



2025 LLOYD REES LECTURE

Quantum computers approaching fast

Professor Lloyd Hollenberg FAA, School of Physics,
Faculty of Science, The University of Melbourne.

2.30pm–4.30pm **Thursday 6 November 2025**

Ian Wark Lecture Theatre, CSIRO
Research Way, Clayton, Victoria

About the lecture

After many years of research and development, quantum computers are emerging from research labs around the world. Programmable quantum computers, such as those based on superconducting circuits and individual trapped atoms, can be accessed via the cloud. Meanwhile, the associated quantum algorithms, software and programming frameworks are developing rapidly. But what are quantum computers, and what are they good for? Where are they heading? Can we believe the hype? To address these questions, we will take a brief (personalised) tour through the world of quantum computers, covering the basics of their operation, current status and outlook for applications in areas such as chemistry and material science, bioinformatics, finance, and AI.

About the award

In 1990, Sir Alan Walsh FAA proposed that the Australian Academy of Science initiate a series of lectures by distinguished researchers in chemical physics, to recognise the contributions of the late Dr A L G Rees FAA to science, industry and education.



About the speaker

Professor Lloyd Hollenberg FAA completed his PhD in theoretical particle physics at the University of Melbourne in 1989 and was subsequently awarded a JSPS Fellowship at the KEK accelerator laboratory in Tsukuba, Japan. After his postdoctoral period he returned to the School of Physics to take up a research and teaching position. Lloyd's early work in mathematical physics and lattice gauge theory was a natural starting point for his interest in quantum computing. Since 2001, Lloyd has been a driving force for the silicon quantum computer vision, providing theoretical underpinnings from device physics to quantum error correction and scale-up. He is an internationally known proponent of quantum technology, having made contributions in both theoretical quantum computing and experimental implementations of quantum sensing using spin qubits in semiconductors.

Lloyd has published more than 250 papers in refereed journals, including prestigious journals such as Science, Nature, Nature Physics, Nature Nanotechnology, Nature Materials and Physical Review Letters. He was ranked 6th in the world for contributions to quantum computing in the 2001–10 Thomson Reuters census. Under his ARC Laureate Fellowship (2013–18) he developed quantum sensing and imaging technology that crosses the nano–bio divide. Lloyd has served on the Australian Research Council's College of Experts and was Chair of the Physics, Chemistry and Geosciences panel in 2008. He was elected a Fellow of the Australian Academy of Science in 2018.