

EXTENDED REALITY COOPERATIVE RESEARCH CENTRE

INVITATION TO PARTICIPATE



DISSOLVING DISTANCE AND DISADVANTAGE

Immersive experiences that will redesign business, eliminate distance and provide readily accessible content for workforce, society & culture





WELCOME FROM

Professor Julie Owens

DEPUTY VICE-CHANCELLOR | RESEARCH

While Deakin has an enviable existing research capability in eXtended Reality that qualifies the University to lead a CRC bid, the vision for the bid goes beyond an extension to our existing research programs and reimagines eXtended Reality in a holistic way as a tool to dissolve distance, boundaries and disadvantage.

Many other research and training organisations in Australia also have considerable expertise in this area and their committed involvement in the CRC is critical.

This will also be a true industry-led CRC solving real-world problems and providing commercial solutions for the partners that will form the backbone of the research program.

We welcome the participation of industry partners in this exciting new endeavour.

Professor Julie Owens
Deputy Vice-Chancellor Research





WHY THE XRCRC?

The Extended Reality Cooperative Research Centre - XRCRC - invites industry partners to be part of a transformative journey that will revolutionise the global workforce, society and culture through the provision of readily accessible experiences and content enabled by eXtended Reality (XR) research and technologies. Advances in cyber-physical systems including artificial intelligence, automation and connective technologies are rapidly changing the nature of work, education and social interaction. By dissolving the constraints of distance and disadvantage, XR technologies and experiences enable equitable and accessible solutions to training for the jobs of the future.

XR represents the spectrum of immersive technologies and experiences that encapsulate human and machine interaction across real and virtual environments. The creative power of XR is the capacity to evoke a profound emotional response through sophisticated real-time human and machine interaction design. Whether it be empathy, delight or introspection, XR's capacity to empower and engage users through unique individual experiences will greatly enhance the impact and efficacy of immersive learning.

As global industry adapts to new opportunities, the skills required to participate in the workforce will expand and diversify. This shift necessitates a new approach to preparing workers of the future through industry-validated XR-based training, education and upskilling. XR solutions are the key interface to ensure individuals are able to adapt to this transformation in those industries and sectors where human intervention and interaction remain essential.

Through the XRCRC, Australia will demonstrate the vision, innovation and advanced research capabilities necessary to ensure society can adapt to the future of work through enhanced education processes, training systems and technological advancement. In doing so, Australians will be among the first to benefit as we address the grand challenge of moving into the fourth industrial revolution.

“By dissolving the constraints of distance and disadvantage, XR technologies and experiences enable equitable and accessible solutions to training for the jobs of the future.”



XR MARKET

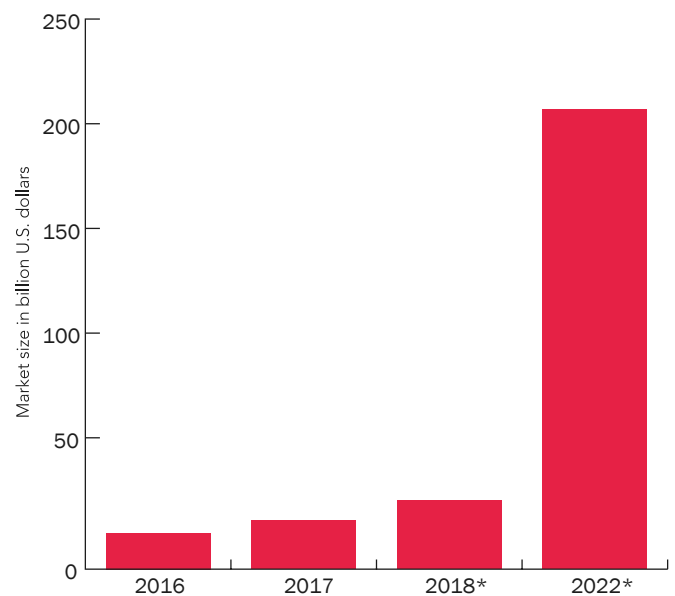
PROJECTIONS AND OPPORTUNITIES



The sheer size of the projected XR market growth is staggering and whilst estimates can vary from \$170B USD - \$209B USD as the value in 2022¹, the phenomenal growth trajectory suggests that XR will drive the next industrial revolution.

Estimates predict the VR, AR and MR markets are expected to grow in market size to \$13B USD, \$27B USD and \$300M USD respectively by 2019², and the market side of VR training alone to be over \$6B USD in 2022³.

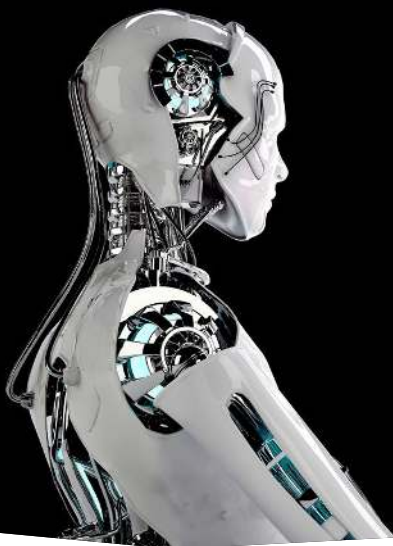
The Federally-funded Australian CRC Program is a proven mechanism for building Australian capability and growing our economy through research-inspired innovation and knowledge creation. The XRCRC will be industry-led, delivering real world solutions that are commercially fit for purpose, ethical and equity-minded, positioning Australia to take a leading role in this emerging market.



XR technologies (such as AR and MR) are poised to reach the plateau of productivity within the next five to ten years, achieving ubiquity and utility within a wide range of industries and applications areas.



1. <https://www.statista.com/statistics/591181/global-augmented-virtual-reality-market-size/><https://www.consultancy.uk/news/17876/virtual-and-augmented-reality-market-to-boom-to-170-billion-by-2022>
2. Deloitte Insights, Digital Reality: A Technical Primer, 2018
3. ABI Research, Virtual Reality in Enterprise Training, 2017



RESEARCH PROGRAM

STRUCTURE, TARGET DISCIPLINES AND SECTORS

The strategic aim of the XRCRC is to collaborate with industry to meet the changing needs of society and to grow the Australian economy. Core to this aim is the design, development, implementation and curation of XR content.

Technological innovation enables the production of content that is better, cheaper and more efficient to produce. For example, integrating existing proprietary software and equipment into virtual production ecosystems with haptic enablers can enhance the experience for both creators and consumers of XR content.

Responses from the consumer are at the centre of the research effort, informing optimal product development and iteration.

Across the XRCRC, research teams will be necessarily multi-disciplinary, incorporating expertise from health care, education, arts, engineering, creative industries and more, drawing on the technological powerhouse of data science, software engineering and computer science.

XRCRC				
INDUSTRY PARTNERS & SECTORS	RESEARCH PROGRAM			EDUCATION & TRAINING PROGRAM
<ul style="list-style-type: none"> • Companies • Not-for-profits • Government • Agencies • Universities (domestic and international) • TAFE • Quality-Assured/Non award Training • Organisations • Health Service Providers • Hospitals • Retail • Infrastructure • Mining • Manufacturing • Entertainment • Service Sector • Banking and Finance 	JOBS OF THE FUTURE/UPSKILLING			<p>The Education and Training Program will provide:</p> <ul style="list-style-type: none"> • PhD industry placements • Content for award and non-award courses • Tailored industry-based training content • Regional and remote upskilling for carers volunteers and skill building
	HEALTH	EMERGENCY TRAINING & SIMULATION	FILM, TV & ANIMATION	
	<p>Patient awareness/engagement with treatment, carer training, simulated social skills training for people with psychosocial or cognitive disabilities</p>	<p>Simulations for emergency situations that are too hazardous to create in real life such as aircraft emergencies, train station or other public place rush hour evacuation, cruise ship emergencies, humanitarian disaster simulations</p>	<p>Film, TV, Streaming, Computer Graphics, Visual Effects, Game Development</p>	

XRCRC OUTCOMES

FASTER, BETTER, CHEAPER

THE XRCRC ADDRESSES THE NEED FOR FASTER, BETTER, CHEAPER EXPERIENCES AND WILL DELIVER:

1	<p>AUTOMATED CONTENT GENERATION</p> <p>Focus on creating techniques and tools that can help improve the content generation workflow, with a specific focus on combining traditional procedural generation techniques with recent advances in AI to improve the overall productivity of this common task.</p>	
2	<p>NEXT GENERATION INTERACTION MODELS</p> <p>XR systems present new challenges in interaction between user and XR. This area focuses the research to identify generalisable patterns that can be supported by associated software frameworks to improve overall quality of experience.</p>	
3	<p>CONSTRUCTION WORKFLOW TECHNIQUE AND TOOLS</p> <p>The overall life cycle and workflow of XR systems bring challenges across the entire life cycle and present new risk vectors. This area focuses on project management and tools/techniques for construction workflow automation.</p>	
4	<p>EDUCATION (XR SPECIALISATION)</p> <p>XR is a specialisation, and there is a need for talented resources that are aware of the specific tools, techniques and approaches to ensure we create high quality applications cost effectively. This research area focuses on the courses (what to teach and how) that will prepare the next generation of staff for organisations with a focus on XR. This is critical to ensure that the industry overall is successful.</p>	



RESEARCH THEMES

HEALTH | EDUCATION | EMERGENCY | CREATIVE INDUSTRIES

The **XRCRC** has identified the following key research themes, which intersect across multiple disciplines and industries. A brief description of each research theme is below

JOBS OF THE FUTURE | UPSKILLING

Australia's workforce needs are changing and, combined with an ageing population, this presents a significant challenge to the economy. Training, educating and upskilling are essential to responding to this change. XR provides the disruptive ability to train, educate and upskill 'faster, cheaper, and better' than conventional methods, as well as providing access to training environments which might not be otherwise possible due to cost and logistical constraints.

HEALTH

Health care is an increasing cost to the community – one that can be managed most effectively with improved education, upskilling and managing better the emotional communication across stakeholders. XR technology coupled with recent advances in AI techniques provide the foundations for a range of new interventions, as well as help us improve depth of training at a lower cost and provide novel options that improve emotional wellbeing.

EMERGENCY TRAINING

Emergency services and first responder organisations face unique challenges every day in being prepared for and managing high risk situations across police and security, fire and natural disasters, and community and public safety management. XR technologies offer emergency services and first responder organisations opportunities to enhance effectiveness with operational and training solutions, and also as a means for community outreach programs and message delivery. The XRCRC will be a dedicated research program that brings together technology and domain

expertise to identify, assess, develop, test and integrate XR into emergency services. Understanding the viability, applicability and suitability of XR solutions and the benefits they can bring, currently and in the future, will be a key research driver for the emergency service organisations in partnership with the XRCRC.

FILM | TV | ANIMATION | GAMES

XR technologies such as VR and AR are creating enormous opportunities for the creative industries in general, and film/television and animation in particular. In these fields, the telling of stories through the creation of content is a core concern, and XR technologies have the ability to become both the medium for creating new stories for expanding audiences, as well as the format on which outputs can exist. With the increasing demand for content for our big and small screens, the integration of XR technology represents a point of disruption for the field, even as it offers tremendous potential for creative innovation. Through the XRCRC, technology and domain experts will come together to explore the integration of XR technologies into the creative industries fields of film, television and animation, as well as associated fields that focus on the application of entertainment-based content production to other domains (i.e. health, training, engineering). Through these industry and research partnerships, the XRCRC will identify, assess and evaluate the application of XR across the content production life cycle. Understanding the benefits of XR solutions to creative storytelling will be a key research driver for partner organisations.

XRCRC PARTICIPATION

The XRCRC will provide an opportunity to partner with other segments of industry and the research community to develop leading-edge applications in the eXtended Reality market. This program will be responsive to a range of sectors including utilities, aged care, manufacturing, and health, bringing together industry, not-for-profits, SMEs, government agencies, TAFE and other education providers to deliver future-facing upskilling solutions.

The XRCRC will offer flexible IP and commercialisation agreements with the aim of growing sovereign skills and job opportunities, growing social skills sectors, growing the economy and growing sustainable investment.

THERE ARE THREE WAYS TO GET INVOLVED IN THE XRCRC:

CORE PARTICIPANT

Commit cash and in-kind investment over the life of the XRCRC. Are entitled to XRCRC company membership and to shape the business including: governance and operations; R&D programs, strategy and setting key milestones; intellectual property and commercialisation principles. Core Participants share in the equity benefits.

SUPPORTING PARTICIPANT

Commit to a lower level of funding, likely on a per project/program basis. Share in benefits of the specific projects they work on.

SMES

Through the establishment of a separate entity, SMEs can join together to become a Core Participant. This a proven model providing access for a greater number of participants in the XRCRC and the structure is purpose-designed for representation on key decision-making committees within the XRCRC. SMEs can also work on specific projects.

TIMELINE

MAR 2019	APR 2019	JUN 2019	JUL 2019	SEP 2019	NOV 2019	FEB 2020	JUL 2020
Develop Research Program	Partner commitments	Stage 1 Application finalised	Stage 1 Submission	Stage 2 Selection	Stage 2 Submission	Interviews	XRCRC Commences

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