



ARM
ADVANCED ROBOTICS
FOR MANUFACTURING
HUB

ACTIVITY SNAPSHOT

REPORT CARD



OUR INDUSTRY IMPACT

The Advanced Robotics for Manufacturing (ARM) Hub is building Australia's sovereign manufacturing capability. Our mission is to accelerate the creation and adoption of next-generation technologies, including artificial intelligence (ai) and robotics, to scale manufacturers and grow the nation's industrial capability.



HOW WE HAVE HELPED INDUSTRY APPLY DIGITAL TECHNOLOGY OVER FOUR YEARS



\$86M
IN SECURED FUNDS

Backing industry to undertake projects that will grow and scale their business



\$200M
IN NETWORK FUNDS

Funds delivered through manufacturing partnership programs including MMI collaborations



\$78M
PIPELINE

Submissions made for investment in projects and industry development



77
BUSINESSES

Participating in or pursuing projects with ARM Hub



213

Site visits and Industry 4.0 needs assessments conducted



8213

People engaged in person and online events



8

New products by ARM Hub Members and tenants



106

STEM and design interns and graduates from TAFE and university



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MESSAGE FROM THE CEO

*Professor Cori Stewart
Founder and CEO, ARM Hub*

Every day at the ARM Hub I see why Australia is renowned as a technology integrator on the global stage. Our Learning Factory is full of innovative companies creating and commercialising cutting-edge technologies and scaling-up manufacturing with a global outlook.

Together with our university, technology and government partners, we have participated in more than 77 digital transformation projects across the country over the past four years.

It is a privilege to lead the talented team at the ARM Hub as they bring new technologies and processes to the manufacturing sector. For example, we are building collaborative robots as new tools for manufacturers, implementing generative ai so manufacturers can reap the benefits of automation, and expanding the digital skills of workers so Australian manufacturing can secure its place in decarbonising global supply chains.

Through our work we are also creating the future capability able to support the nation's burgeoning electronics, biotechnologies, low emissions technology, defence technology industries, and more.

Industry's strong demand for ARM Hub Services in our first four years has informed our plans for the next four years. We will deepen our work with a focus in defence, low emissions technologies and renewables, and medical manufacturing. We will help commercialise new ideas and digitally transform manufacturers using our technical capabilities, and we will expand our national and international network of partners that have an important role to play in accelerating Australia's manufacturing revival.

My vision is for the Hub to galvanise and coordinate Australia's manufacturing innovation capabilities and set to work growing companies (and inspiring new ones), creating new industries and building local manufacturing supply chains with global reach.

I invite you to join the ARM Hub and its partners in creating Australia's modern industrial base for today and for tomorrow.



OUR PURPOSE

The ARM Hub is a nationally focused, not-for-profit organisation helping companies grow using advanced manufacturing technology. Our clients are companies seeking technology solutions to current and future manufacturing challenges. Our team works side-by-side with clients creating or adopting robotics, automation, ai, and industrial design solutions to improve their business. Our service is unique in Australia.



WHAT WE DO

We are specialists in helping companies understand and use:

- » robotics and cobotics
- » automation
- » data science and analytics
- » ai and machine learning
- » computer vision
- » industrial and human-centred design and design for manufacture
- » material science
- » cybersecurity.

We have an in-house team of technical staff and engineers that works directly with clients on projects. This expertise is augmented by a network of world-class industry and research professionals in the fields of robotics, ai, automation, industrial design, and more.

We have included some examples of the work we've done in the medical, defence, agricultural, and energy spaces from page 8.

The Australian Government is investing \$15 billion through the National Reconstruction Fund to diversify and transform industry and the economy. We are playing our role by focusing on companies in the following priority areas:



Medical Science



Defence Capability



Value-Add In Agriculture



Renewables and Low Emissions Technologies

WE ARE AN APPROVED RESEARCH INSTITUTE





ACTIVITY SNAPSHOT

The past year has seen growth in our service to industry.

Data and ai-as-a-service

In late 2023 we introduced a new service to help our clients make the most of their data. Many of our SME clients cannot develop, operate, and maintain data management infrastructure, leading to valuable information becoming invisible, underutilised, or lost. Our data and ai-as-a-service can draw together diverse data sources into a single platform in real time, providing greater insight into business operations.

Applying data and ai-as-a-service

As a pilot, we created a Retrieval Augmented Generation-based Large Language Model (LLM) for our organisation, called ARMBot. Like ChatGPT, ARMBot is a query and response-based model; however, ARMBot stores selected LLMs locally, only draws on our data, and is linked to the internet only when it is desired.

Jointly developed with a local company DKE, our junior engineer and fourth-year University of Queensland Mechanical Engineering student Callum Elder is also getting the opportunity to enhance its capabilities as part of his thesis in chatbots.

Board appointments

Our founder and CEO Professor Cori Stewart has been appointed to the Industry Innovation and Science Australia Board to provide a manufacturing with a voice in the development of government policy. Chair Emeritus Professor Roy Green has also been appointed to the CSIRO Board.



Industry-led Fellowships

We began a new four-year Industry-led Research Fellowship program in early 2024 to help companies commercialise projects in the areas of robotics, ai, data analytics, and design.

Technology in Manufacturing workshops

We had the pleasure of connecting with manufacturers in south-east Queensland and Mackay as part of our Technology in Manufacturing workshops. These practical, hands-on events showcased the benefits of robotics, ai, and additive manufacturing in growing a business. We will be visiting Toowoomba, Maryborough and Townsville in mid-2024.



Inquiry into advanced manufacturing

We contributed to the House of Representatives Standing Committee on Industry, Science and Resources inquiry into developing advanced manufacturing in Australia. The inquiry found Australia has a once-in-a-generation opportunity to revive a world-class competitive manufacturing sector by fully embracing the advantages of advanced manufacturing.

Industrial Transformation Training Centre in Radiation Innovation

We were part of a successful university and industry bid to establish an Industrial Transformation Training Centre to bolster Australia’s capabilities in sectors underpinned by radiation science and policy. The Centre, RadInnovate, is a collaboration between the Australian Government, the Australian National University (lead agency), University of South Australia, University of Adelaide, and 16 industry partners.

Major conferences

Our session at the Indo Pacific expo on using robotics and ai to scale-up manufacturing was a sell-out success. Our thanks to EM Solutions VP Programmes John Logan for his ‘fireside chat’ about the business and its adoption of advanced manufacturing technology to help build navy communication satellites.

We met with some of Australia’s leading biotech companies to discuss joint opportunities during our involvement in AusBiotech 2023 in Brisbane. AusBiotech is the nation’s largest life sciences conference.

Professor Cori Stewart participated on a panel with global energy leaders and leading voices across the energy ecosystem to discuss decarbonisation at ADIPEC 2023 in Abu Dhabi.

Health Innovation Forum

Smart companies Umbrella Solutions, Innovative Rehab Technologies, Remuve, Enabler, VALD, Conpago, and Omron demonstrated next-generation technology for health at a joint event with the Queensland Government.

Townsville Combat Training Centre

We received a fantastic response from attendees of the tour of the Townsville Combat Training Centre, James Cook University, and Cubic in Townsville. Our thanks to event partners Queensland Defence Science Alliance.

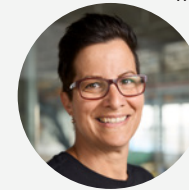
Industry and Academic Engagement

Each quarter we invited companies and academics to our Learning Factory to share information about their projects and activities with each other to encourage collaboration.

ARM Hub Technology Roadmap Accelerator for Female Founders

We helped six women on their advanced manufacturing journey as part of the ARM Hub Technology Roadmap Accelerator for Female Founders.

Thanks to the Queensland Government’s Accelerating Female Founders program, we were able to partner with VenturePro to run an 11-week program that increased the adoption of Industry 4.0 technologies in companies owned or run by women.



Among the group was **Stephanie Bofinger, founder of FemPro Armour.**

Stephanie creates armour from viscoelastic soft memory foam to protect women from injury in sport or high-risk professions, such as defence, security and law enforcement. The idea was sparked by her own challenge to find suitable equipment to protect her while riding her motorbike.

“As a woman, it was hard to find protective gear that fit properly. Most of it was designed for men, then just made smaller – and maybe with a token splash of pink! – for women. Very little if anything was properly designed to protect the boobs, which are prone to terrible tissue damage and that trauma can also cause internal injuries, such as rib, sternum and displacement of organs.”

The accelerator provided an opportunity to identify her manufacturing challenges and create a personalised roadmap to implementing solutions. Among the direct outcomes have been onshoring the company’s injection moulding for the armour components, an international defence contract, and interest from investors.



PRIORITY AREA

MEDICAL

“In the face of global challenges, Australian SMEs stand on the brink of a transformative opportunity in medical manufacturing, fuelled by government initiatives such as the Industry Growth Program (IGP) and National Reconstruction Fund (NRF). The time is ripe for innovation, collaboration, and growth.

The digital health sector is burgeoning, driven by an ageing population, chronic diseases, and technological advancements where businesses can harness ai, telemedicine, and health informatics to revolutionise patient care, making healthcare more accessible and efficient.

Australia's prowess in research and innovation lays a solid foundation for advanced manufacturing in medical devices, digital technologies and bio-manufacturing. From bionics to diagnostic devices, we aim to accelerate the journey from concept to market. ”

Sam Jesuadian, COO



IMPACT STORY Digital health

Australia's Medical Research Future Fund has allocated \$13.8M to address the challenge of health data fragmentation. This data problem impacts the care continuum, preventing large-scale research efforts targeting chronic diseases.

We are working with UQ-Queensland Digital Health Centre and 23 other Australian and global partners to co-design the National Infrastructure for Federated Learning in Digital Health (NINA) conceptual framework.

NINA will implement a data infrastructure based on a technique known as federated learning. Instead of bringing data sets together, the data sets will remain in situ, and an analysis of the data sets will be provided—a technique known as federated learning.

There is currently no federated learning for healthcare research in Australia. This disruptive technology allows knowledge to be gained from health data across organisations and states without attempting traditional integration.

It will provide Australia's researchers and industry with an ethical pathway to access large-scale comprehensive health data to accelerate research and improve outcomes for chronic disease.

PRIORITY AREA

DEFENCE

“The ARM Hub works in lockstep with Australia’s national defence strategy and its allies. Our daily interactions with defence SMEs and prime contractors in the defence industry are centered on identifying useful Industry 4.0 technologies within their production processes and implementing them.

The ARM Hub is uniquely positioned to translate new disruptive technologies out of the research sector into minimal viable products or capabilities at the speed of relevance for deployment to our warfighters. ”

Kevin Hernan, Director Defence



IMPACT STORY

Building Australian warships

We are working with international defence prime BAE Systems to develop a prototype edge preparation robot to help build Australia’s new warships.

BAE Systems Maritime Australia (BAESMA) was awarded the contract to build the Hunter class frigates for the Royal Australian Navy. The Hunter Class Frigate Program will provide six frigates optimised for anti-submarine warfare. BAESMA approached the ARM Hub to develop a system that would reduce safety risks, improve ergonomic considerations, increase production efficiency, and enable BAESMA’s pool of technicians to be deployed on higher value-adding activities.

We also congratulate BAE Systems and ASC Pty Ltd on their appointments as Australia’s Sovereign Submarine Build Partner and Sovereign Submarine Sustainment Partner. Together, these world-leading companies will build the SSN AUKUS submarines.



AGRICULTURE AND REGIONAL QUEENSLAND

“The concept of value-added agriculture encourages innovation, leading to more sustainable and efficient farming practices, higher-quality products, and increased competitiveness. We support national economic development by working with rural and regional companies to adopt next-generation technologies.

The banana dehanding project is one example of the use of robotics to overcome an industry challenge. Computer vision unlocked a solution for banana growers as it allowed robots to identify appropriate cutting locations. The flow-on effects are a safer and more efficient work environment and opportunities for other crop-types to adopt similar technologies.

We are also seeing the use of robotics and ai pave the way for domestic and international expansion. Female Founder Umar Nguyen from Platinum Providore is exploring how cobots can help her scale her wild scampi caviar business to meet demand from overseas clients. We are also helping companies to access investment to undertake projects that will have a significant impact on their business and local economies.”

Dr Troy Cordie, Lead Mechatronics Engineer



IMPACT STORY **Banana dehanding stage 2**

We are working with Australia's banana industry to improve processing.

The second stage of a research project to automate de-handing bananas is underway, with the proof-of-concept to be tested in a mocked-up banana processing facility at the ARM Hub Learning Factory.

Banana de-handing is the process of separating the banana hands from the bunch, which is repetitive and physically demanding. Improvements in efficiency impact on growers' processing costs and workers' safety, and is also a win for consumers.

The project is a collaboration with Hort Innovation, QUT, Future Food Systems CRC, and BNL Industrial Solutions.

In addition to being part of the project delivery team, our staff were instrumental in the feasibility stage of the study, which provided information to the industry on what was required for automation.

The robotic arm will build on the first stage of the project, which found that using computer vision within the robotic system could identify appropriate cutting locations, assisted by the contrasting green and black abscission line that is present where the banana hand connects to the stalk.



RENEWABLES AND LOW EMISSION TECHNOLOGIES

“The shift towards low emissions and renewable energies is vital for everyone’s future and Australia and Queensland are rapidly growing innovation leaders in this sector. The Australian and Queensland Governments’ approach will leverage our national advantages, R&D capability, bright ideas, procurement systems and our international collaborations to secure Australia’s place in high-value global supply chains, with a significant focus on the development and deployment of batteries.

At the ARM Hub, we are supporting the transition with battery, carbon sequestration, electric transport and automation companies using the full range of our services to innovate and grow. We are aware that for Australia to meet its 2050 carbon emission targets, large companies and SMEs need to make the transition to Net Zero. We will continue to assist Australian businesses, especially SMEs, on this journey.”

Professor Cori Stewart, CEO



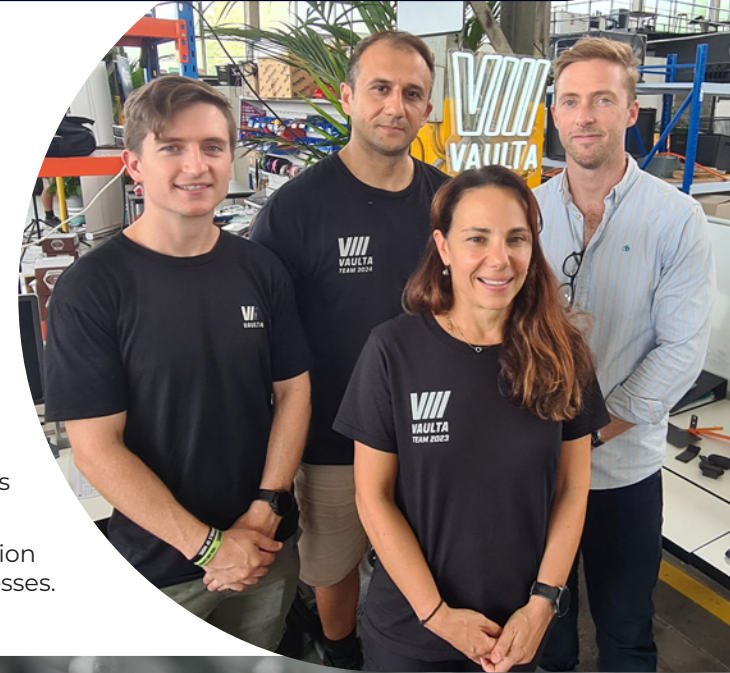
IMPACT STORY Vaulta

We are extremely proud to be supporting a Queensland start-up company to create cleaner, safer, and smarter lithium battery packs for Australian homes.

Vaulta is one of our amazing tenants at the ARM Hub Learning Factory in Brisbane.

The company has developed a new casing for lithium batteries that can be removed to repair the battery. Casings are one of the main reasons batteries are not repaired or recycled.

With our support, Vaulta has tripled its production capability and soon plans to automate its processes.



MEMBERS AND PARTNERS

“ARM Hub Membership offers flexibility to our clients, enabling them to choose which of our many services they need right now to achieve their objectives. These memberships are designed to suit companies of all sizes as well as not-for-profits and academic institutions.

We are extremely proud of our Members. In the past year, many have released revolutionary products and services into the marketplace. We have also welcomed the opportunity to work on projects with new Members, such as Downer. Downer has been awarded the contract for the Queensland Government’s Queensland Train Manufacturing Program.

The ARM Hub Learning Factory regularly hosts Australia’s industry and political leaders, which has led to Members leveraging introductions to grow their businesses. Our aim is to have your Membership serve as a catalyst for business development, foster partnerships, and build national and international collaborations that can lead to new opportunities and improved competitive advantage.”

Angela Reed, Director Marketing & Memberships



ROBERT is a neurorehabilitation robot owned by Queensland start-up and ARM Hub Member, Innovative Rehab Technologies. A one-of-a-kind in Australia, ROBERT offers both lower and upper limb robotic rehabilitation assistance to aid recovery and achieve better patient outcomes. The robot was successfully trialed at a major Queensland hospital to determine the value to staff and patients. Innovative Rehab Technologies owner, Daniel Carter, says the exposure they received through their ARM Hub membership has helped to fast-track their success.

OUR MEMBERS



We are proud to be an industry partner of the Australian Cobotics Centre (ACC), which is co-located at our Learning Factory.

The ACC is an Australian Research Council Industrial Transformation Centre is focused on the implementation of collaborative robotics to create a safer, more efficient, and globally competitive manufacturing sector.

The industry partners include B&R Enclosures, Cook Medical, InfraBuild, IR4, Stryker, TAFE Queensland, and Weld Australia. The research collaborator is CSIRO Collaborative Intelligence Future Science Platform while the university partners are QUT, Swinburne University of Technology, University of Technology Sydney, and the Technical University of Dortmund.

HISTORY

The ARM Hub was established in 2020 to accelerate technology adoption in Australian manufacturing.

The Hub was born out of a multi-award-winning advanced robotics collaboration between UAP (previously known as Urban Art Projects), the Queensland University of Technology (QUT), Royal Melbourne Institute of Technology (RMIT), and the Commonwealth Scientific Industry Research Organisation (CSIRO) with the financial support of the then Innovative Manufacturing Co-operative Research Centre.

The above partners worked on a challenging five-year robotics collaboration aimed to 'teach robots to see', resulting in new robots able to deliver bespoke and mass customised solutions for Australian-made manufactured products. The project drew hundreds of companies to visit UAP to see how the world's largest manufacturer of public artworks had successfully implemented robotics as well as augmented and virtual reality and new materials into its production workflow.

The demand generated by companies for digital transformation assistance after visiting UAP was the inspiration for the ARM Hub. Spinning out the ARM Hub business from QUT was Professor Cori Stewart with assistance from Professor Greg Hearn as well as Matt Tobin and Ann Maree Willet from UAP.

In 2024, QUT was nominated for the fourth consecutive year as Australia's top-ranking research institution in robotics by *The Australian Research Magazine*. Going into our fifth year, the ARM Hub continues to deliver the best in applied robotics research solutions partnering with over twelve universities nationally and internationally on projects. Key to the ARM Hub's success has been complementing this research expertise with its in-house design, engineering and commercial project management capability.

In 2024, the University of Queensland, which ranks in the top 50 universities worldwide, joined QUT, UAP and the Queensland Government as investors in the ARM Hub business.



ARM HUB STAFF

EXECUTIVE TEAM



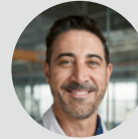
Professor Cori Stewart, CEO



Samuel Jesuadian, Chief Operating Officer



Angela Reed, Director Marketing and Memberships



Kevin Hernan, Director Defence



Ann-Maree Willett, Principal Advisor



Catherine Leather, Executive Officer

BOARD



Emeritus Professor Roy Green, Chair



Matthew Tobin, Director



Jackie Taranto, Director



Professor Mark Harvey, Director



Brian Sheahan, Director

EXPERTS

We have an extensive network of experts in the fields of artificial intelligence, robotics, design, and other technologies critical to advanced manufacturing. Visit armhub.com.au

TECHNICAL TEAM



Professor Jonathan Roberts, Professor in Robotics, Faculty of Engineering, Australian Robotics Centre Director, ARM Hub Technical Director



Professor Will Browne, Professor and Chair in Manufacturing Robotics, QUT, CSIRO & ARM Hub



Dr Troy Cordie, Lead Mechatronics Engineer & Project Services, ARM Hub



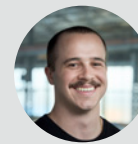
Anthony Franze, Industrial Designer



Lindsay Paul, Graduate Electrical Engineer



Harrison Tucker, Graduate Mechatronics Engineer



Callum Elder, Mechatronics Engineering Intern



Patrick Lin, Software Engineering Intern



Alex Young, Mechatronics Engineering Intern



Carl Martin, Business Development and Biomedical Intern

OUR 2023-24 OPERATIONS



57

Site visits and Industry 4.0 needs assessments conducted



5297

Engineering hours provided to industry



34

Grants and tenders completed to the value of \$76.3M



30+

Companies referred to robotic and technology integrators



16

Request for Quotes sent to robotic and technology integrators

We are an industry-run centre that tackles problems brought to us by industry.

FOUNDING MEMBERS



UAP



imcrc

with the support of the



Queensland
Government



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