

The image features a modern building with a glass and metal facade, reflecting the sky and surrounding greenery. In the foreground, there is a paved courtyard area with a tree on the left and a wooden bench on the right. The Archer logo is overlaid on the left side of the image.

# ARCHER

Research & Prototype Foundry Archer operates in,  
Sydney, Australia.



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This presentation contains information which was reported in ASX announcements lodged between 1 October 2017 and 23 November 2021 (together the “Announcements”). All material assumptions and technical parameters set out in the Announcements continue to apply and have not materially changed. The Announcements can be viewed online at <https://www.archerx.com.au>.

Certain statistical and other information included in this presentation is sourced from publicly available third party sources and has not been independently verified.

Ticker

**AXE**

*Australian Securities Exchange listing*

Sector

**Semiconductors**

Market Capitalisation

**A\$363m**

*As of 23 Nov 2021*

Peers

**Intel, AMD, IonQ  
Rigetti, NVIDIA**

*Chosen by similar industry, tech, or activity*

Cash at Bank

**A\$29.4m**

*No corporate debt. As of 21 Oct 2021*

Share Price

**A\$1.470**

*As of 23 Nov 2021*

Key Activities

**Quantum computing, deep tech,  
semiconductor devices, chips**

Shareholder Return

**+185%**

*12 months as of 23 Nov 2021*



# ARCHER IS ONE OF A FEW COMPANIES IN THE WORLD DEVELOPING A QUANTUM COMPUTING PROCESSOR



## / Archer: A Pure-play Deep Tech Company

Archer is a technology company that is developing advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics. Archer is long-term value driven and creates maximum value by:

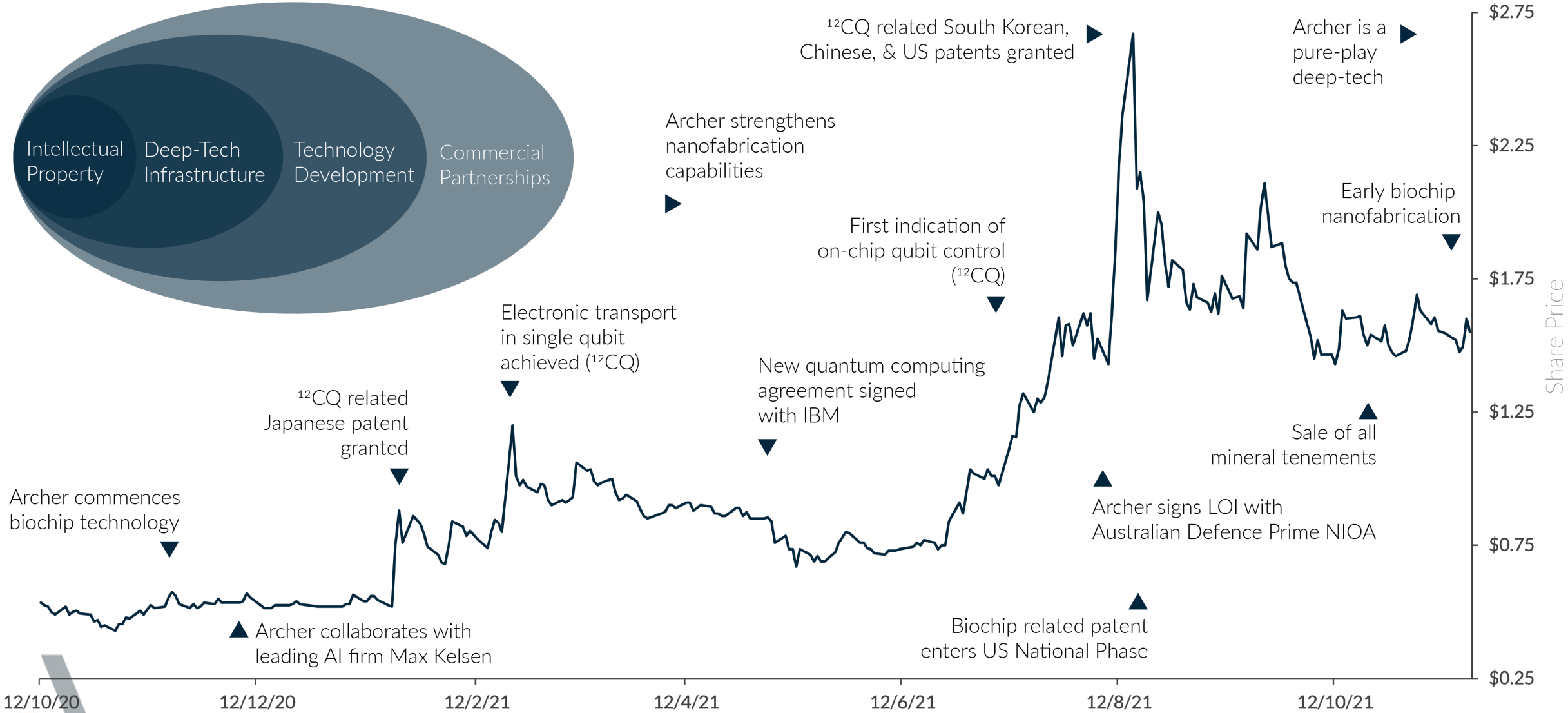
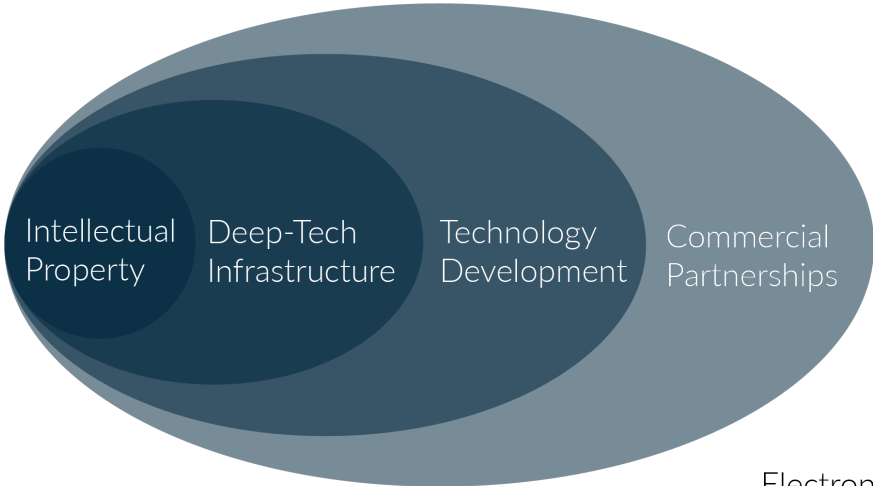
- + Progressing its technology development, including its  $^{12}\text{CQ}$  quantum computing processor chip (“ $^{12}\text{CQ}$  chip”) and graphene-based biosensor chip (“biochip”).
- + Utilising Tier 1 tech development infrastructure and facilities, R&D, people and IP, to support pre-market development.
- + Protecting key intellectual property assets (e.g. patents and patent applications) with global competitive advantages.
- + Applying a business model that values partnerships, as a key player<sup>†</sup> in global networks coordinated by large companies.



<sup>†</sup> <https://www.nature.com/articles/s42254-020-00247-5>; also <https://www.ibm.com/quantum-computing/network/members/>

On-chip components of a qubit control device, with features ten times smaller than the width of a human hair.

/ Company Strategy in Action

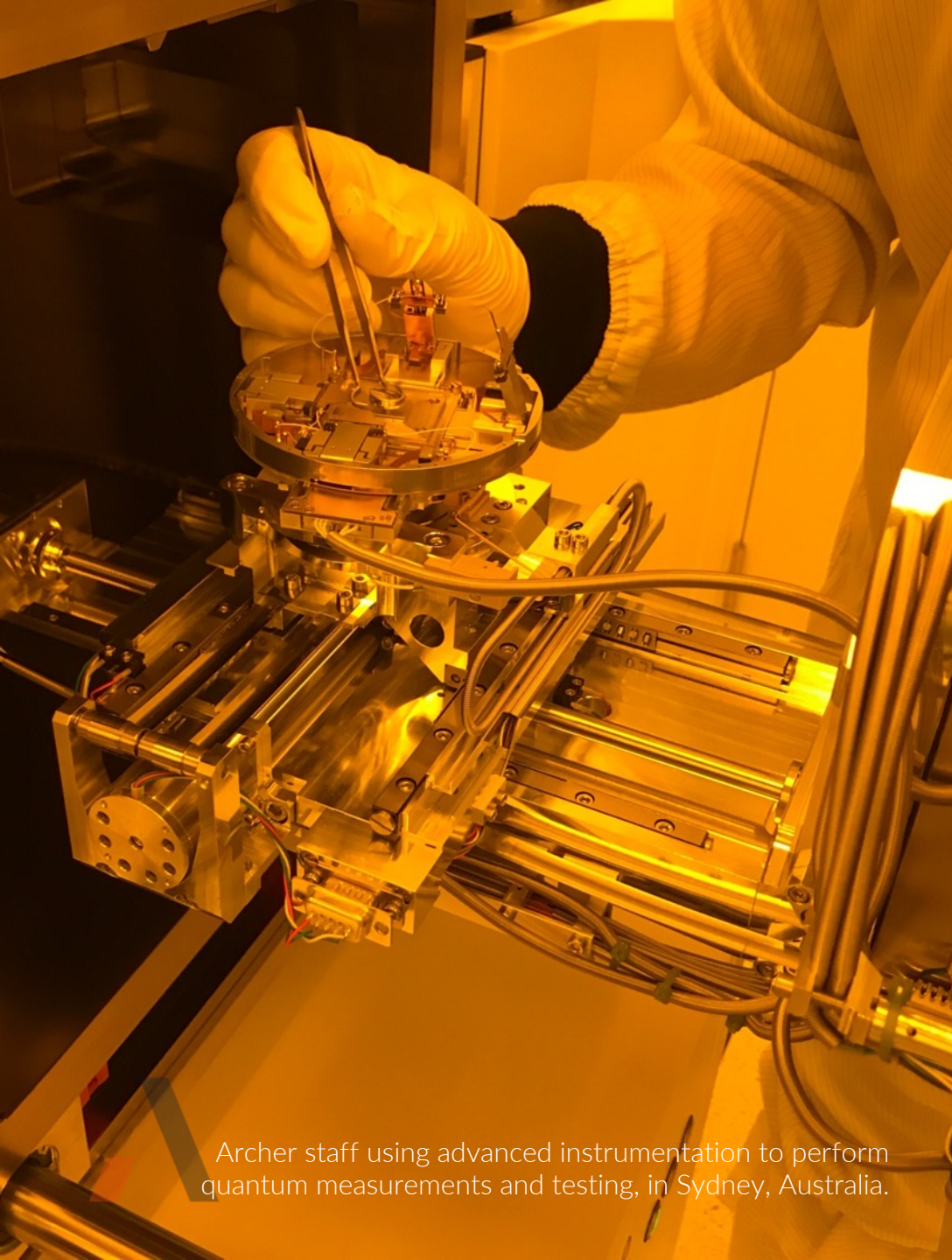




A person wearing a blue cleanroom suit, hood, and gloves is working on a piece of semiconductor equipment. The person is leaning over a workbench, and their hands are visible near the equipment. The background shows a cleanroom environment with various pieces of machinery and equipment.

# ARCHER IS DEVELOPING ADVANCED SEMICONDUCTOR DEVICES





Archer staff using advanced instrumentation to perform quantum measurements and testing, in Sydney, Australia.

## / Era of Quantum Computing

Value for investors in the quantum computing economy is expected to increase as quantum hardware is developed<sup>†</sup>:

- + The Australian Government's Blueprint and Action Plan for Critical Technologies sets a national vision & strategy for critical technologies, including quantum technology<sup>‡</sup>.
- + The CSIRO<sup>§</sup> reported Australian quantum tech could create A\$4 billion revenue and 16,000 new jobs by 2040.
- + The US National Quantum Initiative Act was signed into US law on Dec 21, 2018\* with the US planning to invest US\$170+ billion on advanced tech\*\*.
- + The International Roadmap for Devices and Systems lists Quantum Computing a key tech in the 'post-Moore' era<sup>‡</sup>.

<sup>†</sup> <https://www.bcg.com/en-au/publications/2019/quantum-computers-create-value-when.aspx>

<sup>‡</sup> <https://www.pmc.gov.au/resource-centre/domestic-policy/blueprint-critical-technologies> and <https://www.pmc.gov.au/resource-centre/domestic-policy/action-plan-critical-technologies>

<sup>§</sup> <https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/csiro-futures/futures-reports/quantum>

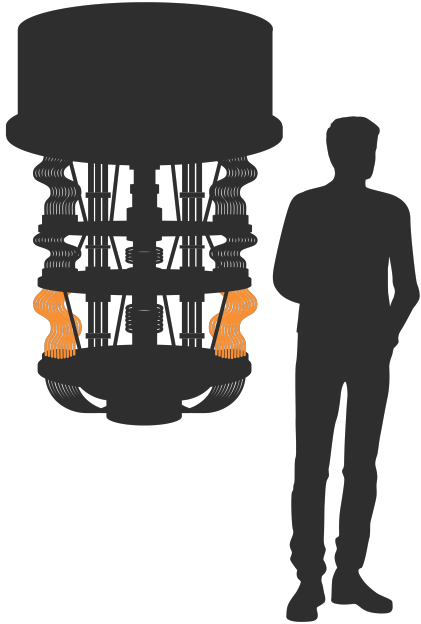
\* <https://www.congress.gov/bill/115th-congress/house-bill/6227>

\*\* <https://www.congress.gov/bill/117th-congress/senate-bill/1260>

<sup>‡</sup> [https://en.wikipedia.org/wiki/International\\_Roadmap\\_for\\_Devices\\_and\\_Systems](https://en.wikipedia.org/wiki/International_Roadmap_for_Devices_and_Systems)

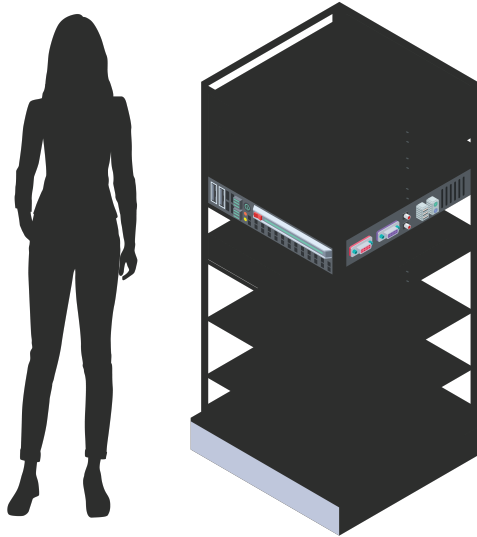


## / Archer's Unique Technological Advantage



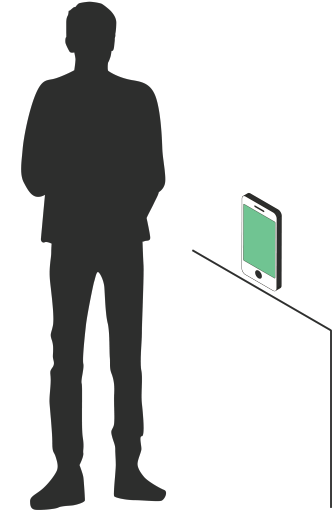
### Cloud-based

- + Require ultra-low temperatures and infrastructure to operate. Accessed via the cloud.  
*e.g. Superconductor, silicon, topological.*



### Edge and/or Cloud-based

- + Operate at room temperature but are difficult to integrate into modern devices. Installed on-site.  
*e.g. Photonic, ion-traps, diamond.*



### Quantum Powered Mobile Devices

- + QPMDs will require practical qubit processors that integrate into modern devices.  
*e.g. <sup>12</sup>CQ chip development.*

In-depth analysis: <https://www.bcg.com/en-au/publications/2021/building-quantum-advantage>  
More information, by Dr M. Choucair, Mar 26 2021: <https://www.ibm.com/blogs/ibm-anz/why-quantum-deserves-your-attention/>

## / Global Partnerships

As COVID-19 travel restrictions begin to ease, Archer's focus into the year includes developing existing partnerships and to create new strategic partnerships:

- + The Company is exploring access to world-class institutional deep-tech infrastructure and resources in North America to grow its capability in quantum computing hardware development.
- + The Archer team has recently visited Canadian institutes, including Institut Quantique - Université de Sherbrooke, housing an IBM Quantum Hub, and Polytechnique Montréal, University of Waterloo, and McGill University.
- + Archer is expanding its team to include expertise in semiconductor device fabrication, nanotech, quantum theory, and advanced materials engineering, to develop its technologies and grow its IP.



Archer staff in Canada exploring access to world-class deep tech infrastructure to develop, build and test  $^{12}\text{CQ}$  chip devices.





## / Quantum Ecosystem Engagement

The Company considers the US a critical strategic jurisdiction to protect and potentially commercialise its IP, with initial efforts by Archer focused on participating in the US technology economy:

- + Archer's CEO and Quantum Technology Manager will engage with members of the international quantum computing community at the in-person Q2B event in Silicon Valley, 7-9 Dec 2021<sup>†</sup>.
- + The Q2B conference will allow Archer to engage with industry speakers, obtain industry and government market outlooks, and for significant networking opportunities.
- + The CEO and QTM will meet representatives of a number of partners and other leaders in the quantum field, in-line with Company strategy to identify opportunities to expand Archer's development in North America.

Santa Clara Valley at dusk as seen from Lick Observatory in Mount Hamilton, California, USA. Licenced image.

<sup>†</sup> Practical Quantum Computing Conference: <https://q2b.qcware.com/>



# / Record Setting Innovation

2009

Choucair is the first to directly synthesise single-atom-thick carbon: graphene (UNSW)

2011

Choucair receives the prestigious Cornforth Medal for best PhD in Chemistry in Australia (RACI)

Choucair probes entanglement of sub-atomic particles with graphene (OXF)

2016

Choucair sets record for qubit lifetime based on itinerant electron spins at room-temp (USYD/EPFL)

2017

Choucair joins Archer as CEO (AXE)

2019

Fuechsle joins Archer as QTM and  $^{12}\text{CQ}$  commences (AXE)

2021

First indication of on-chip qubit control (AXE)

Onwards

Focus on qubit control and quantum information detection devices (AXE)

2014

Choucair sets the record for electron spin lifetime in graphene (USYD/EPFL)

2013

Fuechsle receives prestigious Bragg Gold Medal for best PhD in Physics in Australia (AIP)

2012

Fuechsle is the first to demonstrate a single-atom transistor in silicon (UNSW)

2020

Computational quantum mechanical theory developed to model qubit for the first time (AXE)

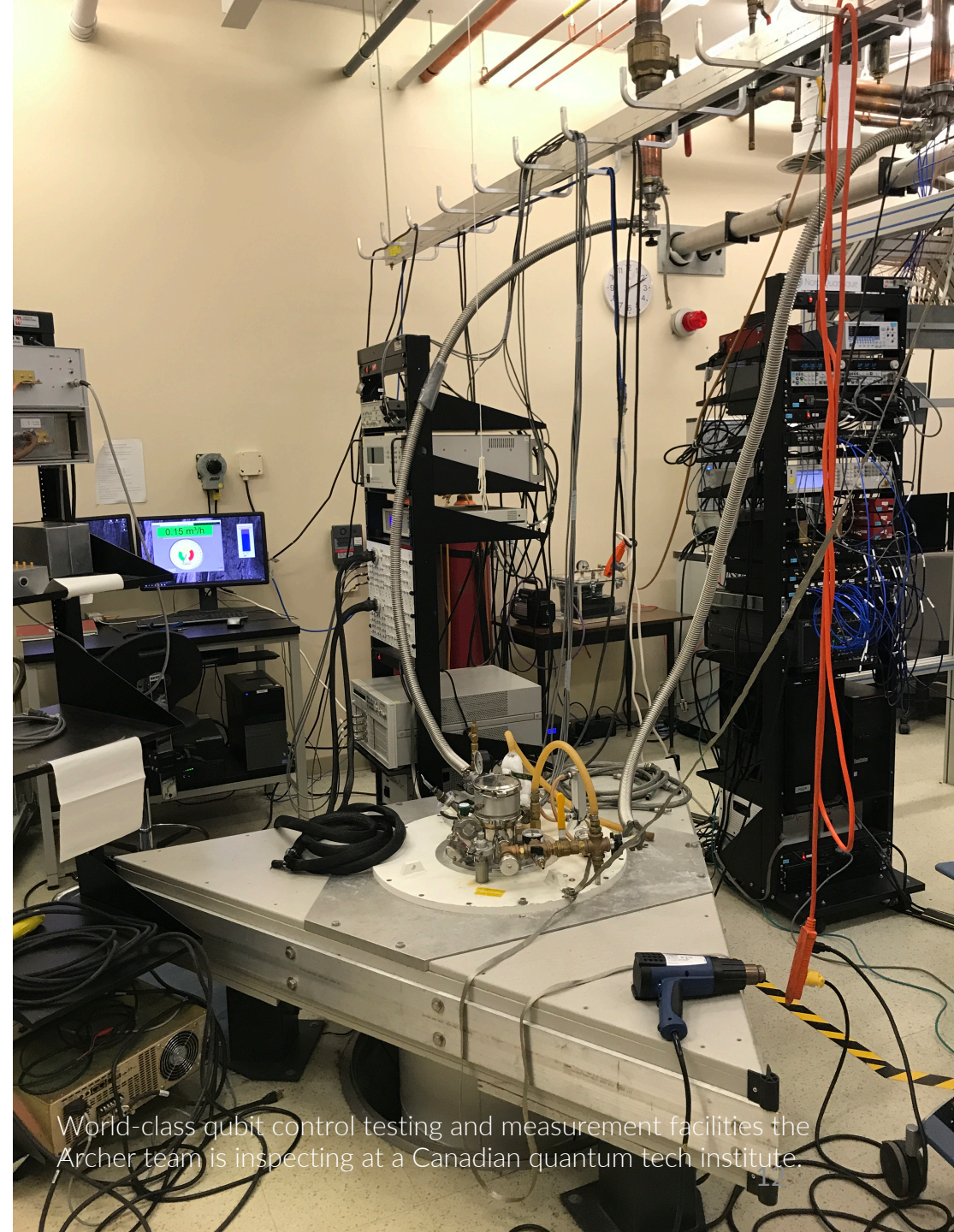
2019

Single qubit precision positioning and scalable assembly of single qubit arrays achieved (AXE)

2021

Electronic transport in a single qubit achieved at room temp. (AXE)

† References: <https://www.nature.com/articles/nnano.2008.365>; <https://www.nature.com/articles/nnano.2012.21>; <https://www.nature.com/articles/ncomms12232>; <https://pubs.acs.org/doi/10.1021/nl202866q>; <https://doi.org/10.1016/j.carbon.2014.03.046>



World-class qubit control testing and measurement facilities the Archer team is inspecting at a Canadian quantum tech institute.



**ASX Code: AXE**

ACN: 123 993 233

The Board of Archer authorised this announcement to be given to ASX.

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