

EQUS

Australian Research Council
Centre of Excellence for
Engineered Quantum Systems

STRATEGIC PLAN 2018-2020



Australian Government
Australian Research Council



THE UNIVERSITY
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Strategy

Our mission is to engineer the quantum future.

Our vision is to conduct world-leading research to exploit the potential of quantum science and develop a range of transformational technologies that will benefit society.

Australia's quantum future

Quantum technologies use the properties of quantum mechanics for practical applications. Quantum technologies can be found in our everyday lives, from smart phones and cars to industrial applications in manufacturing, engineering and imaging.

Today's technology only captures a small fraction of the potential of quantum physics. New developments in research and engineering mean a new generation of technologies are being created. These technologies have potential uses in a range of fields - including health, telecommunications, and finance - and will impact across business and society as a whole.

The Australian Research Council Centre of Excellence for Engineered Quantum Systems (EQUS) is a seven-year investment of over \$40 million by the Australian government in quantum technologies. EQUS researchers are conducting world-leading research into building quantum machines, with programs to develop the Designer Quantum Materials, Quantum-enabled Diagnostics & Imaging, and Quantum Engines & Instruments at the heart of these machines.

We will achieve this through discovery and education

Discovery: Foster leading-edge research and engineering of quantum physics and quantum machines for the social and economic benefit of our community

Education: Create a quantum-literate ecosystem by training a generation of quantum engineers and scientists within a program of focussed research, as well as engagement with community

The values that guide our performance are:

Discovery: Our research transforms technology

Innovation: Our ideas shape the quantum future

Collaboration: Our partnerships with all parts of society translate research into application

Communication: Our research must be shared

Aims and objectives

What is a quantum machine?

Quantum machines are next-generation technologies that use the principles of quantum physics.

Possible applications include: **quantum sensors** that are potentially cheaper, lighter, and more sensitive than classical sensors; **quantum imaging systems**, such as cameras that visualise gas leaks or see through smoke; and **quantum communication technologies** for ultra-secure communications and storage of data.

We are committed to four strategic objectives:

1 Building quantum machines by engineering multi-component quantum systems

- Support ground-breaking research in quantum physics with programs to develop quantum designer materials, quantum-enabled diagnostics and imaging, and quantum engines and instruments
- Grow research collaboration across different physics platforms to build integrated quantum technologies
- Strengthen and grow national and international research collaboration to ensure we leverage the breadth of our research to make significant contribution to global quantum research

2 Developing practical quantum technologies with societal impact

- Build capacity in translational research through industry partnerships, strategic recruitment, developing prototyping ability and the involvement of scientific partners in research activities
- Establish cross-disciplinary collaboration to help identify societal needs that may benefit from the new possibilities in quantum research
- Maintain a strong commitment to responsible research and innovation
- Provide workshops to encourage the development of skills in entrepreneurship, innovation, and collaboration, which will enable us to find better ways to translate discoveries into social and economic benefits

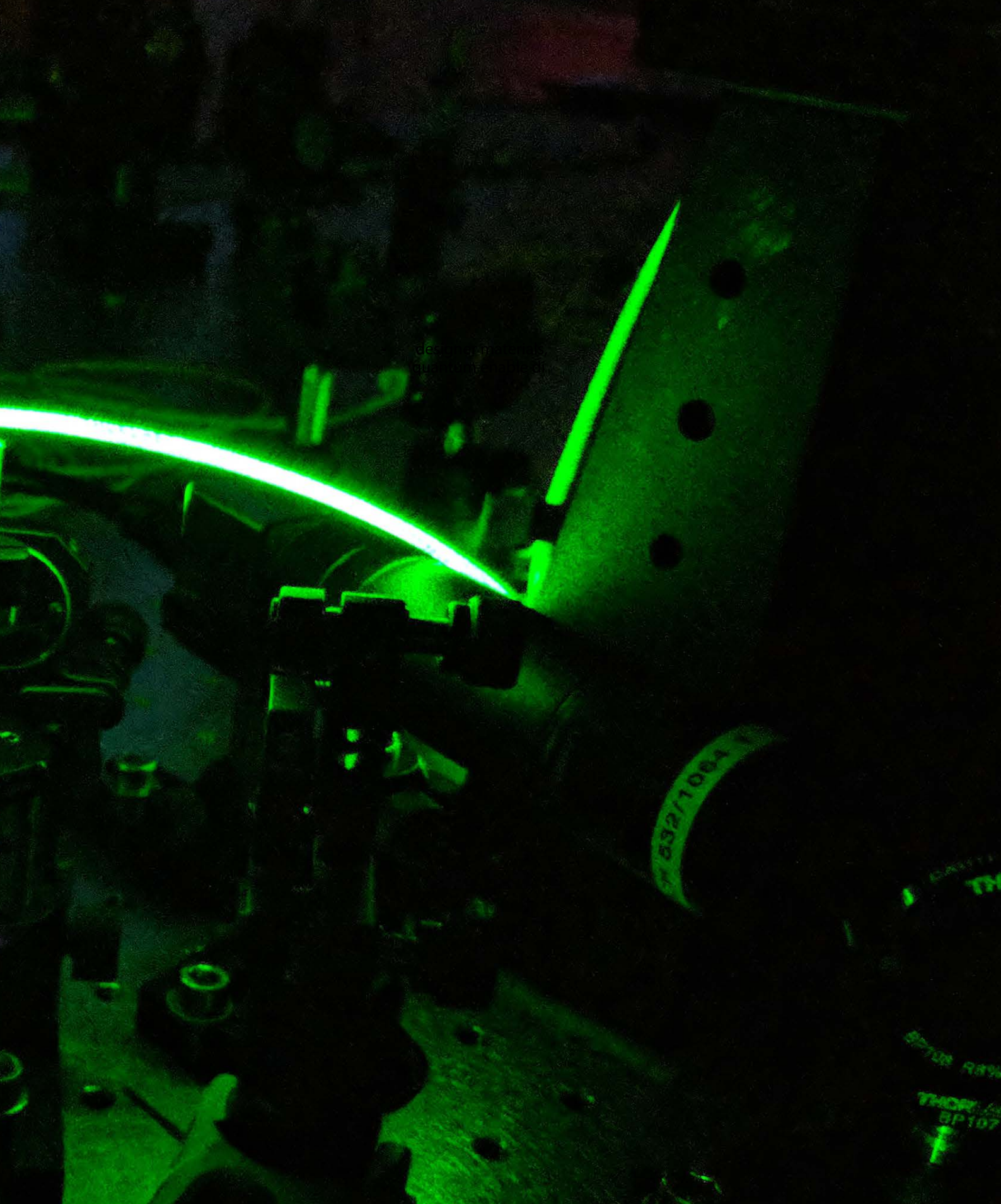
3 Growing Australia's world-leading research community in quantum engineering

- Actively pursue strategic and high-quality international collaborations, partnerships, and networks
- Attract, retain, and nurture research talent by providing access to mentoring, skill building, and talent development programs
- Build research capacity through strategic funding to improve national and international engagement of researchers by nurturing links with globally leading academic and industry partners
- Uphold equity and diversity as core drivers of research

4 Training a new generation of versatile and knowledgeable quantum engineers

- Facilitate access for our researchers to world-class technologies, capabilities, and services that will support high-quality research endeavour
- Support the development and technical capabilities of our researchers through professional development workshops, fellowships, study visits, industry internships, and international student exchange programs
- Build capacity and technical capabilities through graduate programs to meet the rising need for scientifically trained engineers

Our focus on research excellence will create a thriving ecosystem where research and engineering of quantum machines is integrated across industry, the public sector, and the research community.



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