive brand of manufacturing shift to one that embraces industrial transformation, in which companies leverage digital technologies, including Industry 4.0, to deliver innovative business models and sell new products, services and solutions to a global market.







## Our Vision

is for Australian manufacturing to be thriving, relevant and globally integrated.



## Our Mission

is to help catalyse the transformation of Australian manufacturing through collaborative investment, research impact and innovation.



## Our Values

### Collaboration

Improving engagement between industry, research institutions and the global community with open, respectful conversations that leverage effective feedback and 'collective genius' to find the best pathways to success.

### Entrepreneurship

Thinking and acting creatively and adventurously and providing the insights and advice necessary to activate a spirit of enterprise and risk taking.

### Leadership

Demonstrating the courage and boldness necessary to create and foster the skills and methods needed to bring about industrial transformation. Prepared to question the norm, find better solutions and drive outcomes.

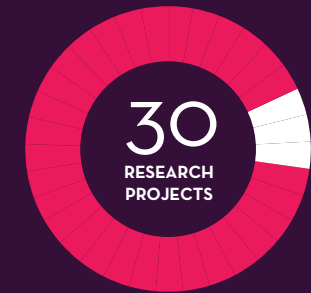
### Advocacy

Energising, engaging and inspiring individuals and the wider community to get behind the transformation of Australian manufacturing.

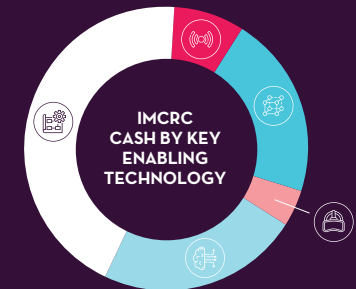
### Advancement

Pursuing economic and social progress by continuously seeking opportunities for change, growth and evolution.

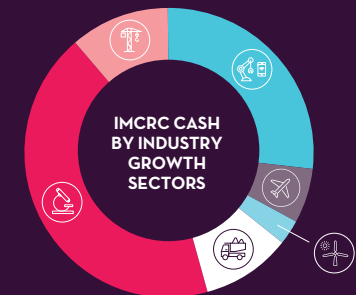
# Industry-led Manufacturing Research across Australia



● 26 in progress  
● 4 completed



● Additive manufacturing  
● Automation and robotics  
● Sensors and analytics  
● Augmented and virtual reality  
● Advanced materials

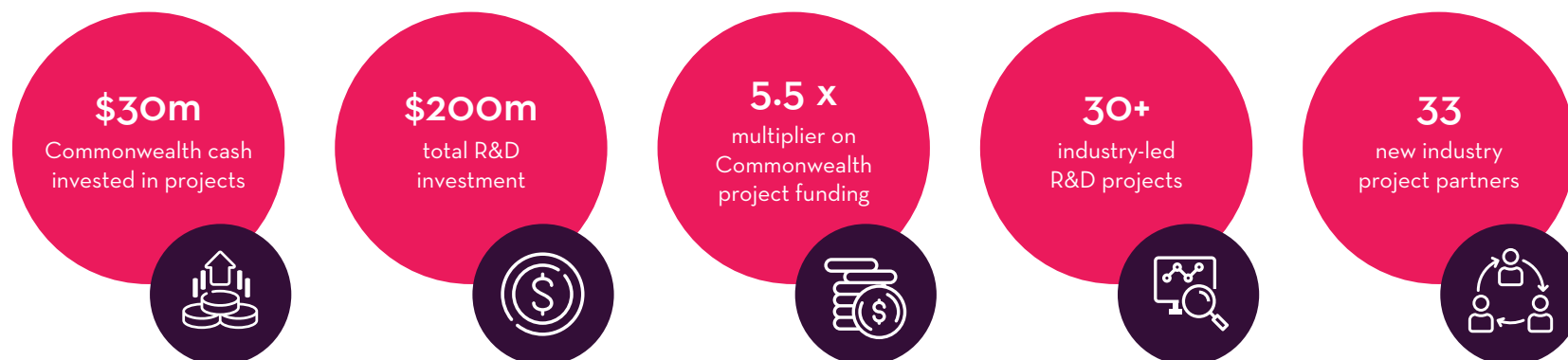


● Advanced manufacturing  
● Oil, gas and energy resources  
● Medical technology and pharmaceuticals  
● Building and construction  
● Mining equipment, technology and service  
● Defence

\* as at 30 June 2020

## Progress to Date

Since its launch in 2016, IMCRC has purposefully invested **\$31 million of Commonwealth and other funding** to advance Australian manufacturing, catalysing over **\$200m investment** in collaborative research, manufacturing innovation and education across Australia.



FOCUS	INDUSTRY FOCUS	RESEARCH COLLABORATION	MANUFACTURING INNOVATION	INDUSTRIAL TRANSFORMATION	ACROSS AUSTRALIA AND BEYOND
APPROACH	<ul style="list-style-type: none"> <li>Being industry-led</li> <li>Driving real-world manufacturing and commercial outcomes</li> <li>Removing barriers to SME participation</li> <li>Taking proof of concepts through to pilot readiness and commercial investment (TRL/MRL 4-7)</li> <li>Taking no CRC share in project IP</li> </ul>	<ul style="list-style-type: none"> <li>Accessing a network of 12 research organisations, plus CSIRO</li> <li>Agreed returns on investment for all collaborative parties</li> <li>In-kind contributions not matched with CRC cash</li> <li>Fostering talent through PhD stipends, Masters scholarships and industry internships</li> </ul>	<ul style="list-style-type: none"> <li>Co-investing in emerging manufacturing technologies (Industry 4.0) and new business models to benefit the broader Australian manufacturing industry</li> <li>Independent Innovation Investment Committee reviewing project applications</li> <li>Manufacturing projects across multiple key industry growth sectors</li> </ul>	<ul style="list-style-type: none"> <li>Delivering manufacturing industry SME customised education and awareness programs, centred around futuremap®, IMCRC's unique and proprietary diagnostic</li> <li>Collaborating with federal, state and local government, industry growth centres and industry associations to advance the adoption of Industry 4.0</li> </ul>	<ul style="list-style-type: none"> <li>Engaging with industry and research organisations across Australia</li> <li>Stimulating SME growth and collaboration</li> <li>International partnerships such as with Germany's Fraunhofer Institutes and New Zealand's Callaghan Innovation</li> </ul>
PROGRESS	<ul style="list-style-type: none"> <li>35 industry project participants</li> <li>~70% cash co-invested with Australian SMEs</li> </ul>	<ul style="list-style-type: none"> <li>30 projects approved with 4 projects completed</li> <li>Average project investment is 5.5 multiple on CRC cash</li> <li>26 PhD and Masters students</li> </ul>	<ul style="list-style-type: none"> <li>Projects across 6 primary industry sectors</li> <li>Investment in all CSIRO defined key enabling manufacturing technologies</li> </ul>	<ul style="list-style-type: none"> <li>futuremap® inspired 500+ manufacturers (90% SMEs) to future-proof their business and invest in Industry 4.0</li> <li>Catalysed the ~\$20m ARM Hub establishment in QLD</li> </ul>	<ul style="list-style-type: none"> <li>Industry-led investment across all states and the ACT</li> <li>&gt;80% CRC cash co-invested with Australian owned businesses</li> </ul>

## Our Partners

IMCRC believes in collaboration. By connecting companies and research organisations, and sharing knowledge and resources, we aim to make Australian manufacturing innovative, effective, resilient and relevant.

### Industry





## Research



## Other





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