Quantum Cyber Defense

Australia - Investing in a Quantum Future

Dr. Jane Melia
The First Quantum Revolution is All Around Us

- Semiconductors
- Lasers
- GPS
- MRI
The Second Quantum Revolution is Under Way

Quantum Computing

Quantum Security and Communication

Quantum Sensors

Quantum Simulation

Australia is well positioned to take a leadership role in this new technology revolution
Australia - Steps for Developing a Quantum Ecosystem

**Develop Centres of Excellence**

**STEM Education**

**Partnerships and Investment**
Silicon Quantum Computing – SQC

- Develop and commercialize work done by UNSW on silicon qubits
- Some of the highest qubit longevity in the world
- Target: 10-qubit machine commercialised by 2022
- Launched August 2017
- Strong partnership between industry academia and government
- Hiring team of ~40
Spotlight: Australian-born Quantum Software

QxBranch – Data Analytics with expertise in quantum computing

- Launched by Australian company Aerospace Concepts
- Now headquartered in DC, with offices in Adelaide, Hong Kong and London
- Solves complex problems by combining quantum expertise with classical techniques.
- Characterizes and exploits opportunities enabled by quantum capabilities
Spotlight: Australian Quantum Cyber-Security Innovation

**QuintessenceLabs – Commercializing quantum cyber security**

- **Founded in Canberra leveraging research from the Australian National University (ANU)**
- **Integrates advanced quantum technology with classical security techniques to strengthen cyber-security today and for the future**
- **High Speed Quantum Random Number Generators in operational use**
- **Quantum Key Distribution demonstration and maturation projects**
Quantum Random Number Generation

Quantum Measurements

Full Entropy Random, up to 1Gb/s
Spotlight: Australian Quantum Cyber-Security Innovation

**QuintessenceLabs – Innovating for Secure Key Exchange**

Quantum Key Distribution:
- Security based on the laws of physics
- Proven safe today and in the future

On-going collaboration with Australian Department of Defense to productize CVQKD and enable free space implementations.
Australia: Gearing Up for a Quantum Future

Quantum Supremacy: how Australia can lead the world in the new computing

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Quantum computers, build it and they will come, possibly

CQC^2T researchers are connecting up the global quantum internet

A team of researchers led by A. Prof Matthew Sellers at The Australian National University have shown that an erbium-doped crystal is a practical building block for a global quantum internet.

A revolution is coming in computing and Australia is at the forefront

Ultimate Data Security for Enduring Trust®
Thank you!