CONFERENCE + CAREERS FAIR

QUANTUM
AUSTRALIA

SYDNEY + ONLINE

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02:2022

⊗ XANADU

Photonic Quantum Computers

COMPANY

Xanadu is a Canadian quantum technology company with the mission to build quantum computers that are useful and available to people everywhere.

Founded in 2016, Xanadu is building towards a universal quantum computer using silicon photonic hardware and offers users access to near-term quantum devices through the Xanadu Cloud platform.

The company also leads the development of PennyLane, an open-source software library for programing quantum computers.

PRODUCTS

Xanadu Cloud
PennyLane
Strawberry Fields

RESEARCH

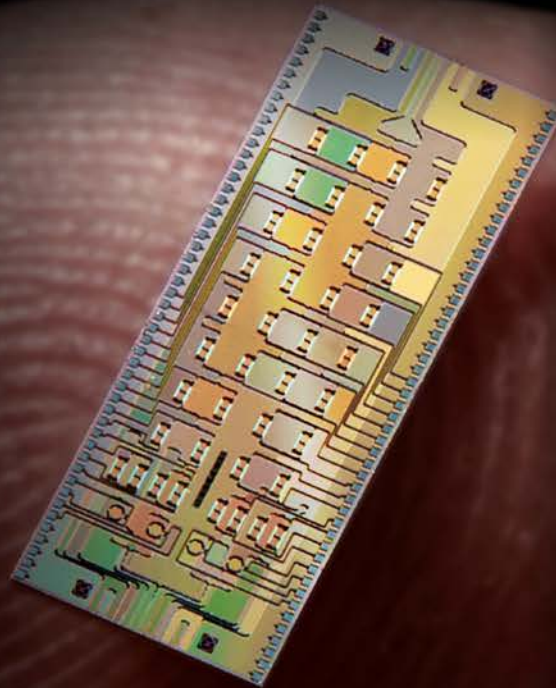Blueprint for a Scalable Photonic Fault-Tolerant Quantum Computer
arXiv:2010.02905

Quadratic speedup for simulating Gaussian boson sampling
arXiv:2010.15595

Quantum Algorithm for Simulating Single-Molecule Electron Transport
arXiv:2012.09231

xanadu.ai

WELCOME TO THE INAUGURAL QUANTUM AUSTRALIA CONFERENCE AND CAREERS FAIR!

> We're delighted many of you could join us for what we hope will become an essential annual addition to the quantum events calendar.

A message from the Chair of the Quantum Australia Conference Steering Committee

We have an exciting in-person and online program planned over the next three days. Over 60 speakers and panellists will be taking part in 19 thought-provoking panels and presentations. Our speakers and panellists range from quantum researchers, government decision-makers, big tech companies and startups making waves on the global stage.

2021 was a big year for quantum technology in Australia, and we expect 2022 to be no different. We have a national quantum strategy in progress being led by Australia's Chief Scientist and Quantum Australia keynote speaker, Dr Cathy Foley. In addition, many of the speakers joining us on the program have led or have been directly involved in ground-breaking developments over the past year.

This year's conference theme is '*Realising Australia's Quantum Future: Advancing Talent and Technology through Collaboration*'. Quantum technology promises to be a game-changer with wide-ranging applications across areas such as cybersecurity, pharmaceuticals, finance, logistics, and materials science, to name just a few. Innovative collaborations across industry, government and academia are needed now and are essential to ensure we realise quantum's full potential.

We also have over 50 posters on display on our virtual platform as part of the fully online Careers Fair on Friday, 25 February. They are a testament to the calibre of emerging talent coming out of our education and research institutions.

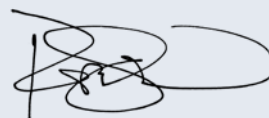I encourage you to make the most of the Quantum Australia experience whether joining us online or in person at the iconic Doltone House. Visit one of our many in-person or virtual exhibitors, reach out to your fellow delegates and join in the conversation in our online discussion threads.

Thank you to our generous sponsors for their support including our platinum sponsor Xanadu Quantum Technologies, our official government sponsors NSW Government and Tech Central, and our gold sponsors CSIRO, IBM Quantum, Keysight Technologies and QuintessenceLabs. This event would not be taking place if it weren't for your support.

I'd also like to thank Sydney Quantum Academy's founding partners, Macquarie University, UNSW Sydney, University of Sydney and University of Technology Sydney, and their representatives on the Conference Steering Committee.

We hope you enjoy Quantum Australia!

Kind regards

Prof Peter Turner, CEO
Sydney Quantum Academy

QUANTUM AUSTRALIA CONFERENCE STEERING COMMITTEE

John Bartholomew – *Senior Lecturer*, University of Sydney; Chief Investigator, ARC Centre of Excellence for Engineered Quantum Systems (EQUS)

Michael Bremner – *Professor; Director*, Centre for Quantum Software and Information, University of Technology Sydney; Work Package Leader and Program Manager, ARC Centre of Excellence for Quantum Computation and Communication Technology (CQC2T)

Susan Coppersmith – *Professor; Head of School*, UNSW Sydney; Associate Investigator, ARC Centre of Excellence for Engineered Quantum Systems (EQUS); Associate Investigator in FLEET (ARC Centre of Excellence in Future Low-Energy Electronics Technologies)

Thomas Volz – *Associate Professor*, School of Mathematical and Physical Sciences, Macquarie University; Deputy Director, ARC Centre of Excellence for Engineered Quantum Systems (EQUS)

Sydney Quantum Academy Team

QUANTUM AUSTRALIA

TECH CEN— TRAL

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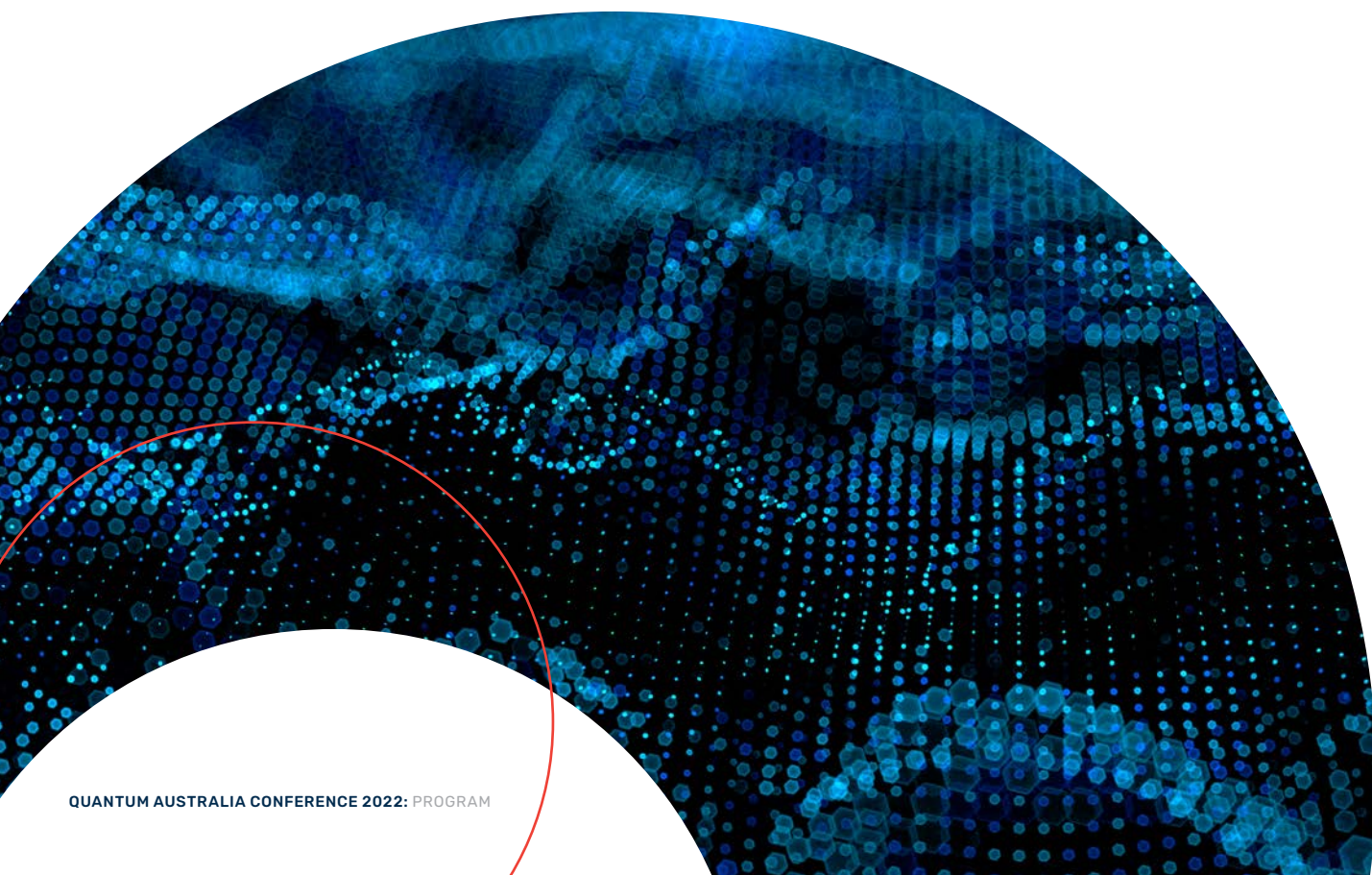scitek — technologies for science

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- Quantum Key Distribution (QKD)

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8.30 am	**Registration and Arrival Tea and Coffee**	
9.00 am	**Official Opening**	*MC - Bernie Hobbs*
		Prof Peter Turner, CEO, Sydney Quantum Academy
		The Hon. Alister Henskens, SC MP, Minister for Science, Innovation and Technology, and Minister for Skills and Training
9.30 am	**Panel: Quantum State of the Nation** Proudly sponsored by:	*Prof Bronwyn Fox*, Chief Scientist, CSIRO
		Prof Sir Peter Knight, UKRI National Quantum Technology Programme and Imperial College London
		Prof Tanya Monro, Chief Defence Scientist, Defence Science and Technology Group, Department of Defence
		Prof Michelle Simmons, Director, Centre of Excellence for Quantum Computation and Communication Technology; Founder and Director, Silicon Quantum Computing
		Prof Andrew White, Director, ARC Centre for Engineered Quantum Systems (EQUS)
		Chair: *Prof Sven Rogge*, Pro Vice-Chancellor (Research), UNSW Sydney
10.15 am	**Keynote Presentation: Building in quantum industry coherence**	*Dr Cathy Foley*, Australia's Chief Scientist
11.00 am	**Networking Morning Tea and Exhibition**	
11.30 am	**Panel: Quantum software: future applications for quantum devices**	*Prof Stephen Bartlett*, School of Physics, University of Sydney
		Assoc Prof Dominic Berry, Macquarie University
		Dr Maria Kieferova, SQA Fellow & Lecturer at University of Technology Sydney; Research Scientist at Google Quantum AI
		Dr Krysta Svore, General Manager - Quantum Software, Microsoft
		Chair: *Dr Simon Devitt*, Senior Lecturer, Centre for Quantum Software and Information, University of Technology Sydney; Co-founder and Managing Director, h-bar
12.15 pm	**Presentation: Quantum computing at Amazon Web Services**	*Prof Simone Severini*, Director, Amazon Web Services (AWS); Professor, University College London
12.45 pm	**Networking Lunch and Exhibition**	

DAY 1 – Conference Program *continued*

Time	Session	Speakers
1.45 pm	**Panel: Quantum sensing: what is the quantum advantage and what are the benefits?**	*Prof John Close*, Head of the Department of Quantum Science, The Australian National University *Prof Ben Eggleton*, Co-Director of the NSW Smart Sensing Network (NSSN); Director of the Sydney Nano Institute and Professor in the School of Physics, University of Sydney *Svenja Knappe*, Founder and Scientist, Fieldline Inc; Associate Research Professor, University of Colorado *Prof Andre Luiten*, Managing Director, QuantX Pty Ltd *Dr Jean-Philippe Tetienne*, ARC Future Fellow, RMIT **Chair:** *Prof Jim Rabeau*, Director, Quantum Technologies, CSIRO
2.30 pm	**Panel: Preparing business for a quantum future** Proudly sponsored by: XANADU	*Dr David Garvin*, Principal Researcher Quantum Computing Office, NEC *Peter Johnson*, Co-founder and Lead Research Scientist, Zapata Computing *Jacqui Kernot*, Technology Consulting Partner, EY *Christian Weedbrook*, CEO & Founder, Xanadu Quantum Technologies **Chair:** *Prof Glenn Wightwick*, Deputy Vice-Chancellor of Enterprise, University of Technology Sydney
3.15 pm	**Networking Afternoon Tea and Exhibition**	
3.45 pm	**Presentation: More than qubits: challenges and opportunities in scaling quantum computers**	*Prof David Reilly*, Director of Microsoft Quantum–Sydney and Professor of Physics, University of Sydney
4.15 pm	**Panel: Quantum computing hardware: Race to 1 million qubits** Proudly sponsored by: KEYSIGHT TECHNOLOGIES	*Prof Rainer Blatt*, Research Director, Institute for Quantum Optics and Quantum Information, Austrian Academy of Sciences (ÖAW); Professor, University of Innsbruck *Dr Maja Cassidy*, Principal Researcher, Microsoft Quantum *Prof Andrew Dzurak*, ARC Laureate Fellow & Professor of Quantum Engineering, UNSW Sydney *Dr Geoff Pryde*, Senior Quantum Researcher, PsiQuantum **Chair:** *Prof Andrew Doherty*, School of Physics, University of Sydney
5:00 pm	**Closing Remarks**	Bernie Hobbs
5.15 pm to 7.15 pm	**Welcome Cocktail Party (in person only)** Proudly sponsored by **QuintessenceLabs** *The Loft, Doltone House, Jones Bay Wharf*	

DAY 2

**Doltone House,
Jones Bay Wharf
Sydney + Online**

8.30 am	**Registration and Arrival Tea and Coffee**	
9.00 am	**Day Two Opening**	*MC - Bernie Hobbs*
9.15 am	**Presentation: Building the quantum ecosystem: from the lens of IBM Quantum**	*Dr Jay M. Gambetta*, IBM Fellow and Vice President of Quantum Computing, IBM Quantum
9.45 am	**Presentation: Silicon Photonic Quantum Computing**	*Dylan Saunders*, Lead Quantum System Architect & Q1 Technology Lead, PsiQuantum
10.15 am	**Presentation: Towards useful quantum computing**	*Dr Hartmut Neven*, Engineering Vice President, Google
10.45 am	**Networking Morning Tea and Exhibition**	
11.15 am	**Panel: Responsible innovation in quantum technology**	*Scott Aaronson*, Professor of Computer Science, University of Texas at Austin
		Aurélie Jacquet, Chair of Standards Australia AI Committee
		Dr Ian Oppermann, NSW Chief Data Scientist; Industry Professor, UTS
		Dr Tara Roberson, Research Fellow, Australian Research Council Centre of Excellence for Engineered Quantum Systems (EQUS)
		Chair: *Prof Gavin Brennen*, Director of the Macquarie Centre for Quantum Engineering, Macquarie University
12.00 pm	**Panel: Quantum Networking - A national quantum network: opportunities and challenges**	*Prof Ping Koy Lam*, Professor, Australian National University
		Peter Rohde, Senior Lecturer, University of Technology Sydney
		Dr Vikram Sharma, Chief Executive Officer, QuintessenceLabs
		Maria Spiropulu, Shangi-Yi Ch'en Professor of Physics, California Institute of Technology
		Chair: *Dr Zixin Huang*, SQA Postdoctoral Fellow, Macquarie Centre for Quantum Engineering, Macquarie University
12.45 pm	**Networking Lunch and Exhibition**	
1.45 pm	**Presentation: How Q-CTRL is making quantum technology useful for enterprise**	*Prof Michael Biercuk*, CEO of Q-CTRL and Professor of Quantum Physics and Quantum Technology at the University of Sydney

DAY 2 – Conference Program *continued*

2.15 pm	**Keynote Presentation: Why Australia can and should build its own quantum computer**	*Prof Michelle Simmons*, Director, ARC Centre of Excellence for Quantum Computation and Communication Technology (CQC2T); Founder and Director, Silicon Quantum Computing

3.00 pm — Networking Afternoon Tea and Exhibition

3.30 pm	**Panel: The quantum startup journey**	*Dr Marcus Doherty*, Chief Scientific Officer, Quantum Brilliance
		Prof Andrew Dzurak, ARC Laureate Fellow & Professor of Quantum Engineering, UNSW Sydney
		Dr Si-Hui Tan, Chief Science Officer, Horizon Quantum Computing
		Chair: *Sally-Ann Williams*, CEO, Cicada Innovations
4.00 pm	**Panel: What drives investment in quantum technology** Proudly sponsored by:	*Ekaterina Almasque*, General Partner, OpenOcean
		Bill Bartee, Managing Partner, Main Sequence Ventures
		Matthew Gould, Director & Head of Emerging Technologies, Allectus Capital, ICM Group
		Annie Parker, Executive Director, Tech Central, Greater Sydney Commission
		Chair: *Sally-Ann Williams*, CEO, Cicada Innovations
4.45 pm	**Closing Remarks**	Bernie Hobbs

6.30 pm to 10.00 pm — Gala Dinner (in person only)
Doltone House, Jones Bay Wharf

Presentation: *Christian Weedbrook*, CEO & Founder of Xanadu Quantum Technologies

Doltone House, Jones Bay Wharf

DAY 3
Online Only

All Day	**Online posters available for viewing** Poster sessions are proudly sponsored by **PsiQuantum**	
9.00 am	**Careers Fair Opening**	*Dr Eser Zerenturk*, Education Manager, Sydney Quantum Academy
9.15 am	**Panel: Developing the future quantum workforce** Proudly sponsored by: **IBM Quantum**	*Dr Aggie Branczyk*, Manager, Quantum Applications Research & Software, IBM Quantum *Assoc Prof Daniel Burgarth*, Macquarie University *Assoc Prof Chris Ferrie*, University of Technology Sydney *Prof Lloyd Hollenberg*, Director, IBM Quantum Hub; Professor of Physics, The University of Melbourne *Prof Andrea Morello*, Scientia Professor of Quantum Engineering, UNSW Sydney **Chair:** *Prof Peter Turner*, CEO, Sydney Quantum Academy
10.15 am	**Sponsor Session**	IBM Quantum
10.30 am	**Sponsor Session**	Xanadu Quantum Technologies
10.45 am	**Sponsor Session**	Sydney Quantum Academy
11.00 am	**Poster Viewing**	
11.30 am	**Panel: Where a career in quantum can take you**	*Dr Claire L. Edmunds*, Erwin Schrödinger Center for Quantum Science and Technology (ESQ) Postdoctoral Fellow, University of Innsbruck *Rachpon Kalra*, Senior Hardware Engineer, Microsoft *Sam Roberts*, Senior Quantum Architect, PsiQuantum *Dr Matt van Breugel*, Co-Founder & CEO, Redback Systems *Dr Emma Mitchell*, Senior Principal Research Scientist and Team Leader: Quantum Devices & Materials, CSIRO Manufacturing. **Chair:** *Juan Pablo Dehollain*, Chancellor's Postdoctoral Research Fellow, University of Technology Sydney
12.30 pm	**Sponsor Session**	QuintessenceLabs
12.45 pm	**Sponsor Session**	CSIRO
1.00 pm	**Sponsor Session**	Keysight Technologies
1.15 pm	**Poster Viewing**	
1.45 pm	**Sponsor Session**	The Australian National Fabrication Facility (ANFF)
2.00 pm	**Sponsor Session**	Liquid Instruments
2.15 pm	**Sponsor Session**	EY
2.30 pm	**Sponsor Session**	NetApp
2.45 pm	**Sponsor Session**	Google Quantum AI

| DAY 3 – Careers Fair Program *continued*		
3.00 pm	**Poster Viewing**	
3.30 pm	**Sponsor Session**	Global Business and Talent Attraction Taskforce
3.45 pm	**Sponsor Session**	Nano Vacuum
4.00 pm	**Sponsor Session**	Bluefors
4.15 pm	**Poster Viewing**	
5.00 pm	**Careers Fair Concludes**	

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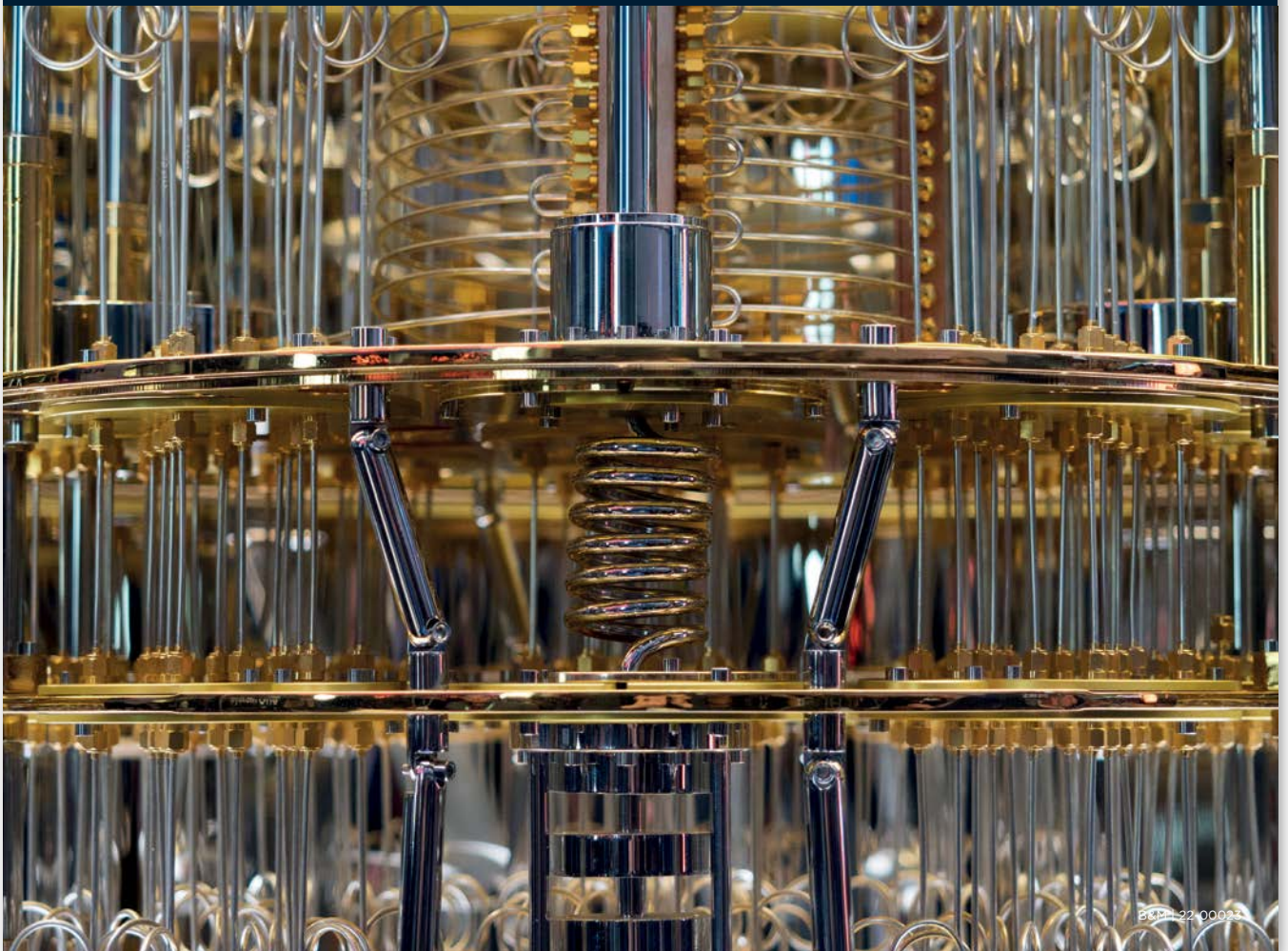
MAKING THE MOST OUT OF QUANTUM AUSTRALIA

Whether you are joining us in person or online, there are plenty of ways to engage with the program and other attendees.

For more detail on how to use our online platform, please see the '*How-to Guide*' at:

live.quantum-australia.com

Here are some tips and tricks to make sure you get the most out of the Quantum Australia experience over the next three days and beyond.

Check out our exhibitors
We have over 14 in-person exhibitors and online booths from across government and industry.

Make some connections!
You can view the Quantum Australia attendee list at *live.quantum-australia.com*

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Missed a session? All content will be made available on the platform 48 hours after live sessions.

Access 50+ innovative posters
Research posters will go live on the platform on Friday. You can vote for your favourites to go in the running for a People's Choice Award.

Join in the conversation
Post a question to Q&A, join the discussion board or use *#QuantumAustralia* on social media.

And importantly, stay COVID safe!
If you're joining us in person, make sure you keep COVID safe! Our conditions for entry and COVID safety guidelines can be found under FAQs on *live.quantum-australia.com*

QUANTUM AUSTRALIA SPEAKERS AND PANELLISTS

Keynote Presenters

Dr Cathy Foley

Australia's Chief Scientist.

Dr Cathy Foley AO PSM commenced as Australia's ninth Chief Scientist in January 2021 after an extensive career at Australia's national science agency, the CSIRO.

Dr Foley is an internationally recognised physicist with major research achievements in superconductors and sensors which led to the development of the LANDTEM™ sensor system to locate valuable deposits of minerals deep underground, resulting in discoveries and delineation of minerals worth more than $6 billion.

Dr Foley's scientific excellence and influential leadership have been recognised with numerous awards and fellowships, including election to the Australian Academy of Science in 2020, along with an Order of Australia for service to research science and to the advancement of women in physics. She is also a Fellow of Australian Academy of Technological Science and Engineering (2008) and an honorary Fellow of Australian Institute of Physics (2019).

Prof Michelle Simmons

Director, Centre of Excellence for Quantum Computation and Communication Technology; Founder and Director, Silicon Quantum Computing.

Professor Michelle Simmons is the founder of Silicon Quantum Computing Pty Ltd, Australia's first quantum computing company. She is also Director of the Centre of Excellence for Quantum Computation and Communication Technology (CQC2T) at UNSW Sydney and internationally renowned for creating the field of atomic electronics, pioneering new technologies to build computing devices in silicon at the atomic scale. Her team is leading the global race to develop a quantum computer in silicon, a transformational technology that has promise to exploit quantum physics to provide an exponential speed up in computing power for key problems.

She has been recognised by the American Computer Museum as a pioneer in quantum computing, awarded the US Feynman Prize in Nanotechnology and was named the 2017 L'ORÉAL-UNESCO Asia-Pacific Laureate in the Physical Sciences. In 2018 Professor Simmons was admitted as a Fellow to the Royal Society of London and named Australian of the Year. She is currently Editor-in-Chief of Nature Quantum Information and Chair of the American Physical Society Division of Quantum Information.

Presenters

Prof Michael Biercuk

CEO of Q-CTRL and Professor of Quantum Physics and Quantum Technology at the University of Sydney.

Michael J. Biercuk is the CEO and Founder of Q-CTRL, a quantum technology company, and a Professor of Quantum Physics and Quantum Technology at the University of Sydney. In his academic position he leads a research team as a Chief Investigator in the ARC Centre of Excellence for Engineered Quantum Systems (EQUS), exploring the role of control engineering in quantum-coherent systems.

Michael earned his undergraduate degree from the University of Pennsylvania, and his Masters and PhD from Harvard University. He held a research fellowship in the Ion Storage Group at NIST Boulder, and has served as a full-time technical consultant to DARPA, helping to steer government investments in quantum information and advanced computer architectures. Michael is a SXSW and TEDx speaking alumnus and a multi-time Australian Museum Eureka Prize nominee and winner.

Dr Jay M. Gambetta

IBM Fellow and Vice President of Quantum Computing, IBM Quantum.

Dr Jay Gambetta is the Vice President in charge of IBM's overall Quantum initiative. He leads the strategy and execution of IBM Quantum. IBM Quantum is an industry defining initiative to build the future of computing through quantum computing systems. The IBM Quantum's mission is to devise the tools and capabilities to make quantum computers easy to use, and by collaborating directly with institutions and communities, to solve real-world problems that turn into commercial opportunities.

Dr Gambetta received his PhD in Physics from Griffith University in Australia. He is an IBM Fellow, a Fellow of the American Physical Society and has over 130 publications with over 27,000 citations.

Dr Hartmut Neven

Engineering Vice President, Google.

Dr Hartmut Neven is an Engineering Vice President at Google. He is the founder and manager of the Quantum Artificial Intelligence lab. The objective of the lab is to fabricate quantum processors and develop novel quantum algorithms to dramatically accelerate computational tasks for machine intelligence.

Previously, Hartmut was head of the Google's Visual Search team. He was also a co-founder of project Glass and led the team that built the first prototype. Hartmut started two computer vision companies. His second company, Neven Vision, was acquired by Google in 2006. Neven Vision pioneered visual search and launched the first face filters based on facial feature detection.

Hartmut obtained his PhD in 1996 with a thesis on "Dynamics for vision-guided autonomous mobile robots". Then he became a research professor at the University of Southern California.

Presenters

Prof David Reilly
Director, Microsoft Quantum – Sydney; The University of Sydney.

Professor David J. Reilly joined Microsoft in 2017 where he is Partner and Research Manager of Microsoft Quantum – Sydney and a Professor in the School of Physics, The University of Sydney.

The focus of much of David's work is at the quantum-classical interface and the scaleup of quantum technology. As a leader in Microsoft's quantum effort he bridges the gap between fundamental quantum physics and the engineering approaches needed to scale quantum devices into quantum machines. Prior to joining the University of Sydney, David was a postdoctoral Fellow at Harvard University (USA) and has held a Fellowship from Hewlett-Packard. Born in Sydney Australia, he hold degrees from UNSW (PhD) and UTS (B.App.Science Hons-1).

Dylan Saunders
Lead Quantum System Architect & Q1 Technology Lead, PsiQuantum.

Dylan Saunders is the Quantum System Architecture & Q1 Technology Lead at PsiQuantum, where they are on a mission to build the world's first large-scale, general-purpose, 1 million-plus qubit silicon photonic quantum computer.

Before PsiQuantum, Dylan was an experimental quantum physicist. He worked on Quantum: memories, sources, optics, metrology, foundations, and the like; lectured optics and quantum optics at Oxford University, working alongside Prof Ian Walmsley; and a proud under- & postgraduate of Griffith University, under the stewardship of Prof Geoff Pryde, with a good helping hand from Prof Howard Wiseman.

Prof Simone Severini
Director, AWS; Professor, University College London.

Simone Severini works as Director, Quantum Computing, at Amazon Web Services (AWS) and is Professor of Physics of Information at University College London (UCL). At AWS he helped launch Amazon Braket, the Amazon Quantum Solutions Lab, and the AWS Center for Quantum Computing at Caltech.

While at UCL he contributed to start industry collaborations with Google, Lockheed Martin, and Siemens. He helped establishing some of the first startups in the quantum technology space like Cambridge Quantum and PhaseCraft, and advised a number of equity funds. His PhD was in Bristol, with Richard Jozsa, and he holds a degree in Philosophy.

Christian Weedbrook
*CEO & Founder, Xanadu Quantum Technologies.*

Christian Weedbrook is the CEO and Founder of Xanadu Quantum Technologies, a Canadian quantum technology company building fault-tolerant quantum computers using light. Over the last 15 years, he has been at the forefront of bringing quantum technology to the world through his research and leadership in academia, government, and industry. Christian holds a PhD in Physics from the University of Queensland and held postdoc positions at MIT and the University of Toronto.

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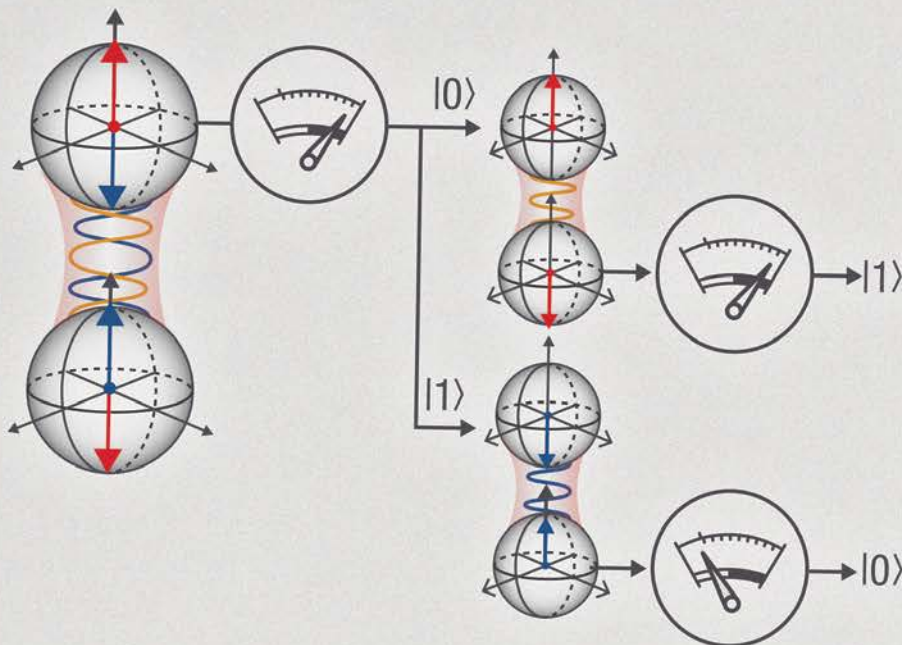
Master of Ceremonies (23-24 February)

Bernie Hobbs

Bernie Hobbs is best known as a popular judge from ABC TV's The New Inventors, and her many years presenting science on ABC radio & TV around Australia.

Bernie has a background in medical research, environmental writing and science teaching. She has won awards for the kids tv show the experiMENTALS, and for her greenhouse website PlanetSlayer. She also has a first class honours degree in biochemistry and microbiology.

Bernie has MC'd and chaired her way through many forums and events for clients including the Prime Minister's Prizes for Science, the Association of Consulting Engineers Australia, a swathe of CRCs, GHD, Queerscreen, the Queensland Government, CSIRO, World Science Festival Brisbane, The Australian Society of Medical Research, various writers festival, The World Congress of Science Journalists, and Questacon.

Panellists

PANEL: QUANTUM STATE OF THE NATION
Proudly Sponsored By **CSIRO**

Prof Bronwyn Fox
Chief Scientist, CSIRO.

Professor Bronwyn Fox is Chief Scientist of CSIRO, Australia's national science agency and innovation catalyst. Professor Bronwyn Fox joined CSIRO in October 2021 and became CSIRO's fourth female Chief Scientist. She is known globally as a leader in advanced manufacturing, materials science, and industry 4.0 technologies, and is passionate about bringing together multidisciplinary teams for collaborative research.

She was formerly Deputy Vice-Chancellor (Research and Enterprise) at Swinburne University of Technology and founding Director of Swinburne's Manufacturing Futures Research Institute. During that time, she established a world first Industry 4.0 Testlab for additive manufacturing of carbon fibre composites, in collaboration with CSIRO.

Prof Sir Peter Knight
UKRI National Quantum Technology Programme and Imperial College London.

Sir Peter Knight FRS is Emeritus Professor at Imperial, a past President of the Institute of Physics, 2004 President of the Optical Society of America, Chair of the UK National Quantum Technology Programme Strategy Advisory Board and chairs the Quantum Metrology Institute at the National Physical Laboratory. His research centres on quantum technology. He has won the Thomas Young Medal and the Glazebrook Medal of the Institute of Physics, the Ives Medal and the Walther medal of the OSA, the Royal Medal of the Royal Society and the Faraday Medal of the IET.

Prof Tanya Monro
Chief Defence Scientist, Defence Science and Technology Group, Department of Defence.

Professor Tanya Monro commenced as Australia's Chief Defence Scientist in March 2019. As Chief Defence Scientist, she is head of Defence Science and Technology Group (DSTG) and Capability Manager for Innovation, Science and Technology within the Australian Department of Defence.

Professor Monro was previously Deputy Vice Chancellor Research and Innovation and an ARC Georgina Sweet Laureate Fellow at the University of South Australia.

Her research is in the field of photonics, with a focus on sensing, lasers and new classes of optical fibres. Professor Monro is a Fellow of the Australian Academy of Science (AAS), the Australian Academy of Technology and Engineering (ATSE), the Optical Society of America (OSA) and the Australian Institute of Physics (AIP). She is a member of the Board of the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Let's build a quantum future together

When we launched the world's first quantum computer on the IBM cloud back in 2016, we were astonished to gain 8000 users in a few weeks.

Today we've had over 350,000 users. We also have the largest open-source quantum developer community by far, running over 1 billion executions a day on a fleet of 20 of the most powerful commercially available quantum computers in the world.

We now have over 140 active clients including Exxonmobil, Daimler-Benz, Goldman Sachs, BP, Mitsubishi Chemical, Woodside, and Boeing. In 2021 we shared our development roadmap, showcasing our integrated vision and timeline for full-stack quantum development.

In May 2021, we launched Qiskit Runtime demonstrating a remarkable 120X speedup on our existing hardware. In November 2021, we unveiled our 127 qubit Eagle processor, offering unprecedented performance to our clients and partners, and a stepping stone on the path to 1000+ qubit systems by 2023.

We feel this is just the beginning. If you're as excited about what quantum computing can do for your organisation as we are, then we should talk.

If you'd like to learn more, please contact us at:
hmcortes@us.ibm.com

IBM Quantum

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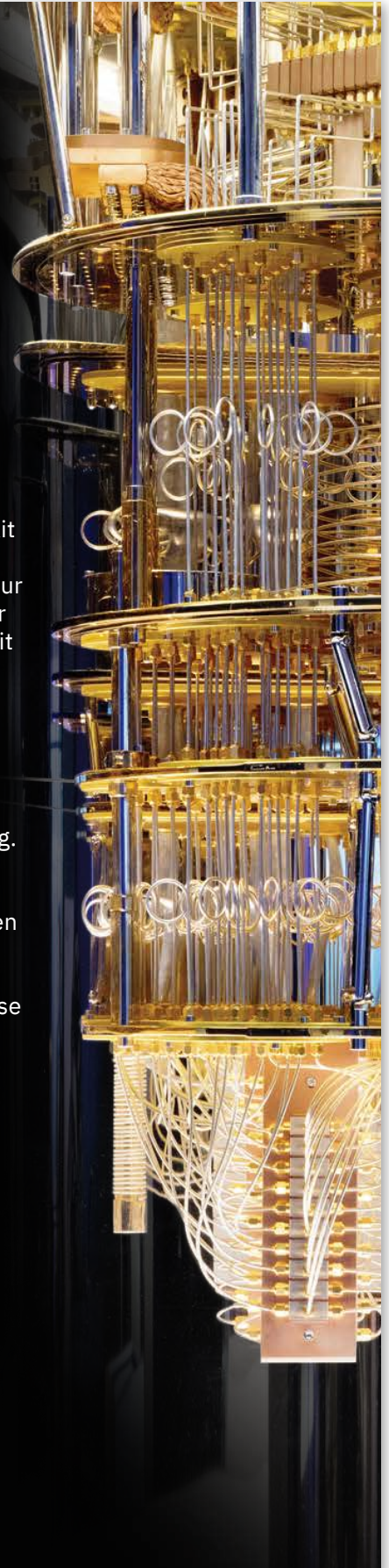
Panellists and Chair

Panellist: Prof Michelle Simmons

Director, Centre of Excellence for Quantum Computation and Communication Technology; Founder and Director, Silicon Quantum Computing. (See page 18)

Prof Andrew White

Director, ARC Centre for Engineered Quantum Systems (EQUS).

Professor Andrew White is at the forefront of quantum technology research, and is a world leader in creating, detecting, and applying, new states of light, both quantum & classical. He is an Australian Research Council Laureate Fellow and Director of the Australian Research Council Centre of Excellence for Engineered Quantum Systems (EQUS). Andrew's contributions include both fundamental advances—quantum-logic gates, quantum simulation & emulation, quantum metrology—and methodological advances—entanglement engineering, quantum tomography, and optical vortices. In 1999, he established the world's first quantum technology laboratory to explore and exploit the full range of quantum behaviours—notably entanglement—with an eye to engineering new technologies and scientific applications.

CHAIR:
Prof Sven Rogge

Pro Vice-Chancellor (Research), UNSW Sydney.

Professor Sven Rogge is Pro Vice-Chancellor (Research) at the University of New South Wales (UNSW Sydney) and President of the Australian Institute of Physics. Sven focuses on quantum computation in silicon in the ARC Centre for Quantum Computation and Communication Technology (CQC2T). He leads a team of enthusiastic researchers that work on gaining atomistic insight into the interactions of qubits with their environment. This allows them to manipulate quantum information and minimise decoherence.

Before joining UNSW in 2011 Sven worked at the Kavli Institute for Quantum Nano Science at Delft University and Stanford University.

Panellists

PANEL: QUANTUM SOFTWARE: FUTURE APPLICATIONS FOR QUANTUM DEVICES

Prof Stephen Bartlett

School of Physics, University of Sydney.

Stephen Bartlett is a theoretical quantum physicist and Professor in the School of Physics. He leads a team pursuing both fundamental and applied research in quantum information theory, including the theory of quantum computing. He is a Chief Investigator in the Australian Research Council Centre of Excellence in Engineered Quantum Systems (EQUS), where he leads a research program on Designer Quantum Materials. He is the inaugural Lead Editor of the APS journal PRX Quantum.

Assoc Prof Dominic Berry

Macquarie University.

Dominic Berry is an Associate Professor at Macquarie University, also working 50% for Google under a Sponsored Research agreement. Dominic's research ranges over quantum optics and quantum computing, where he has provided the fastest known algorithms for quantum simulation. In 2007 he pioneered the use of high-order product formulae, he developed the quantum walk approach in 2012, and in 2014/2015 he developed the linear combination of unitaries approach to simulation. His most recent work has provided many orders of magnitude improvement in the simulation speed for quantum chemistry, both for molecules and for crystalline materials.

Dr Maria Kieferova

SQA Fellow & Lecturer at University of Technology Sydney; Research Scientist at Google Quantum AI.

Dr Maria Kieferova is a Sydney Quantum Academy postdoctoral fellow at the UTS Centre for Quantum Software and Information and the ARC Centre of Excellence for Quantum Computation and Communication Technology (CQC2T) and a Research Scientist at Google Quantum AI. Maria completed her undergraduate and masters degree at Comenius University in Slovakia and her PhD at IQC, University of Waterloo and Macquarie University. She is interested in developing quantum algorithms, namely for machine learning and quantum simulations.

Panellists and Chair

Dr Krysta Svore

General Manager – Quantum Software, Microsoft.

Dr Krysta Svore is a Distinguished Engineer and VP of Quantum Software at Microsoft. She is dedicated to realizing commercial-scale quantum computing to solve today's unsolvable problems and to empowering people and organizations around the world with quantum computing through Azure Quantum, the most diverse cloud platform for quantum computing.

Dr Svore is a AAAS Fellow, and was named one of the 39 Most Powerful Women Engineers by Business Insider in 2018. She serves on the Advanced Scientific Computing Advisory Committee of the Department of Energy, the ISAT Committee of DARPA, and is a Kavli Fellow of the National Academy of Sciences. She received an ACM Best of 2013 Notable Article award and was a member of the winning team of the Yahoo! Learning to Rank Challenge in 2010. Dr. Svore has authored over 70 papers and has filed over 30 patents.

CHAIR:
Dr Simon Devitt

Senior Lecturer, Centre for Quantum Software and Information, University of Technology Sydney; Co-founder and Managing Director, h-bar.

Dr Simon Devitt is Research Director at the Centre for Quantum Software & Information at the University of Technology Sydney. He is a world leader in quantum architectures, error correction and quantum communication. He has over 100 publications in international peer-reviewed journals and has won 25 competitive research grants valuing ~AU$31m in total.

He is the co-founder and managing director of h-bar quantum consultants in Melbourne and Co-founder of a new quantum startup, Eigensystems Pty Ltd, focused on quantum education and literacy. Having spent over a decade overseas working in the quantum computing programs of the UK and Japan, Simon has worked with numerous corporations, startups and VC firms on their expansion into the quantum technology space and advised multiple government agencies on multimillion dollar R&D initiatives.

In 2020, he was awarded the inaugural Warren Prize from the Royal Society of NSW for his service to global quantum technology development and was elected Fellow of the Royal Society of NSW and the Australian Institute of Physics in 2021.

Panellists

Prof John Close

Head of the Department of Quantum Science, The Australian National University.

Professor John Close completed his PhD in at the University of California, Berkeley in 1991. After Fellowships at the University of Washington, Seattle and the Max Planck Institut für Strömungsforschung, John took up a Queen Elizabeth II Fellowship at the ANU in 2000. He is currently Head, Department of Quantum Science and Head, ANU Defence Engagement.

John's expertise is in precision measurement and quantum technologies for defence and civilian applications on Earth and in space. John was the winner of the 2020 Defence Industry Award for Academic of the Year, and the Winner of the 2020 Defence Industry Excellence Award.

Prof Ben Eggleton

Co-Director of the NSW Smart Sensing Network (NSSN); Director of the Sydney Nano Institute and Professor in the School of Physics, University of Sydney.

Professor Benjamin Eggleton is the Director of The University of Sydney Nano Institute (Sydney Nano). He also currently serves as co-Director of the NSW Smart Sensing Network (NSSN). He was previously an ARC Laureate Fellow and an ARC Federation Fellow twice, was founding Director of the ARC Centre of Excellence for Ultrahigh bandwidth Devices for Optical Systems (CUDOS) and was Research Director at Bell Laboratories, Lucent Technologies in the USA.

He is a Fellow of the Australian Academy of Science (AAS), the Australian Academy of Technology and Engineering (ATSE), the Optical Society of America, IEEE Photonics and SPIE. He is Editor-in-Chief of APL Photonics.

Svenja Knappe

Founder and Scientist, Fieldline Inc; Associate Research Professor, University of Colorado.

Svenja Knappe received her PhD in physics from the University of Bonn, Germany. For 16 years, she worked at the National Institute of Standards and Technology (NIST) in Boulder CO, developing chip-scale atomic sensors. She is now an Associate Research Professor at the University of Colorado and her research interests include microfabricated atomic sensors. In 2018, she founded FieldLine Inc. to commercialise a non-invasive brain imaging system based on small quantum magnetometers.
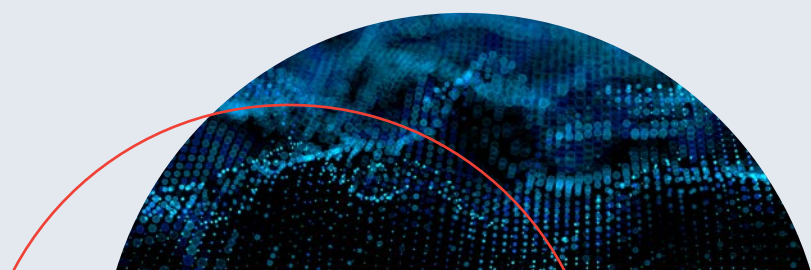
DISCOVER THE SYDNEY QUANTUM COMMUNITY

COLLABORATE | STUDY

Sydney Quantum Academy is a unique partnership between four leading Australian universities, supported by the NSW Government.

Our programs and scholarships help develop the next generation of quantum scientists, entrepreneurs, engineers, programmers, and researchers.

Our community includes 100 quantum experts and over 100 PhD students. Together they're delivering innovative and industry-focused research across quantum science and technology.

We have a range of engagement activities planned to connect this growing community with industry. Find out how you can get involved through internships, events and more.

Visit **sydneyquantum.org** or email **info.sqa@sydney.edu.au.**

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Panellists and Chair

Prof Andre Luiten
Managing Director, QuantX Pty Ltd.

Professor Andre Luiten is Director of the Institute for Photonics and Advanced Sensing and Chair of Experimental Physics at the University of Adelaide, as well as Managing Director of QuantX Pty Ltd, a start-up company with 15 employees that is growing fast. Andre has published 132 journal papers and raised $35M for research. His work aims at the development and application of state of-the-art physics-based instruments. His efforts have been recognised with a 2018 Eureka Prize for Outstanding Science in Safeguarding Australia, the Alan Walsh Medal for services to industry and the Barry Inglis Medal for Measurement Science.

Dr Jean-Philippe Tetienne
ARC Future Fellow, RMIT.
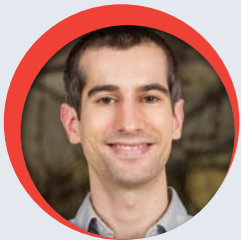
Dr Jean-Philippe Tetienne is a Senior Research Fellow and ARC Future Fellow in the School of Science at RMIT University. He received his PhD in 2014 from ENS Cachan, France, and worked as a Research Fellow at the University of Melbourne from 2015-2020, prior to joining RMIT in 2021. His research focuses on developing quantum sensing and microscopy techniques that exploit optically addressable spins in solids such as diamond and 2D materials. His group also explores applications of these quantum tools in materials science, condensed matter physics and chemical analysis.

CHAIR:
Prof Jim Rabeau
Director, Quantum Technologies, CSIRO.
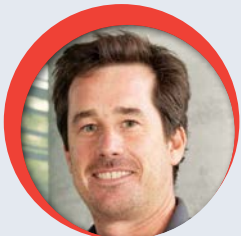
Jim has been leading the Quantum Technologies Future Science Platform at CSIRO since its inception in September 2021. Prior to this he was a Professor in the School of Physics and Deputy Director at University of Sydney Nano Institute. He has spent several years working in industry, most recently as program manager at Microsoft Quantum Computing. He has led the strategy unit at Macquarie University and was a Director at Deloitte in the Data Analytics practice.

In his current role at CSIRO, his focus is on establishing a large, multidisciplinary quantum research program operating across all of CSIRO's business units.

Panellists

PANEL: PREPARING BUSINESS FOR A QUANTUM FUTURE
Proudly Sponsored By **Xanadu Quantum Technologies**

Dr David Garvin
Principal Researcher Quantum Computing Office, NEC.

David Garvin focusses on researching, developing and implementing applications of quantum computing. He has worked at Rigetti, a full stack quantum computing hardware manufacturer and at QxBranch, a quantum applications company. He now works in the Quantum Computing Office at NEC. He has been involved in identifying and advancing quantum applications across many verticals including finance, defence, transport and pharmaceuticals.

David has over 20 years' experience as a Front-Office Quant in the Finance Industry including at Commonwealth Bank of Australia, Deutsche Bank and Morgan Grenfell. He has covered all asset classes and been involved in management, modelling, risk and analytics, derivatives and structured products, machine learning and electronic trading.

David holds a PhD in Artificial Intelligence from Cambridge University and an MBA (Exec) from the Australian Graduate School of Management. He has authored articles in finance, physics, engineering, classical computing and quantum computing.

Peter Johnson
Co-founder and Lead Research Scientist, Zapata Computing.

Peter Johnson received his PhD in 2016 in quantum information from Dartmouth College and then moved to the Harvard Chemistry Department for postdoctoral work in quantum algorithms. At the end of 2017, a year after starting his postdoc, he and several colleagues from the Aspuru-Guzik group co-founded Zapata Computing. Zapata Computing is a quantum software company building quantum-ready applications for enterprise deployment. Peter leads the quantum research team at Zapata, where they focus on developing quantum algorithms for solving industry-relevant computational problems.

Jacqui Kernot
Technology Consulting Partner, EY.

Jacqui Kernot is a senior cyber security, and risk management professional with over 20 years' experience. She is currently a Cyber Partner within EY's Financial Services Organisation, and the FSO Consulting APAC Lead for Diversity and Inclusion. Jacqui has dealt with government, enterprise, carrier and FSI clients within Australia and the UK. She has regular engagement with executives in risk and security across both countries.

Jacqui is an Inaugural Fellow of the Australian Information Security Association. A former Intelligence officer with the ADF, Jacqui's focus was Special Forces Planning, NATO engagement and Information Operations.

She is also a founding partner of the Better Cyber Security Coalition, a global group leading thinking on new ways to approach cyber security problems and Chair of the largest body for women in the IT industry, Females in IT and Telecommunication (FITT), as well as a founding member of the CyberShift Alliance.

Panellists and Chair

Panellist: Christian Weedbrook

*CEO & Founder, Xanadu Quantum Technologies. *

CHAIR:
Prof Glenn Wightwick

Deputy Vice-Chancellor of Enterprise, University of Technology Sydney.

Professor Glenn Wightwick is the Deputy Vice-Chancellor of Enterprise at the University of Technology Sydney (UTS) where he has responsibility for the university's entrepreneurship, enterprise learning and industry engagement.

Prior to this he was Deputy Vice-Chancellor of Research for 3.5 years. He spent 27 years working at IBM in Australia, the USA and China in a variety of technical and leadership roles in systems engineering, development and research. He is a Fellow of the Australian Academy of Technology and Engineering and a Senior Fellow of the IEEE. He is Co-Chair of 2SER, a community radio station jointly owned by UTS and Macquarie University and is on the board of the Sydney Quantum Academy, Sydney School of Entrepreneurship and SCECGS Redlands.

Panellists

KEYSIGHT TECHNOLOGIES

PANEL: QUANTUM COMPUTING HARDWARE: RACE TO 1 MILLION QUBITS
Proudly Sponsored By **Keysight Technologies**

Prof Rainer Blatt

Research Director, Institute for Quantum Optics and Quantum Information, Austrian Academy of Sciences (ÖAW); Professor, University of Innsbruck.

Rainer Blatt studied physics and received his PhD at the University of Mainz. In 1994, he became professor of physics at the University of Göttingen and in 1995, he accepted a chair position at the Institut f. Experimentalphysik of the University of Innsbruck, where he works with trapped ions in Paul traps for quantum computers, quantum simulations and quantum metrology. Since 2003 he has been research director at the Institute for Quantum Optics and Quantum Information (IQOQI) of the Austrian Academy of Science in Innsbruck.

For his quantum information research, he received the Schrödinger Prize of the ÖAW in 2006, the Stern-Gerlach medal of the German Physical Society (DPG) in 2012, the John-Stewart-Bell prize of CQIQC (Toronto) in 2015 and the Micius Quantum Prize 2018. Rainer is a member of the Austrian Academy of Sciences, the Spanish Royal Academy of Sciences and the National Academy of Sciences of the USA.

Dr Maja Cassidy

Principal Researcher, Microsoft Quantum.

Maja Cassidy is an experimental physicist working in nanoscale condensed matter and quantum devices. She is currently a Principal Research Manager at Microsoft Quantum in Sydney, where she leads research into scaling up quantum hardware systems.

After completing her undergraduate degree in Electrical Engineering at UNSW, she was awarded the RG Menzies scholarship to Harvard, where she received her Masters and PhD in Applied Physics. She then completed postdoctoral research at Delft University of Technology, working on hybrid superconductor-semiconductor qubits and topological materials. In 2017 she returned to Australia as a Westpac Research Fellow, before joining Microsoft as part of their partnership with the University of Sydney.

In addition to her work at Microsoft, Maja has been a founder and scientific advisor to several startups in the biotech space, and sits on the Technical Advisory Committee of the Sydney Quantum Academy.
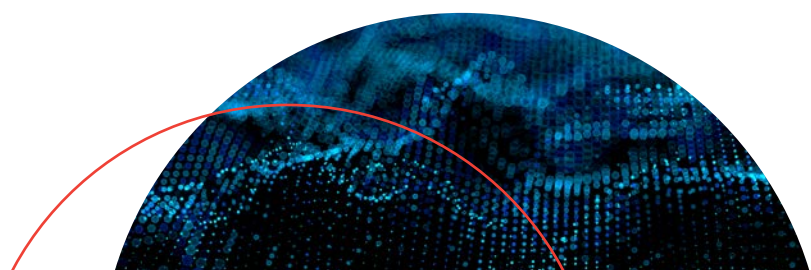
Panellists and Chair

Prof Andrew Dzurak

ARC Laureate Fellow & Professor of Quantum Engineering, UNSW Sydney.

Professor Andrew Dzurak is an expert in silicon-based quantum computing. He holds a PhD in Physics from the University of Cambridge and a BSc (Hons) from the University of Sydney. He is a Scientia Professor at UNSW Sydney, an ARC Laureate Fellow, and is Director of ANFF-NSW, the NSW node of the Australian National Fabrication Facility.

Andrew, with colleague Andrea Morello, demonstrated the world's first silicon quantum bits (qubits) in 2012, and more recently developed a new qubit technology by reconfiguring the ubiquitous CMOS transistors that make up all of today's silicon processor chips. He leads a team at UNSW focused on the development of a quantum processor that can be manufactured using CMOS technology. He has published over 200 research papers with over 20 papers in Science and Nature group journals, and is co-inventor on 12 patent families.

Prof Geoff Pryde

Senior Quantum Researcher, PsiQuantum.

Geoff Pryde recently started as a senior quantum researcher at PsiQuantum Corp., and is on leave from Griffith University. He has 20 years of experience in experimental optical quantum information science, including leading optical quantum computing and quantum network research efforts at Griffith University and within the ARC Centre of Excellence for Quantum Computation and Communication Technology (CQC2T).

CHAIR:
Prof Andrew Doherty

Professor, School of Physics, University of Sydney.

Professor Andrew Doherty is a theoretical physicist in the School of Physics at the University of Sydney with more than 20 years of experience in quantum physics research. His research interests are in quantum control, quantum information, and quantum computing. He has extensive collaborations with experimentalists in a wide range of systems from quantum optics, including cavity QED and optomechanical systems, to condensed matter, including circuit QED and semiconductor quantum dots.

Professor Doherty completed his PhD at the University of Auckland in 2000 and did postdoctoral research at the California Institute of Technology before taking on academic positions at the University of Queensland and the University of Sydney. From 2019 to 2021 he worked for quantum computing company PsiQuantum, including as CTO from March 2020.

Panellists

PANEL: RESPONSIBLE INNOVATION IN QUANTUM TECHNOLOGY

Scott Aaronson

Professor of Computer Science, University of Texas at Austin.

Scott Aaronson is David J. Bruton Centennial Professor of Computer Science at the University of Texas at Austin. He received his bachelor's from Cornell University and his PhD from UC Berkeley.

Scott's research in theoretical computer science has focused mainly on the capabilities and limits of quantum computers. His first book, Quantum Computing Since Democritus, was published in 2013 by Cambridge University Press. He received the National Science Foundation's Alan T. Waterman Award, the United States PECASE Award, the Tomassoni-Chisesi Prize in Physics, and the ACM Prize in Computing, and is a Fellow of the ACM.

Aurélie Jacquet

Chair of Standards Australia AI Committee.

Aurélie Jacquet is a member of the NSW Government AI Advisory Committee and the Australian Computer Society's AI Ethics Committee.

She also works on leading global initiatives for the implementation of Responsible AI. She is the chair of the standards committee representing Australia at the international standards on AI, and the co-chair of the first accredited global certification program for AI developed under the Global AI Action Alliance for the World Economic Forum. Aurelie is also an expert for the Institute of Electrical and Electronics Engineers (IEEE) working with them on various AI standards initiatives.

Dr Ian Oppermann

NSW Chief Data Scientist; Industry Professor, UTS.

Dr Ian Oppermann is the NSW Government's Chief Data Scientist working within the Department of Customer Service. He is also an Industry Professor at the University of Technology Sydney (UTS). From 2015 to 2019, Ian was also the CEO of the NSW Data Analytics Centre (DAC).

Ian is considered a thought leader in the area of the Digital Economy and is a regular speaker on "Big Data", broadband enabled services and the impact of technology on society. Ian has an MBA from the University of London and a PhD in Mobile Telecommunications from University of Sydney. Ian is a Fellow of the Institute of Engineers Australia, a Fellow of the IEEE, a Fellow of the Australian Academy of Technological Sciences and Engineering, is a Fellow and Immediate Past President of the Australian Computer Society, Fellow of the NSW Royal Society, and a graduate member of the Australian Institute of Company Directors.

Panellists and Chair

Dr Tara Roberson
Research Fellow, EQUS.

Tara Roberson is a postdoctoral researcher at the Australian Research Council Centre of Excellence for Engineered Quantum Systems (EQUS). She is a science communicator and social scientist who works with quantum physicists to understand the implications of emerging technologies in their field. Tara also works in industry, supporting activities on ethics, law, and assurance for robotics, autonomous systems, and artificial intelligence.

CHAIR:
Prof Gavin Brennen

Director of the Macquarie Centre for Quantum Engineering, Macquarie University.

Prof Gavin Brennen is director of the Macquarie Centre for Quantum Engineering and is also a Chief Investigator for the ARC Centre for Engineered Quantum Systems (EQUS). He completed his PhD at the University of New Mexico with a thesis proposing one of the first quantum computer architectures. Before moving to Australia, he worked as a research fellow at NIST Gaithersburg, and as Senior Scientist at IQOQI, Innsbruck. His research focus is on the theory of quantum computers, simulators, and quantum sensors as well as the impact of quantum technologies on fintech.

Panellists

PANEL: QUANTUM NETWORKING - A NATIONAL QUANTUM NETWORK: OPPORTUNITIES AND CHALLENGES

Prof Ping Koy Lam

Professor, Australian National University.

Professor Ping Koy Lam is an experimental quantum physicist at the Australian National University and a Fellow of the Australian Academy of Science. His research is in the field of quantum information and metrology. He was a co-founder of QuintessenceLabs – an Australian cybersecurity company productising quantum communication technology.

He was a recipient of the AIP Bragg Medal (2000) and Alan Walsh Medal for contributions to industry (2014), the Eureka Prize for inspiring science (2003) and for scientific research (2006). Ping Koy is currently also a visiting professor and a Distinguished Fellow of Nanyang Technological University, Singapore.

Dr Peter Rohde

Senior Lecturer, University of Technology Sydney.

Dr Peter Rohde is senior lecturer and former ARC Future Fellow in the Centre for Quantum Software and Information at UTS. He is lead author of the upcoming book "The Quantum Internet", in press with Cambridge University Press.

His research focuses on optical quantum computing, quantum networking and the economics of quantum technology, and has presented at TEDxNewtown on the geo-strategic implications of quantum computing. When not pursuing quantum computer science he pursues mountaineering, although often does them simultaneously.

Dr Vikram Sharma

Chief Executive Officer, QuintessenceLabs.

Recognising the potential of quantum cybersecurity, Dr Vikram Sharma founded and now leads Canberra-headquartered QuintessenceLabs. QuintessenceLabs is at the forefront of the global quantum cybersecurity industry. The company's capabilities have received a number of recognitions - most recently being named Global Innovator by the World Economic Forum.

Vikram holds a Master of Science in computer science from the ANU, a Master of Science in management (Sloan Fellow) from Stanford University, and a Doctorate in quantum physics from ANU. Vikram is also the recipient of the 2013 Pearcey State Award for Entrepreneurship, serves on several industry boards and is a member of External Advisory Board of the Sydney Quantum Academy.

Vikram's TED Talk on "How Quantum Physics can make Encryption Stronger", has had over 1 million views.

Panellists and Chair

Maria Spiropulu

Shangi-Yi Ch'en Professor of Physics, California Institute of Technology.

Maria Spiropulu is the Shang-Yi Ch'en Professor of Physics at Caltech. She received her PhD in physics from Harvard and was Enrico Fermi Fellow at the University of Chicago before moving to CERN. She worked at collider experiments at Fermilab and CERN's LHC on detector instrumentation and searches for dark matter and other new physics including the discovery of the Higgs boson. Since 2013 she has been exploring and applying AI and Quantum-AI towards accelerating discovery in particle physics and other domains. In 2017 she founded the IN-Q-NET research program focusing on quantum networks and communications as well as HEP/QIS intersections.

CHAIR:
Dr Zixin Huang

SQA Postdoctoral Fellow, Macquarie Centre for Quantum Engineering, Macquarie University.

Dr Zixin Huang obtained her PhD in quantum photonics at the University of Sydney, before moving to the University of Sheffield (UK) for a postdoctoral position as part of the Quantum Communications Hub. She now holds a fellowship position at Macquarie University. Her research interests include quantum imaging, metrology and cryptography.

Panellists

PANEL: THE QUANTUM STARTUP JOURNEY

Dr Marcus Doherty
Chief Scientific Officer, Quantum Brilliance.

Dr Marcus Doherty is a scientist, educator, entrepreneur and soldier. As an entrepreneur, he is a co-founder and the Chief Scientific Officer of Quantum Brilliance Pty Ltd—the global company developing quantum microprocessors based upon diamond that will make quantum computing ubiquitous. As a scientist and educator, he is the Head of the Diamond Quantum Science and Technology Laboratory and the convenor of various graduate courses related to quantum science, technology and industry at the Australian National University. As a soldier, he currently serves within the Future Land Warfare Branch of Army Headquarters, where he leads the implementation of Army's Quantum Technology Roadmap.

Panellist: Prof Andrew Dzurak
ARC Laureate Fellow & Professor of Quantum Engineering, UNSW Sydney. (See page 35)

Dr Si-Hui Tan
Chief Science Officer, Horizon Quantum Computing.

Dr Si-Hui Tan heads the research development for Horizon's software that will compile classical code to be run on a quantum computer. She has been an active researcher in the field of quantum information science for over 15 years, and has published extensively in top journals and conference proceedings. Si-Hui received a BSc in Physics from the California Institute of Technology and a PhD in Physics from the Massachusetts Institute of Technology (MIT), where she was the recipient of the prestigious MIT Presidential Fellowship.

Prior to joining Horizon, Si-Hui was a research scientist at the Singapore University of Technology and Design, the Centre for Quantum Technologies, and the A*STAR Data Storage Institute. Si-Hui was honoured as the silver winner for CTO of the Year at the WomenTech Global Awards 2020 and was recently named to the SG100 Women in Tech 2021 list.

CHAIR: Sally-Ann Williams
CEO, Cicada Innovations.

Sally-Ann Williams is the CEO of Cicada Innovations, Australia's home of Deep Tech. The Sydney-based incubator has a 21-year track record of developing deep tech ventures tackling some of the world's most pressing problems, like the future of human health, food security and the climate crisis.

Prior to joining Cicada she spent over 12 years at Google as an Executive Program Manager on the engineering team leading work on R&D collaborations with universities, startup and entrepreneurship engagement and pioneering work on CS & STEM education including building world first collaborations delivering national transformation.

Sally-Ann is an experienced Non Executive Board member currently serving on the boards of Cicada Innovations, Qudos Bank, NSSN, and AusOcean, as well as the advisory board member of the Heavy Ion Accelerator NCRIS Facility, a member of the Centre for Entrepreneurial Agri-Technology governance committee, and a member of the NSW Government Tech Central Advisory Board.

Panellists

PANEL: WHAT DRIVES INVESTMENT IN QUANTUM TECHNOLOGY
Proudly Sponsored By **NSW Government / Tech Central**

Ekaterina Almasque
General Partner, OpenOcean.

Ekaterina Almasque is a General Partner at OpenOcean. She invests in unique technologies enabling our future data-driven economy, such as artificial intelligence, quantum computing, data infrastructure and cybersecurity. In the quantum space, Ekaterina is on the board of IQM, a company out of Finland building scalable quantum machines based on their unique superconducting processors.

Before joining OpenOcean, Ekaterina was a Managing Director at Samsung Catalyst Fund in Europe, Samsung's multistage investment arm focusing on cutting edge technologies, such as GraphCore, as well as venture funds. For over 10 years prior to that, Ekaterina was part of several corporate and independent venture capital funds in Silicon Valley and Europe, including EMC and Siemens Venture Capital.

Bill Bartee
Managing Partner, Main Sequence Ventures.

Bill Bartee is the Managing Partner of Main Sequence. Main Sequence backs those scientists and entrepreneurs who are taking the long shots. His interests broadly are in breakthrough, science-based ideas that leapfrog today's solutions. He is currently investing in opportunities in quantum technologies, healthcare, AI, chemistry, and synthetic biology where rapid progress is being made and solutions take decades.

Prior to Main Sequence, Bill founded a number of companies and helped start a few investment firms. Most recently, he co-founded Blackbird Ventures where he was one of three General Partners and an Investment Committee member. Its first fund is among the top 1% globally for its vintage. Key market leaders that Bill has led early-stage investments in include Altium, Seek, Rome2Rio, Looksmart, Autopilot, Baraja, Q-CTRL, Culture Amp, Trellis Data, Prospection, and dozens more.

Matthew E. Gould
Director & Head of Emerging Technologies, Allectus Capital.

Matthew Gould is a specialist in emerging technologies, with a background that includes work in Artificial Intelligence, Virtual Reality, and Fin Tech. He currently leads innovation for the ICM Group and is a director of their private equity technology fund Allectus Capital. Matthew has led investment strategy in new technologies for over twenty years including with DMG, Hewlett Packard, and The Vision Fund. He is currently designing the quantum computing investment strategy for ICM globally.

Matthew has honors degrees in Anthropology, Literary Theory, and Buddhist Philosophy, from Canterbury University; and a Masters in Business with a focus on Corporate Strategy and Finance from the Advanced Business Programme at Otago University. He is a registered financial advisor and member of the IOD.

Panellists and Chair

Annie Parker

*Executive Director,
Tech Central, Greater
Sydney Commission.*

Annie is a globally recognised innovator in startup cultivation, and a distinguished community leader. She has built multiple startup programs that have invested in thousands of founders. A firm believer in the importance of paying her knowledge forward, Annie is also an active angel investor, mentor, keynote speaker and an advocate for inclusion and public interest technology.

Annie joined the Greater Sydney Commission in Dec 2021 to lead the establishment and curation of Sydney and Australia's largest tech innovation engine Tech Central. Prior to Tech Central, she was a senior leader in Microsoft's Global Startups team leading all Equity and Inclusion and Social Impact partnerships and programs around the world. Annie also co-founded Telstra's startup accelerator program Muru-D, co-founded Techfugees Australia and Code Club Australia.

CHAIR: Sally-Ann Williams

*CEO, Cicada Innovations. *

Careers Fair: Master of Ceremonies (25 February)

Eser Zerenturk

*Education Manager,
Sydney Quantum
Academy.*

Eser has a background in life sciences and medical research, completing her PhD at UNSW Sydney before moving to the Baker Heart and Diabetes Institute where she received a prestigious postdoctoral Fellowship from the Heart Foundation.

Eser's passion for teaching, EDI and STEM then led her to various roles where education was the focus, working with high school students, science undergraduates and graduates, and educators. Eser now leads Sydney Quantum Academy's educational and outreach programs for students from high school all the way to PhDs. The programs are focused on creating a robust and diverse quantum talent pipeline in Australia.

Careers Fair: Panellists

IBM Quantum

PANEL: DEVELOPING THE FUTURE QUANTUM WORKFORCE
Proudly Sponsored By **IBM Quantum**

Dr Aggie Branczyk
Manager, Quantum Applications Research & Software, IBM Quantum.

Aggie Branczyk's team at IBM Quantum focuses on two key areas: (1) delivering high-impact research to advance quantum algorithms and applications, and (2) building software prototypes to get state-of-the-art research into the hands of users as quickly as possible. Before joining IBM, her research revolved around quantum optics, applied mostly to quantum information, but also to other areas such as quantum biology and relativity.

Aggie is passionate about helping people find a fulfilling career and has created several web resources to help graduate students who are exploring their options (you can find them at www.agatabranczyk.com). She also regularly posts on LinkedIn about work, life, careers, and quantum tech (you can follow her at https://www.linkedin.com/in/agata-branczyk).

Assoc Prof Daniel Burgarth
Macquarie University.

Associate Professor Daniel Burgarth obtained his PhD at University College London exploring aspects of quantum state transfer in one-dimensional spin systems. He then moved to the ETH Zurich and Oxford University, where as a postdoc and JRF, he researched in the areas of quantum information and computations. In 2009, he was awarded an EPSRC Fellowship in Theoretical Physics, working in the area of Quantum Control and Estimation at Imperial College London.

He moved to Aberystwyth in August 2011, to take up his appointment as Lecturer in Mathematics and Physics. In 2019 he moved to the other side of the Bloch sphere and is now an Associate Professor and ARC Future Fellow at Macquarie University. He is Chief Investigator at the ARC Centre of Excellence for Engineered Quantum Systems (EQUS) exploring quantum control and noise mitigation.

Assoc Prof Chris Ferrie
University of Technology Sydney.

Chris Ferrie is an Associate Professor at the University of Technology Sydney (UTS) and the Centre for Quantum Software and Information. His research interests include quantum estimation and control, and the use of machine learning to solve statistical problems in quantum information science. He obtained his PhD in Applied Mathematics from the Institute for Quantum Computing and University of Waterloo (Canada) in 2012.

Chris's passion for communicating science has led from the most esoteric topics of mathematical physics to more recently writing children's books, such as Quantum Physics for Babies, and a whole collection of other titles that make science accessible even for the youngest children.

Panellists and Chair

Prof Lloyd Hollenberg

Director, IBM Quantum Hub; Professor of Physics, The University of Melbourne.

Professor Lloyd Hollenberg is the director of the IBM Quantum Hub at The University of Melbourne, and holds the inaugural Thomas Baker Chair in the School of Physics. He completed his PhD in 1989 in theoretical particle physics and in 1999 turned his attention to quantum computing. He is the Deputy Director of the Australian Research Council (ARC) Centre of Excellence for Quantum Computation and Communication Technology (2011–2024), and was awarded an ARC Laureate Fellowship in 2013.

Lloyd's nearly two decades of work in quantum computing underpins the establishment of the IBM Quantum Hub at the University of Melbourne. He has published over 250 papers and is well known internationally for his work in quantum computing and the development of quantum sensing techniques at the quantum-nano-bio interface. He was elected to the Australian Academy of Science in 2018.

Prof Andrea Morello

Scientia Professor of Quantum Engineering, UNSW Sydney.

Andrea Morello is the Scientia Professor of Quantum Engineering at UNSW Sydney. He obtained his PhD in 2004 from the University of Leiden, followed by a postdoc at the University of British Columbia. At UNSW since 2006, he demonstrated the world's first electron- and nuclear-spin qubits in silicon. Andrea won the Eureka Prize in 2011, the Malcolm McIntosh Prize in 2013, the Landauer & Bennett Award in 2017, and is an elected Fellow of the American Physical Society. He is heavily involved in education, training and outreach, and in the establishment of the UNSW B.Eng. in Quantum Engineering.

CHAIR:
Prof Peter Turner

CEO, Sydney Quantum Academy.

Peter Turner is CEO of the Sydney Quantum Academy. He also holds an Honorary Professorship in the Department of Physics and Astronomy, Macquarie University, and is a member of the Macquarie University Research Centre for Quantum Engineering.

Active in the quantum information field for nearly 20 years, Peter completed his MSc and PhD in Physics at the University of Toronto, followed by an Alberta Ingenuity Fellowship at the Institute for Quantum Information Science at the University of Calgary, and an Assistant Professorship in Physics at the University of Tokyo.

As Director of the Quantum Engineering Centre for Doctoral Training at the University of Bristol, Peter established one of the world's first programs aimed at preparing graduates for the quantum technology industry.

Panellists

PANEL: WHERE A CAREER IN QUANTUM CAN TAKE YOU

Dr Claire L. Edmunds

Erwin Schrödinger Center for Quantum Science and Technology (ESQ) Postdoctoral Fellow, University of Innsbruck.

Claire Edmunds is a postdoctoral fellow at the University of Innsbruck studying trapped-ion quantum computing. She completed her PhD in experimental quantum physics at the University of Sydney in 2021 and was subsequently awarded the Erwin Schrödinger Center for Quantum Science and Technology (ESQ) fellowship from the Austrian government to continue her research in Innsbruck with the Quantum Optics and Spectroscopy group.

Alongside her PhD, Claire worked part-time at the quantum computing startup Q-CTRL as a Quantum Control Engineer. In addition to research, Claire is passionate about science outreach, and participated in numerous science education and communication activities during her studies.

Rachpon Kalra

Senior Hardware Engineer, Microsoft.

Rachpon Kalra completed his PhD at the University of New South Wales (UNSW Sydney) on the building blocks of a quantum computer based on donor spins in silicon. During his postdoc at University of Queensland, he investigated micro-mechanical systems for quantum networks and radiation-hard computation. He now works as part of the Microsoft quantum computing team in Sydney.

Dr Emma Mitchell

Senior Principal Research Scientist and Team Leader: Quantum Devices & Materials, CSIRO Manufacturing.

Dr Emma Mitchell is a Senior Principal Research Scientist with CSIRO Manufacturing, with experience in experimental condensed matter and applied physics. Emma's focus is on exploiting quantum phenomena to enhance sensor capabilities via improved materials properties, device design and critical parameter uniformity. Her goals are to help support the development of an Australian-based, high-tech quantum sensor industry, applicable to a wide range of industries (e.g., mineral exploration, medical, defence, communications, aerospace) that will benefit from improved sensor performance.

As Project Leader, Emma continues to grow and manage an increasingly complex portfolio of research projects. As Team Leader she manages more than a dozen people involved in a range of scientific and commercial projects focussed on quantum-based sensing. Emma has successfully delivered on several large commercial projects in the defence and aerospace areas, by enabling creative solutions to scientific problems, and meeting customer needs by assessing and deploying resources to deliver project outcomes.

Panellists and Chair

Sam Roberts
Senior Quantum Architect, PsiQuantum.

Sam Roberts is a researcher at PsiQuantum, a startup aiming to build the first large-scale, error corrected, quantum computer using photons. As part of the architecture team, he works primarily on fault-tolerance and quantum error correction.

Prior to joining the company, Sam completed his PhD in 2019 at the University of Sydney, studying the theory of topological phases of matter for use in quantum computing. Sam's research interests are in quantum error-correcting codes, fault-tolerant logic, architecture design as well as understanding the fundamental quantum mechanical properties that give quantum computers their power.

Dr Matt van Breugel
Co-Founder & CEO, Redback Systems.

Dr Matt van Breugel is CEO and co-founder of Redback Systems, an innovative spectrometer startup that builds fundamentally powerful scientific instruments that challenge widely adopted tools.

Matt completed his PhD in experimental quantum physics at Macquarie University in 2020 focusing on engineering quantum systems with nanodiamond material. He continues a role at Macquarie in industry engagement, where he works to identify challenges in industry that can be addressed now and in the future.

CHAIR:
Juan Pablo Dehollain
Chancellor's Postdoctoral Research Fellow, University of Technology Sydney.

Dr Juan Pablo Dehollain is an active experimental physicist with a bachelor degree in Electronic Engineering, carrying out research in the field of quantum technologies. He obtained his PhD at the University of New South Wales (UNSW Sydney) operating quantum devices based on single-atom spins from impurities in silicon.

Juan Pablo then moved to TU Delft as a Postdoc performing quantum simulations with quantum dot arrays in GaAs. In his current Chancellor Postdoc Fellowship appointment he is performing quantum simulations of light-matter interaction using superconducting circuits.

SYDNEY QUANTUM ACADEMY (SQA)

The SQA is a unique partnership between four world-leading universities – Macquarie University, UNSW Sydney, the University of Sydney and University of Technology Sydney. We are generously supported by the New South Wales Government.

Our vision is to build Australia's quantum economy. Collaborating with academia, industry and government, we're harnessing Sydney's collective quantum expertise to develop diverse talent and a globally recognised quantum ecosystem.

sydneyquantum.org

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