

ARIVE



ARIVE Lecture Series XR: Virtual and Augmented Reality

Introduction

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1. XR Potential and Challenges
2. The ARIVE Consortium
3. The ARIVE Lecture Series on XR



XR Potential and Challenges



XR

Cross Reality X Reality

X = {any form of interactive virtual environment}

{Virtual | Augmented | Mixed | Cinematic | Extended | ... } Reality

XR Potential and Challenges

The future of human-information interfaces is:

- interactive
- three-dimensional
- transparent
- engaging
- information rich
- dynamic
- complex
- smart
- multi-sensory
- ubiquitous
- intuitive
- ...
- exciting



XR Potential and Challenges

Engineering



© Microsoft

XR Potential and Challenges

IIoT



© Emerson

XR Potential and Challenges

Training



© Walmart / Rivard Report

Entertainment/Wellbeing



© Staples VR

Therapy



XR Potential and Challenges

Volumetric Video



© Microsoft / Techradar

Telepresence



© Vimeo



XR Potential and Challenges

Some major challenges:

- high-quality information display
- convincing and coherent blending of real and virtual
- understanding human perception and cognition
- post-WIMP interaction
- accurate and precise localisation and tracking
- immersive data visualisation and analytics
- making interfaces disappear
- appropriately addressing senses and emotions
- bringing back fun alongside efficiency
- intelligent and autonomous interfaces
- enabling presence and telepresence
- ...
- How to deliver new and meaningful experiences with computer-mediated realities, aka XR?

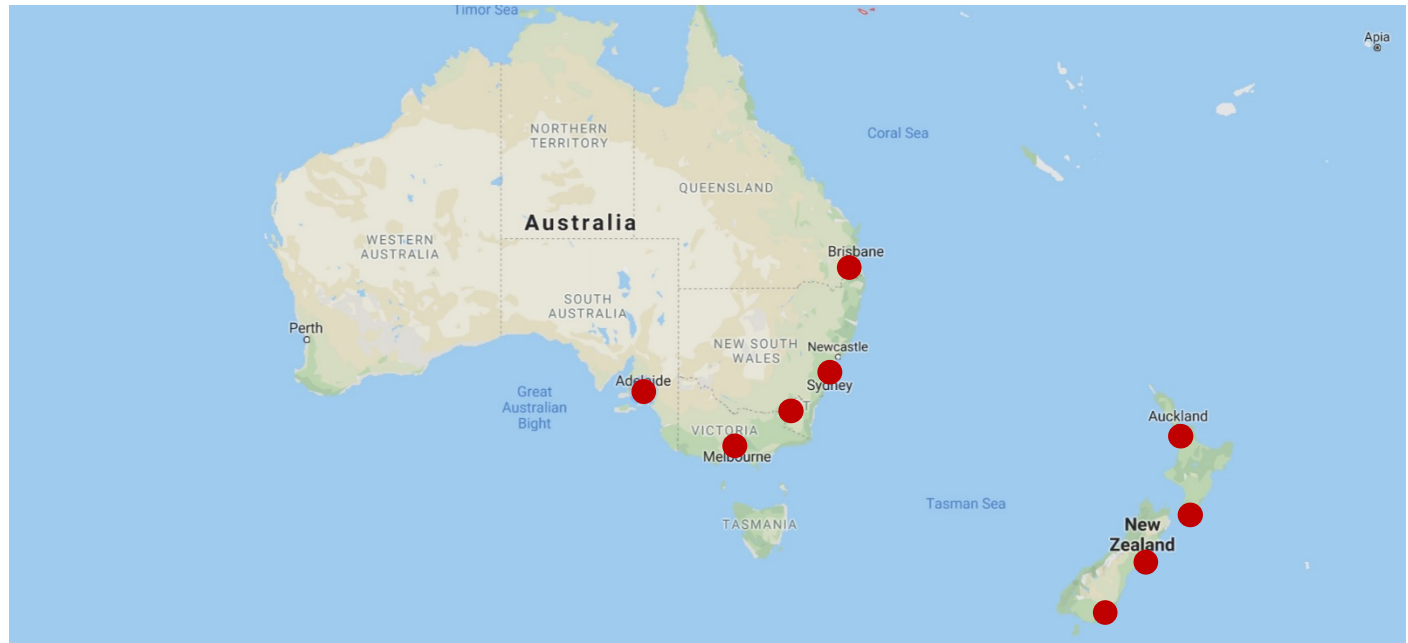


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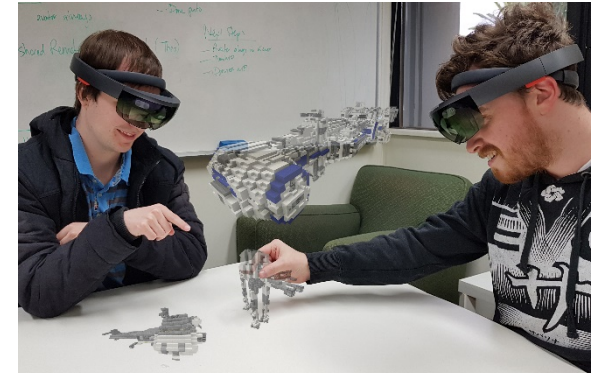
The ARIVE Consortium

Australasian Researchers in Interactive Virtual Environments



ARIVE Partners

- ARIVE network links together existing world class AR/VR laboratories and groups
- One of the largest AR/VR networks internationally
- Initiated by Profs Mark Billingham and Bruce Thomas



Teaching

Develop AR/VR training materials for use by ARIVE partners

Create well trained AR/VR researchers and developers for industry

Research

Share research resources and facilities

Grow a thriving research community of faculty, research staff and students

Generate novel research output and intellectual property

Commercialization

Support the Australia/New Zealand AR/VR industry

Conduct multi-institution research to meet the needs of our industry partners

Transfer technology to national/international partners



- Interaction Techniques
- Simulation and Visualization
- Immersive Analytics
- Education and Training
- Empathic and Assistive Technologies
- Computational and Cinematic Media
- Immersive Gaming
- Presence and Telepresence

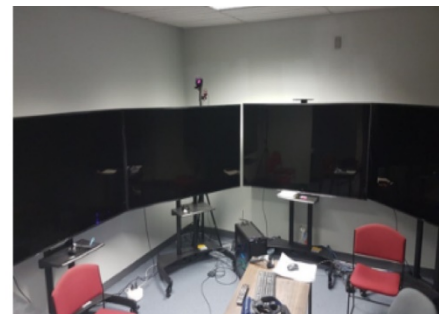


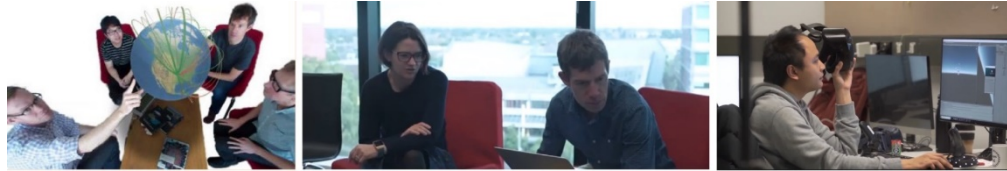
ARIVE Groups





Australian Research Centre for Interactive and Virtual Environments (IVE)





IALab: Immersive Analytics Lab







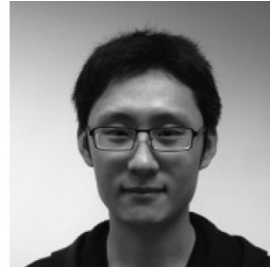
Expanded Perception and Interaction Centre (EPICentre)





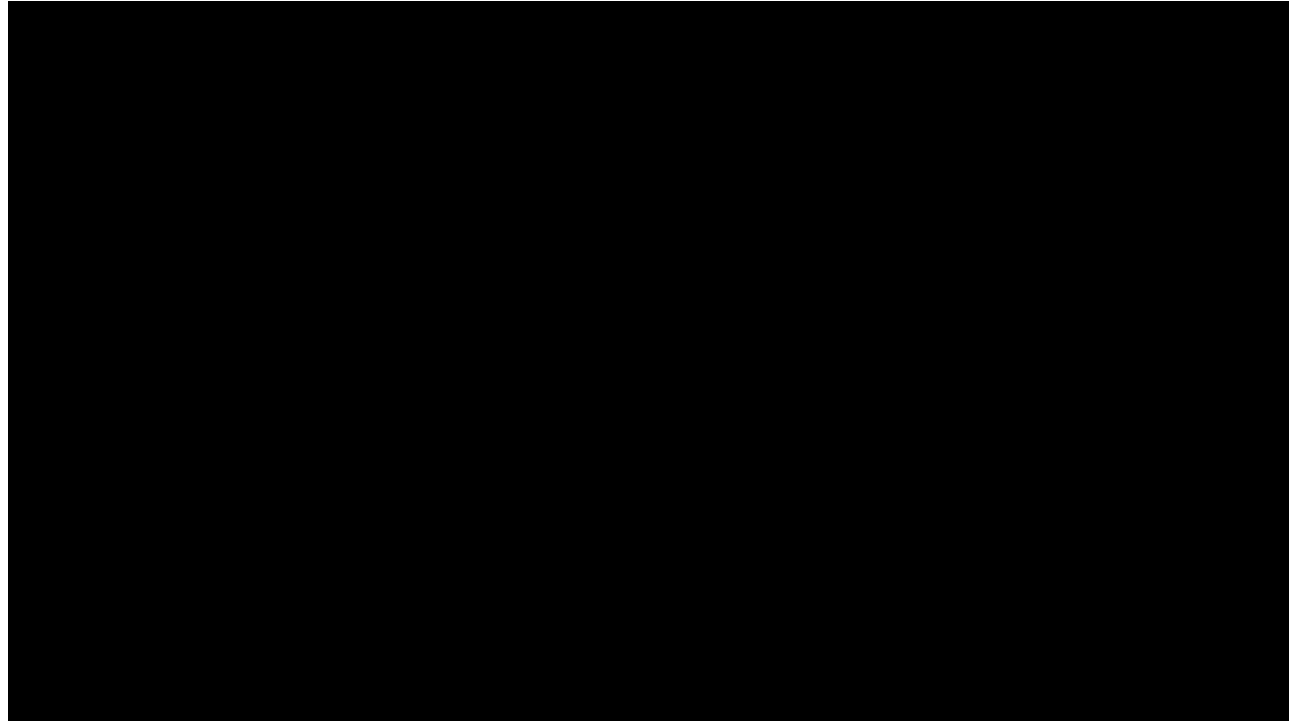
Empathic Extended Reality & Pervasive Computing (EXRPC) Laboratory





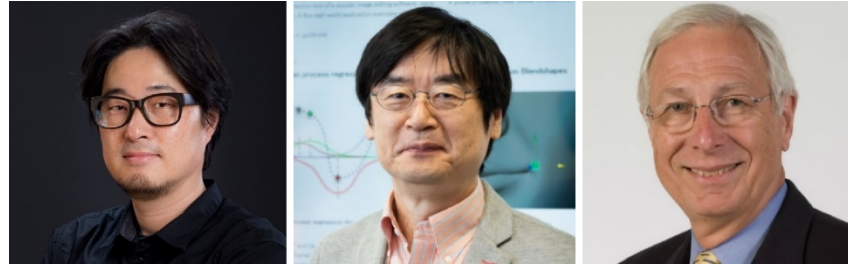
Auckland Human Laboratory and Empathic Computing Laboratory



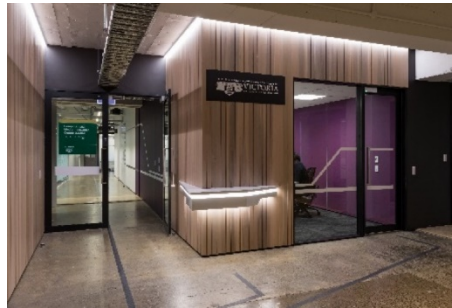


Mark B

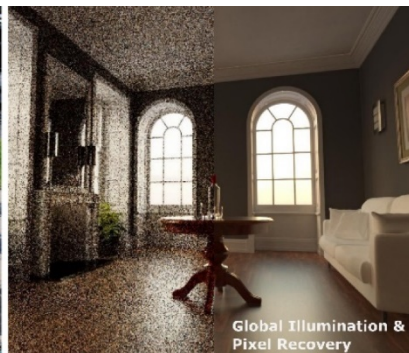




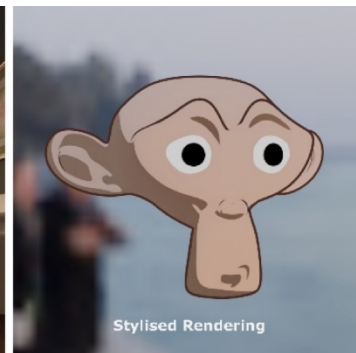
Computational Media Innovation Centre (CMIC)



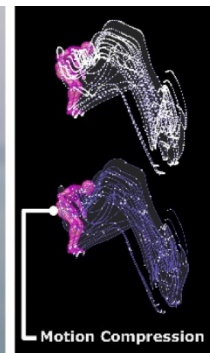
Machine Learning & Mixed Reality Rendering



Global Illumination & Pixel Recovery



Stylised Rendering

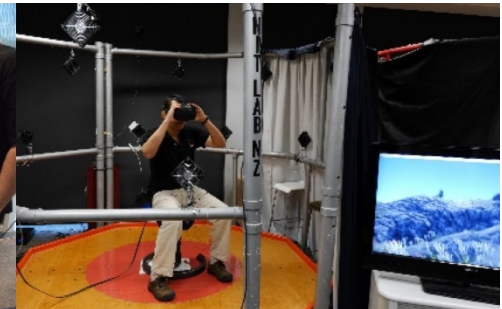
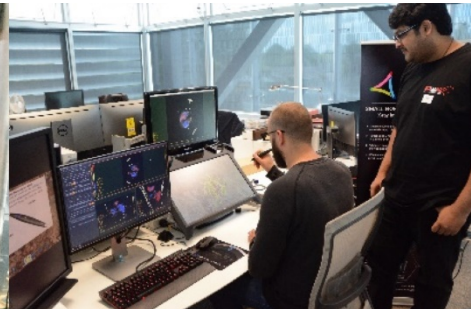


Motion Compression

The University of Canterbury



Human Interface Technology Lab New Zealand (HIT Lab NZ)



The University of Canterbury



Rob L

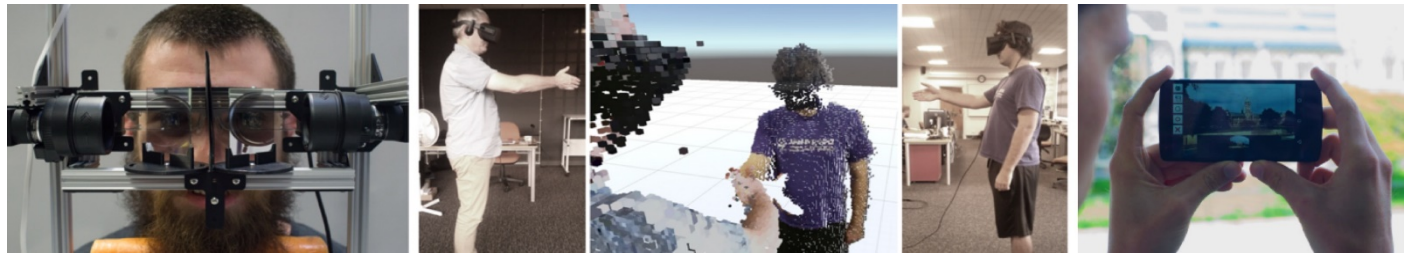
The University of Canterbury

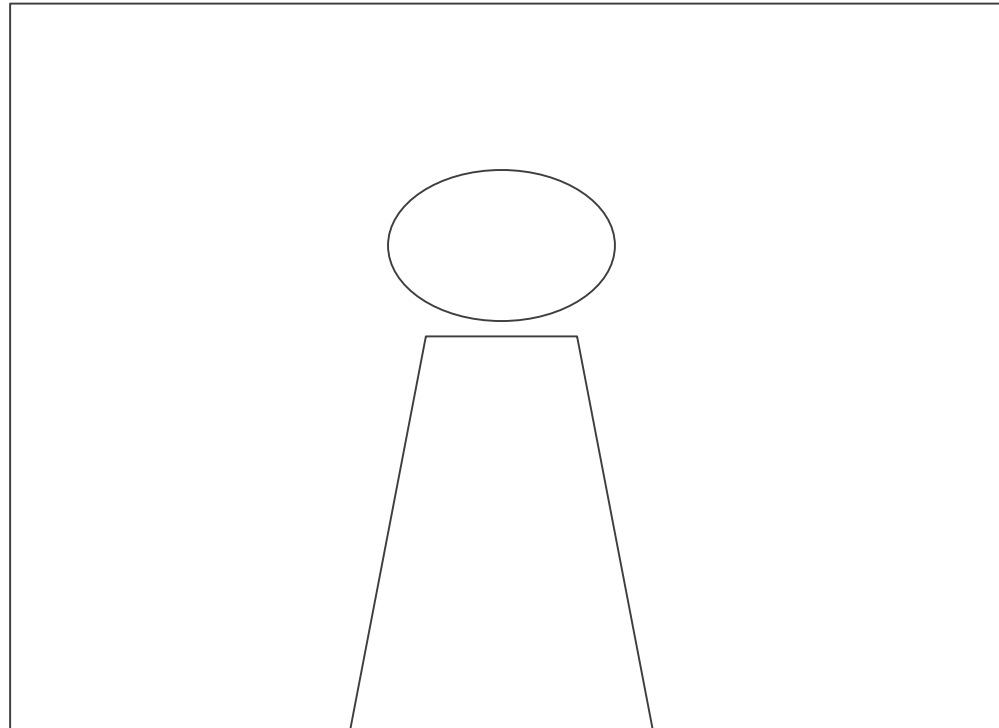


Stephan L



Human-Computer Interaction and Visual Computing Labs



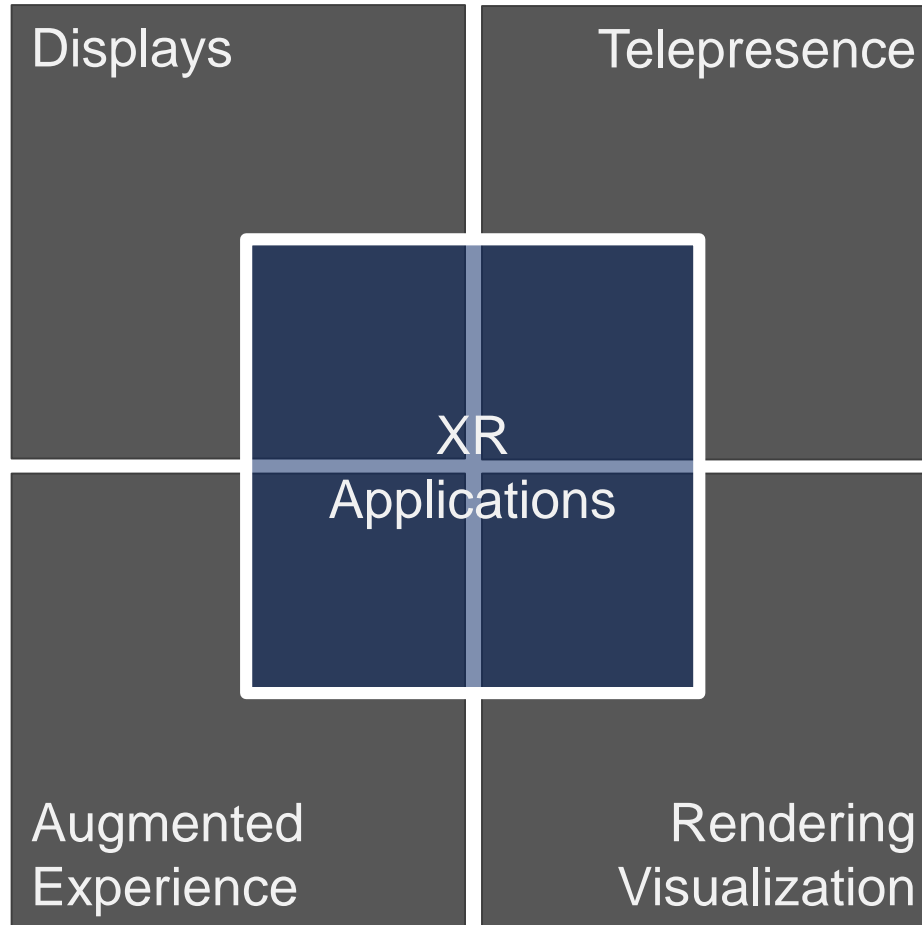


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The ARIVE Lecture Series on XR

ARIVE Lecture Series on XR



ARIVE Lecture Series on XR

Lecture	Date	Topic	Who?
1a	July 7	Introduction: Introduction to the ARIVE Lecture Series on XR	UO
1b	July 9	Introduction: XR/VR/AR/MR Definitions, Concepts, Main Technologies	UO
2a Displays	July 14	Displays: Optical-see through HMDs	UO
	July 16	Displays: Computational Glasses	UO
	July 21	Displays: Immersive Projection Systems	UniSA
3b	July 23	Applications: Industrial XR	UniSA
4a Telepresence	July 28	Telepresence: Presence, Telepresence, Embodiment	UO
	July 30	Telepresence: Nomadic and Mobile Telepresence	UO
5a	August 4	Telepresence/ Augmented Experiences: Empathic Computing	UA
5b Augmented Experiences	August 6	Augmented Experiences: Augmenting Humans	UA
	August 11	Augmented Experiences: Multi-Sensory VR Experiences	UC
	August 13	Augmented Experiences: Immersive Games in Sports and Health	UC
	August 18	Augmented Experiences: Collaborative AR	UQ
7b	August 20	Augmented Experiences: Physiological Sensors/Input and XR	UQ

subject to change



ARIVE Lecture Series on XR

Lecture	Date	Topic	Who?
8a Rendering Visualization	Sept. 1	Rendering and Vis: Visual Computing for XR	UO
	Sept. 3	Rendering and Vis: XR for Sports	UO
9a	Sept. 8	Rendering and Vis: Immersive Analytics: Exploring Data on the Surfaces and Space Around Us	Monash
9b	Sept. 10	Rendering and Vis: IATK Introduction -- Immersive Analytics Toolkit, an introduction	Monash
10a	Sept. 15	Rendering and Vis: Photorealistic XR I	VUW
10b	Sept. 17	Rendering and Vis: Photorealistic XR II	VUW
11a Applications	Sept. 22	Applications: Multi-Modal High-Performance Visualisation System	UniNSW
11b	Sept. 23	Applications: Simulations, Visualisation, Big Data and Digital Twins	UniNSW
12a	Sept. 29	Applications: XR and Learning and Education	UO
12b	Oct 1	XR Ethics and Professionalism	UO

subject to change





Thank you.

Contact (for this lecture)



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