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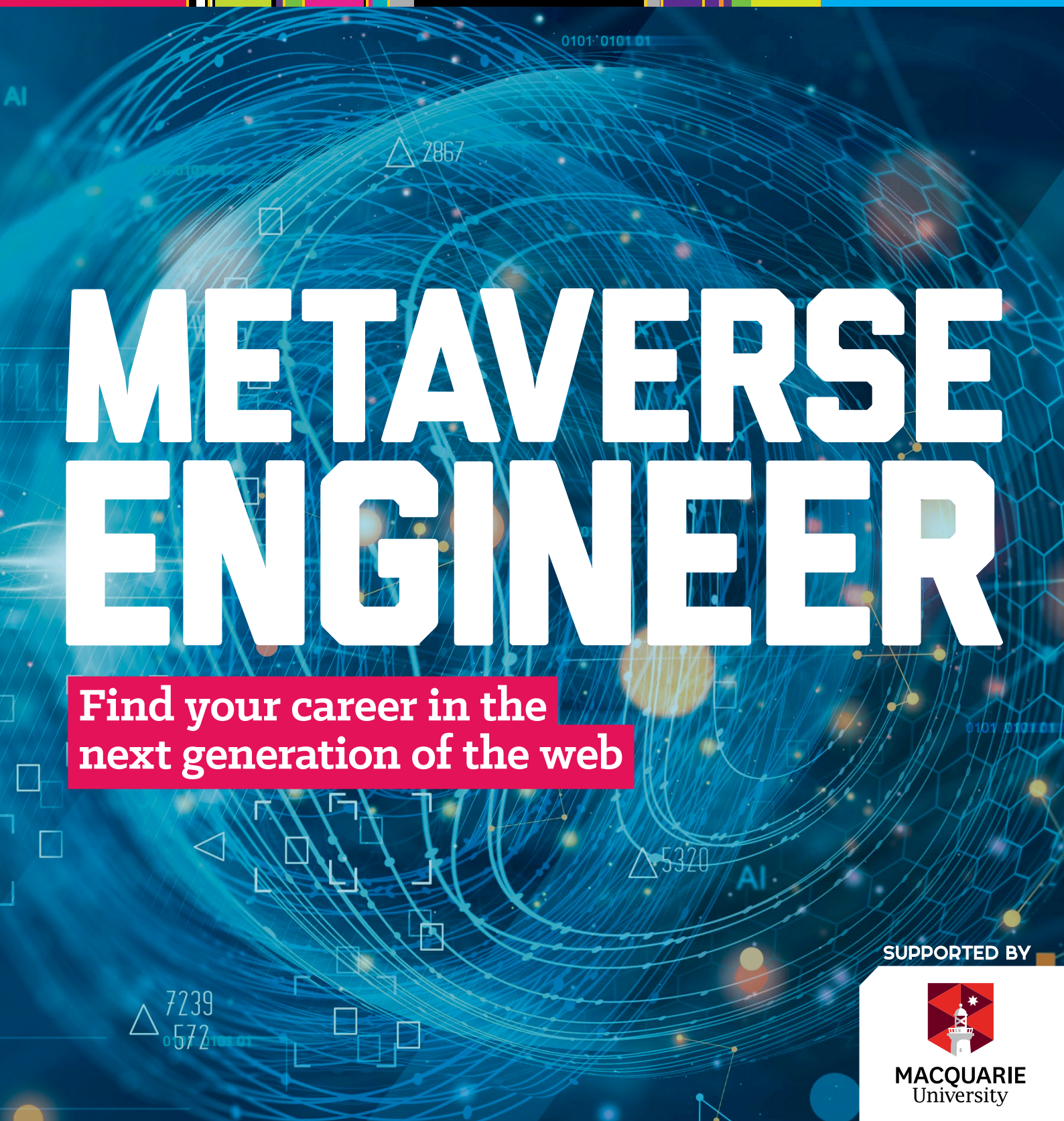

METAVERSE ENGINEER

Find your career in the next generation of the web

SUPPORTED BY

MACQUARIE University

(YOU)us

CAN HELP BUILD THE FUTURE

MACQUARIE University
SYDNEY·AUSTRALIA

Fascinated by AI and virtual reality? Want to work on the frontline of information technology creation in the future? Metaverse engineers engage with new technologies spanning various domains of the metaverse, including research science, ecosystem management, augmented reality, machine learning, spatial computing and blockchain.

Macquarie offers a range of information technology degrees and majors in areas such as cybersecurity, games design, artificial intelligence, data science, app development and software technology. You'll benefit from state-of-the-art facilities – such as our new 14-lab computing precinct with cybersecurity, networking and gaming labs, and VR space – and you'll hone your skills under the guidance of experts dedicated to preparing you for the technology of tomorrow.

FIND OUT MORE AND APPLY TODAY.

GO ANYWHERE

Enter the metaverse, and discover how interactive technologies can help people today and tomorrow

The concept of the metaverse originated in sci-fi in the 1990s and describes a world where the internet is a part of everyday life, facilitated by technology such as virtual reality (VR), augmented reality (AR), and the Internet of Things, or IoT. It's a term that defines how we will use the web in the future (and, increasingly, are already using it).

One cool example of AR is Minecraft Earth, a project to map the world with Minecraft. But the metaverse is much more than games and fun experiences online — it can change the way you see and interact with the virtual world and bring it more into our physical daily lives. The applications of metaverse development are really broad — it's part of healthcare, tourism, education, gaming, real estate, marketing, finance, construction and many other industries. It's been a fascinating career journey for me.

My path to becoming a researcher and academic isn't a traditional one. I come from a low socioeconomic background and left home as soon as I finished the HSC (NSW Higher School Certificate). To support myself, I started working in the bank, then in a computer bureau. That was the start of my IT career. I didn't start studying IT until my mid-twenties when I realised I'd have to start each job at the bottom without a qualification. I completed a Bachelor of Business by distance education while working full-time and caring for my first two children, then did a Master and then a PhD in AI. I've had about 20 years of industry experience and, before coming to Macquarie University, I had my own IT company. With IT it's really true that you can start anywhere, and go anywhere. And metaverse engineering is a really exciting and emerging career area to explore.

DEBORAH RICHARDS
PROFESSOR, SCHOOL OF COMPUTING, MACQUARIE UNIVERSITY

We've used VR to help border security personnel better recognise suspicious behaviour through facial expressions, or to train physiotherapists to develop empathy for dementia patients. And we programmed an empathetic virtual character for The Children's Hospital at Westmead: Dr Evie to discuss recommended treatments with patients who were on the waiting list to see a specialist for incontinence. This led to a significant increase in people following their treatment and getting better.

There are so many ways that working in metaverse engineering can help society. You'll have to keep learning but it will be a rewarding and challenging career because it's always evolving.

Deborah Richards, Professor with the School of Computing, Macquarie University

> "IT WILL ALWAYS BE A GREAT CAREER BECAUSE IT'S ALWAYS EVOLVING"

SUPPLIED/SHUTTERSTOCK

Check out CareerswithSTEM.com for more insights, information, inspiration and advice about metaverse engineering careers!

LECTURER TO PROFESSOR WITH THE SCHOOL OF COMPUTING, MACQUARIE UNIVERSITY
COMPANY DIRECTOR AND COMPUTER CONSULTANT
PHD IN AI
MASTER OF APPLIED SCIENCE (INFORMATION STUDIES)
BACHELOR OF BUSINESS (COMPUTING + MANAGEMENT INFORMATION SYSTEMS)
ICT PROFESSIONAL (VARIOUS INDUSTRIES)

INTO THE METAVERSE

Change the way we connect, game, work and play with a career that's literally out of this world

Welcome to the metaverse, the next generation of the web! The metaverse is based around a group of technologies that are changing the way we live, work and play. A world-within-a-world where the digital tools we have and the physical objects we use change the way we interact with each other, irl and online, and that can apply to games, healthcare, education and more.

Jobs in the metaverse include data scientists and analysts, blockchain engineers, VR and AR developers, games programmers, and AI specialists working in machine learning.

Careers include more than just technical roles. One of the most important aspects of designing useful VR and AR worlds is ensuring that the user can interact with an interface (an interface is how a user interacts with the digital world, like when you tap on your phone screen). We'll need specialists who build communities and manage projects, plus design experts and people with research skills to help us understand how to build technology into our world. We'll also need people who understand laws and ethics, to make sure we build it fairly, and people with different perspectives and from different backgrounds, to make sure we build it in a way that's accessible and inclusive of everyone.

What's it like working in metaverse engineering? Jump into some real-life projects to find out.

What's it worth?

The global **AI software market** is forecast to grow to **$300 billion by 2026***.

SOURCE: WWW.IDC.COM/GETDOC.JSP

SKILLS BREAKDOWN

- Programming
- 3D modelling and design
- Mobile development
- Maths, particularly trigonometry, but also matrix transformations
- Unity3D or Unreal Engine
- Mobile development
- Understanding of user experience/comfort
- Rendering pipelines
- Media and games development
- Lens optics
- Audio
- Networking

WORDS: HEATHER CATCHPOLE. PICS: SHUTTERSTOCK

JARGON BUSTER

AR Augmented reality overlays digital information like graphics or text onto your view of the real world.

Blockchain A linked record of transactions (like a purchase), which can't be hacked.

Machine learning A system where software learns to recognise patterns, make predictions, and make decisions based on the data it's trained on.

Metaverse A virtual universe that's a digital parallel to our own world. It's a place where people can immerse themselves, interact, and engage with others in a shared virtual space. It's like stepping into a fully interactive and interconnected digital realm.

Natural Language Processing Siri and Google Assistant are two examples of programs that learned how to break down, analyse and synthesise speech using natural language processing.

NFT, or non-fungible token An asset such as a rare piece of art, a valuable item in a game or even a piece of virtual 'land' with a unique blockchain token assigned to it. It's like having a one-of-a-kind digital collectible that no one else can duplicate.

Smart contracts Self-executing digital agreements that automatically enforce the terms and conditions written within them. They use blockchain technology to ensure trust, security, and transparency in transactions.

VR Virtual reality immerses you in a simulated, computer-generated environment that you can explore and interact with, making you feel as if you're physically present in a different reality.

XR Extended reality includes augmented, virtual and mixed reality technologies.

MIND-BLOWING METAVERSE PROJECTS

VIRTUAL TRAVEL

Visit the Nile in a virtual world, or chat to AR Ancient Greek philosophers while gazing at the Parthenon.

IMMERSIVE HEALTH

A visit to the doctor might be a chat to an AI in a virtual surgery if a physical visit is too far, or if you need help with mental health, for example.

GAMES

Fortnite is one of the best known metaverse games, with in-world concerts from the likes of Billie Eilish, and media and even supermarket brands buying virtual space and items to connect to the 1.5 million + players. The storm is coming…

WHAT'S IT WORTH

XR DEVELOPER
$55K – $116K
Average: $72,000

MACHINE LEARNING ENGINEER
$59K – $143K
Average: $78,615

PROJECT MANAGER, INFORMATION TECHNOLOGY (IT)
$69K – $152K
Average $112,337

SOFTWARE DEVELOPER
$53K – $106K
Average $72,912

BUSINESS INTELLIGENCE DEVELOPER
$64K – $129K
Average $96,758

ROBOTICS ENGINEER
$51K – $133K
Average $80,675

SENIOR SOFTWARE ENGINEER / DEVELOPER / PROGRAMMER
$84K – $149K
Average $115,553

SOURCE: PAYSCALE.COM.AU/GLASSDOOR AUSTRALIA

GAME ON!

CRAFTING IMMERSIVE REALITIES: MEREDITH PORTE'S JOURNEY INTO THE VIRTUAL REALM

UNITY DEVELOPER, VR LAB, MACQUARIE UNIVERSITY

SENIOR RESEARCH ASSISTANT

RESEARCH PROGRAMMER

RESEARCH ASSISTANT

BACHELOR OF COMPUTER SCIENCE (HONOURS), MACQUARIE UNIVERSITY

MEREDITH PORTE
UNITY DEVELOPER, VR LAB

Dabbling in virtual worlds for fun may be exciting, but for Meredith Porte, it's all in a day's work. As a unity developer at Macquarie University's Virtual Reality Lab, Meredith specialises in creating games and simulations for research projects.

Her passion for computer graphics was ignited during her Bachelor of Computer Science degree at Macquarie Uni. "I really enjoy artistic and creative things, so computer graphics and game design was very interesting to me," she says. "Once I studied it, I knew I wanted to pursue it."

Meredith gained experience during her studies by taking on summer scholarship opportunities, including one at Macquarie University's VR Lab, home to the research group VISOR (Virtual and Interactive Simulations of Reality), a research collaboration between the computing and psychology departments. She enjoyed the work so much that she scored a job as a research assistant at the VR Lab after graduating.

THE ART OF CREATING VR

Meredith's role involves bringing research projects to life through the development of innovative games and simulations. From contributing to an airport security project and an infrared tracking 3D-drawing programme early on, to creating a virtual therapist for a sleep disorders project at Westmead Children's Hospital, she's done a bit of everything. Her collaboration with other disciplines has even included ancient history — such as designing a virtual ancient Greek villa to enhance the learning experience of history students.

As the sole developer on some projects, Meredith says it's a continuous learning experience. With new software and hardware constantly emerging, she embraces the opportunity to stay at the forefront of technology advancements. Another big positive is the great feedback she receives, noting that it's very rewarding knowing her work is making a difference.

"I really like solving puzzles", she says. "One of the cool projects that stands out is a lifeguard training project I worked on where I made a virtual swimming pool environment. We put lifeguards in VR headsets and stood them on the edge of the virtual pool to spot swimmers in trouble."

If designing games and simulations sounds like a dream career to you, Meredith suggests a great starting point is getting familiar with popular game engines like Unity. Her ultimate ambition? To develop her very own game.

— Danielle Lucas

> "I REALLY LIKE SOLVING PUZZLES, ARTISTIC AND CREATIVE THINGS"

A day in the life of a... GAMES DEVELOPMENT ENGINEER

Beyond play: From gaming enthusiast to game-changing career

OLIVER SMITH

> "I WAS PLAYING THESE GAMES THINKING 'I COULD DO BETTER THAN THIS'"

Oliver Smith always thought video games were pretty cool, and now they're his job. The games design and development engineer works at Macquarie University's Games User Research Lab, working with researchers using VR, and when he's not doing that, he's teaching uni students video game theory and design.

"When I was younger, I was playing these games and thinking 'you know what, I could do better at this', so I decided to study it," he says.

Oliver says there are key skills you need to succeed in game design and development. "You need to know how to problem-solve, to have social skills and be able to network, because many projects involve teamwork."

Encounter designing, which is creating the monsters or enemies in a video game, would be a dream gig for Oliver one day. Epic quests, thrilling realms, unleashing imagination… he is living what he teaches!

– Danielle Lucas

Here's a typical day:

9am
I usually teach in the mornings, so I get to Macquarie Uni at least an hour before classes start. I'll have some brekkie, grab a coffee and then go over my notes for what I'll be teaching that day.

10am
Tutoring a class on video game design. I'm a bit old school and like to use PowerPoint slides, and if it's a design class we might even be looking at board games.

12pm
I'll hang around for a bit afterwards to answer any questions, or sometimes I go straight to another class.

1pm
I spend my afternoons in my other role, working as a gaming development engineer and research assistant at the Games Research Lab at Macquarie.

2pm
The project I'm currently working on involves designing a platform where a researcher can look at participants' facial expressions when they're in a game, and then track that data. We use a range of VR devices from the Meta Quest Pro to the Vive.

4 – 6pm
I'll finish up a task I'm working on and then might spend an hour or so managing my task cards.

8pm
After work I'll sometimes go rock climbing or to the gym. Not surprisingly, I also really enjoy playing video games in my spare time. It keeps me in touch with what's going on and it helps to actually be able to analyse games, which is something I teach as well.

CERTIFICATE IV AND DIPLOMA IN IT (GAMES DEVELOPMENT), TAFE NSW >> BACHELOR OF IT (MAJORING IN GAMES DEVELOPMENT), MACQUARIE UNIVERSITY

CASUAL ACADEMIC / UNIVERSITY COURSE TUTOR AND LEAD TUTOR, MACQUARIE UNIVERSITY >> RESEARCH ASSISTANT AND GAMES DEVELOPMENT ENGINEER, GAMES RESEARCH LAB, MACQUARIE UNIVERSITY

MQU / SHUTTERSTOCK

Get the job!

Want to experience the world of metaverse engineering? Take these next steps

Electives checklist

✔ Digital technologies
✔ ICT ✔ Maths
✔ Law, commerce or ethics

TAKE STUDY FURTHER

Enrol in the Major in Artificial Intelligence (AI) with a Bachelor of Information Technology (IT) at Macquarie University. Get the lowdown on deep learning platforms, disease mapping, inter-team chat tools, machine learning platforms, natural language generation, proactive healthcare management, robotic process automation, social media monitoring, speech recognition and virtual agents. **bit.ly/majAIMQU**

Do a Master of IT in AI at Macquarie University. Get industry experience and deep-dive into new technologies and business. Your degree will take place in the state-of-the-art new computing precinct at Macquarie, with purpose-built cybersecurity, networking and gaming labs and a VR space. **bit.ly/MITAIMQU**

Explore a Master of IT in Internet of Things (IoT) at Macquarie University. Address challenges arising from the interconnection of the Internet and everyday devices by applying advanced and applied knowledge of the design, configuration and management of IoT systems, and communication services and networking. Career opportunities abound in electricity, transportation, retail, energy management, resource control and management, healthcare, mining and so much more. **bit.ly/MITIoTMQU**

SKILL UP

Get a head start by teaching yourself some basic programming such as Python, Rust and C#. Google's Grasshopper learning to code app is an easy way to get the basics of Python, or check out YouTube channels like The Coding Train (Javascript, art, machine learning and more) or Rust 101 Crash Course for beginners. You can also study 3D modeling tools and design in Roblox, the community owned virtual world Decentraland and Meta.

STRANGER THAN FICTION

The real metaverse might be stranger than fiction but there are plenty of cool ways to learn about it. Check out these for a start:

READY PLAYER ONE, BY ERNEST CLINE

Published in 2011, this was probably the first novel to fully explore an immersive metaverse. Set in 2045, it follows Wade Watts as he battles to solve the secrets of the OASIS, a VR experienced with haptic suits and headsets. The 2018 movie by Steven Speilberg shows the huge potential of a completely immersive metaverse, starring Tye Sheridan, Olivia Cooke and Ben Mendelsohn.

HER

Joaquin Phoenix and Scarlett Johansson star in this spookily prescient movie where a lonely man falls in love with his AI operating system. Look out for the scene where he's gaming in an immersive world that fills his home, and the earbuds that connect everyone on the planet online.

FREE GUY

Set within a wholly virtual world, avatars and human players battle it out in an open-world video game in this 2021 movie, and yes, the hero (Ryan Reynolds) saves the (virtual) world.

THE MATRIX

The OG world-within-a-world film, *The Matrix* saw the iconic Keanu Reeves discover just how hard it is to know what's really real. Still the best cinematic look at a metaverse scenario, just don't expect the machines to have good intentions.

SHUTTERSTOCK

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