

Early career scientists pitch session

Session 20 | Main room | 4.30-5.15PM



Dr Graham Wright

*Director of the Research Support Centre within Singapore's Agency for Science, Technology & Research (A*STAR)*



Laurence Lejeune

PhD candidate in Science, Technology, and Science (STS) at The Université du Québec à Montréal (UQAM)



Dr Ben Norton

Senior Technical Manager for Griffith Sciences at Griffith University



Inês Pinho

Coordination Manager at EMPHASIS



Dr Ash Dyer

Senior Process Engineer Deputy Facility Manager at the Melbourne Centre for Nanofabrication (MCN)



Dr Pakpoom Buabthong

Deputy Director of the Office of Lifelong Learning at Nakhon Ratchasima Rajabhat University, Thailand



Joel Bautista

Chief of the Knowledge Innovation Division (KID) of the Philippine Department of Science and Technology (DOST) – Philippine Science High School System



Laurence Lejeune
Montreal, Canada



Cytometry
Specialist/Immunologist



Went to the dark side of
the moon ... and came
back



Social Scientist - PhD
Science and technology
studies

Founding member



Chair Impact WG



Passionate volunteer



Consultant/Entrepreneur



Centre interuniversitaire sur les
Sciences et Technologies



Why do we do what we do ?

- Passion and idealism
- Be part of the solution
- Intellectual Challenge

How do we do what we do ?

- Open Science
- Teach, explain, share, inspire
- Learn and be inspired

Vision for 2050



Science for democracy : being idealistic in our vision, being pragmatic in our realisations

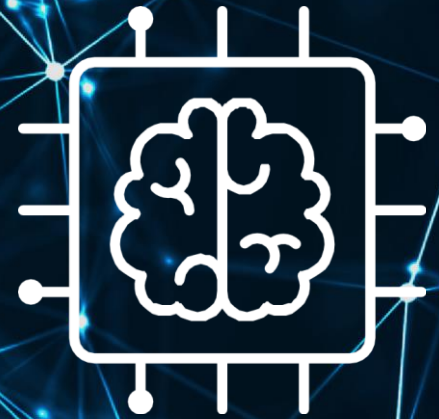


Consolidate ties with the global community with a true transdisciplinary and collaborative approach



Make the vision a reality in Canada

Research Infrastructure in 2050





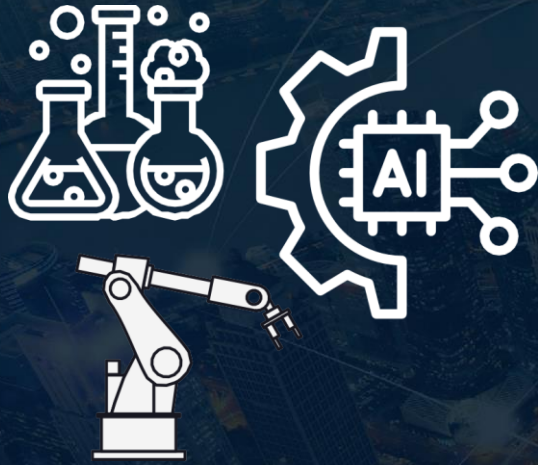
Instruments



Collaboration



Data



Autonomous Agents

2050



Sustainable Facilities



Expert Hubs

Where Will Research Infrastructure Be In 2050?

Ben Norton – Griffith University

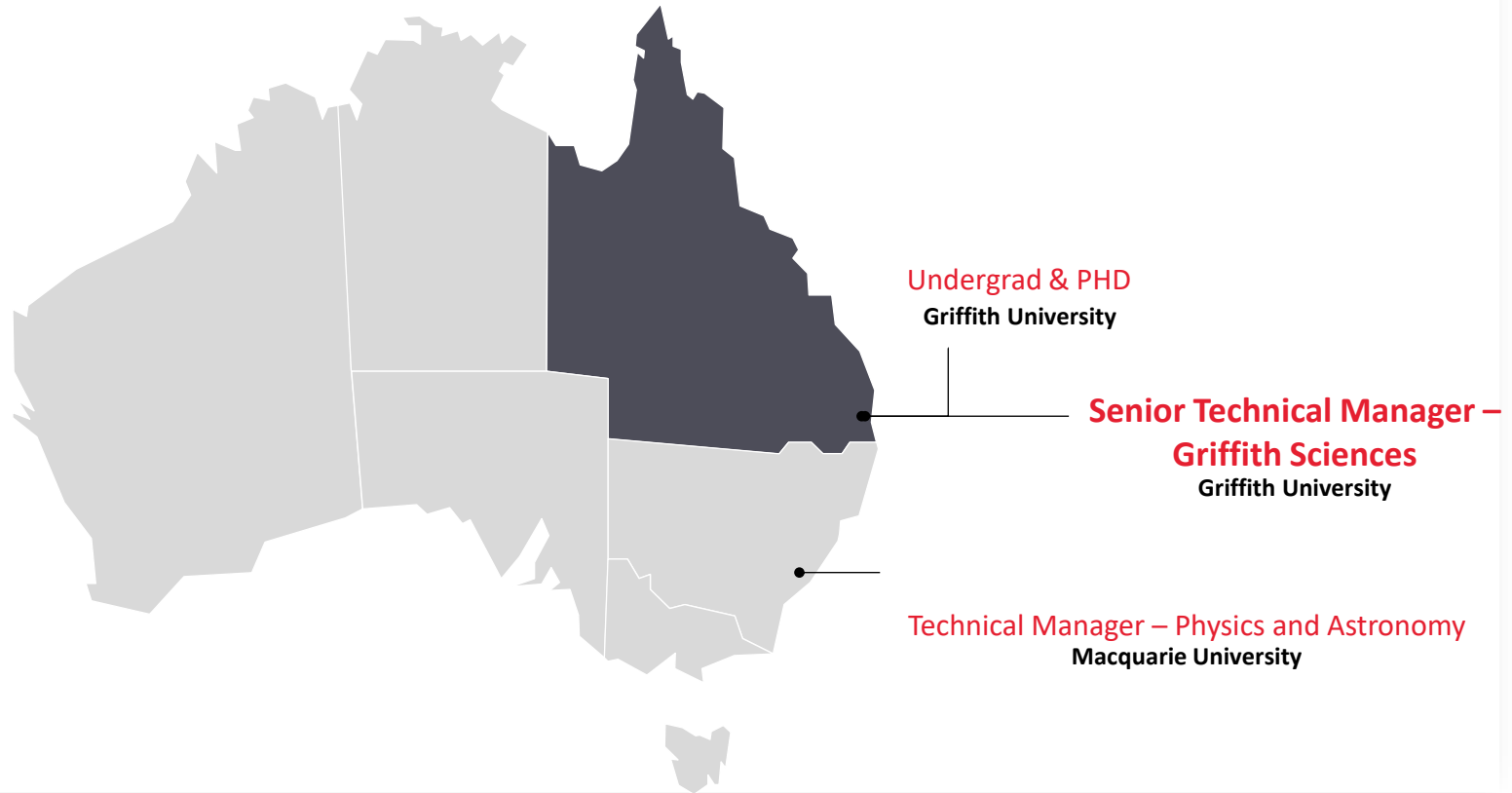
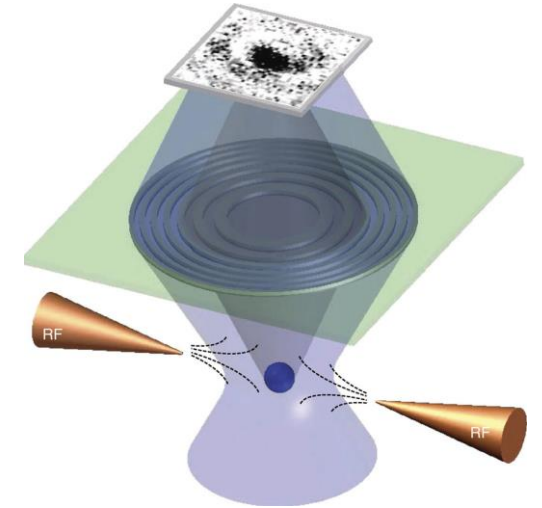


Queensland Australia

Make it matter

Who am I?

- Undergraduate – Photonics and Nanoscience
- PhD in atomic quantum computing
- Moved to Macquarie Uni as Technical Manager
- Came back to Griffith Uni as Senior Technical Manager
 - Bio
 - Chem
 - Physics
 - Ecology
 - Engineering
 - Aviation
 - Architecture



A lesson in backing the wrong horse!



Superconducting QC

Atomic QC

The state of play.

Innovation

PsiQuantum bags \$1 billion to build ‘world’s first useful’ quantum computer in Australia

By Shivaune Field

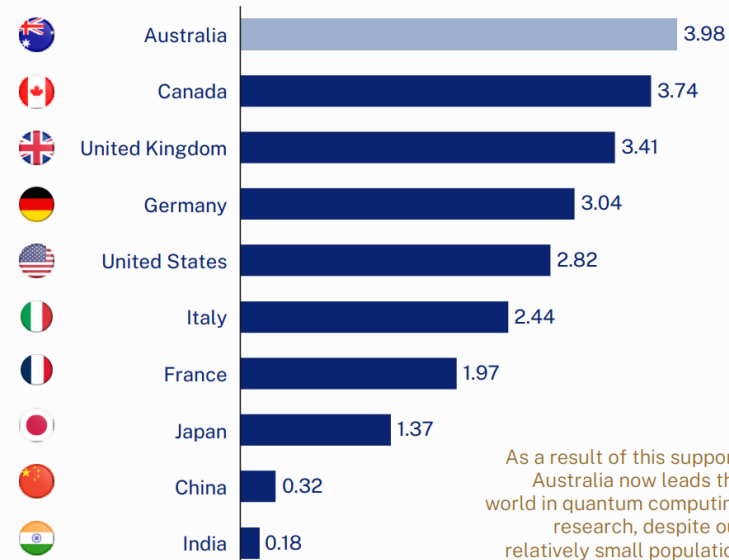
April 30, 2024



The Australian and Queensland governments are investing \$940 million to bring the utility-scale quantum computer to fruition. The technology is billed as capable of propelling the global economy forward for decades.

Exhibit 7: Quantum computing research production

Papers per 100,000 people, to October 2023



As a result of this support, Australia now leads the world in quantum computing research, despite our relatively small population

- Global investment of over \$55 billion
- Quantum market estimated to be worth \$1 billion
- Quantum Computers to outperform classical computers by 2027 - IBM



Nobody expects
the ~~Spanish Inquisition.~~
Quantum Revolution

Applications of quantum computing – What is driving investment?

[nature](#) > [scientific reports](#) > [articles](#) > article

Article | [Open access](#) | Published: 16 August 2021

Demonstration of Shor's factoring algorithm for $N = 21$ on IBM quantum processors

[Unathi Skosana](#)  & [Mark Tame](#)

[Scientific Reports](#) **11**, Article number: 16599 (2021) | [Cite this article](#)



[nature](#) > [news](#) > article

NEWS | 15 May 2024

'Quantum internet' demonstration in cities is most advanced yet

Experiments generate quantum entanglement over optical fibres across three real cities, marking progress towards networks that could have revolutionary applications.

Applications of quantum computing – What will research care about?

[nature](#) > [npj quantum information](#) > [articles](#) > [article](#)

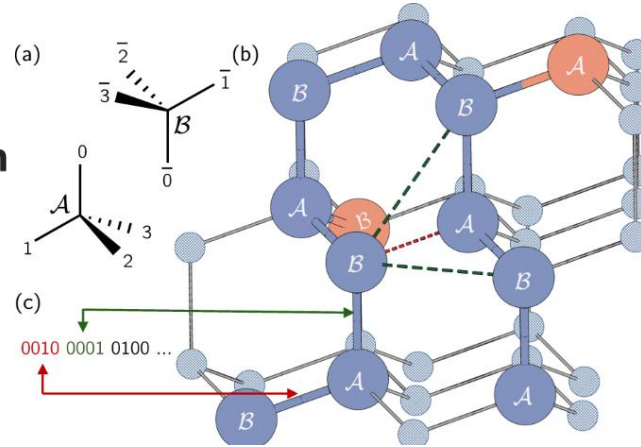
Article | [Open access](#) | Published: 17 February 2021

Resource-efficient quantum algorithm for protein folding

[Anton Robert](#), [Panagiotis Kl. Barkoutsos](#), [Stefan Woerner](#) & [Ivano Tavernelli](#) 

[npj Quantum Information](#) **7**, Article number: 38 (2021) | [Cite this article](#)

32k Accesses | 69 Altmetric | [Metrics](#)



[nature](#) > [npj quantum information](#) > [articles](#) > [article](#)

Article | [Open access](#) | Published: 20 February 2024

Better-than-classical Grover search via quantum error detection and suppression

[Bibek Pokharel](#)  & [Daniel A. Lidar](#) 

[npj Quantum Information](#) **10**, Article number: 23 (2024) | [Cite this article](#)

2346 Accesses | 6 Citations | [Metrics](#)

Applications of quantum computing – What will research care about?

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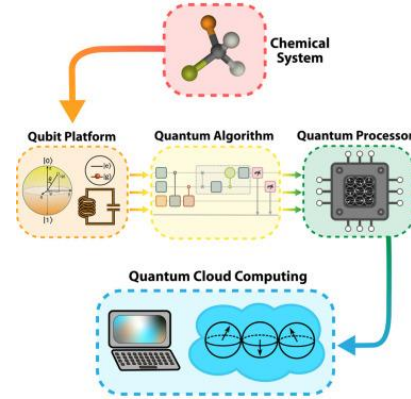
Quantum computational chemistry

[Sam McArdle](#) , [Suguru Endo](#) , [Alán Aspuru-Guzik](#) , [Simon C. Benjamin](#) , and [Xiao Yuan](#) 

Show more ▾

Rev. Mod. Phys. **92**, 015003 – Published 30 March, 2020

DOI: <https://doi.org/10.1103/RevModPhys.92.015003>



 | RESEARCH ARTICLE | PHYSICS

An in-principle super-polynomial quantum advantage for approximating combinatorial optimization problems via computational learning theory

[NIKLAS PIRNAY](#) , [VINCENT ULITZSCH](#) , [FREDERIK WILDE](#) , [JENS EISERT](#) , AND [JEAN-PIERRE SEIFERT](#)  [Authors Info & Affiliations](#)

SCIENCE ADVANCES • 15 Mar 2024 • Vol 10, Issue 11 • DOI: [10.1126/sciadv.adj5170](https://doi.org/10.1126/sciadv.adj5170)

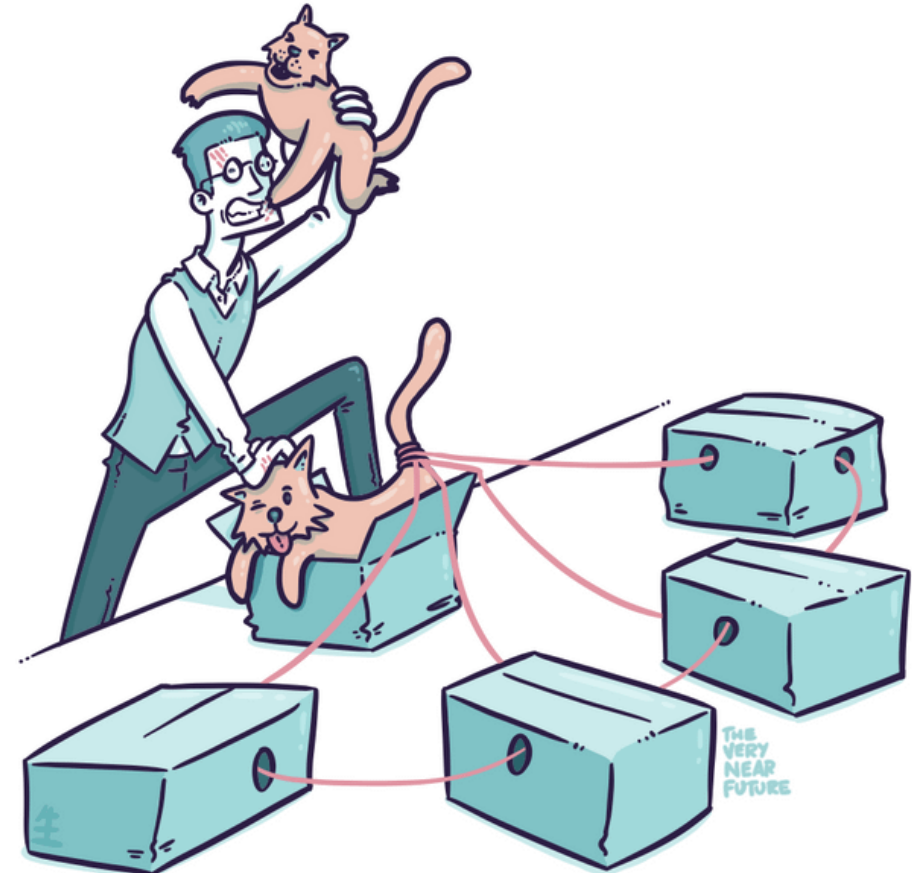
AKA Travelling Salesman Problem

What will research infrastructure look like in 2050?

Other Applications:

- Accelerating drug discovery
- Optimising cancer detection & treatment
- Accelerating strategies to tackle climate change
- Optimised agriculture and food production
- Aerospace innovation and insights
- New scientific frontiers...

Quantum Computers!



SCHRÖDINGER'S QUANTUM COMPUTER



Early Career Scientists

From a European Research
Coordination Manager's Perspective

ICRI 2024

Inês Pinho

- Background in Biology and Marine Biology
- **Coordination Manager** at **EMPHASIS**
The European Research Infrastructure
for Plant Phenotyping

Research
Facilitator



EMPHASIS

Looking into the future



Promote
sustainability



Expand
inclusivity



Strengthen cross-
disciplinary integration



Embrace digitalization
advancements



Encourage
Open Science



Bridge the gap
between science
and society



Never forget our focus

Support researchers to
advance excellent science



Thank You



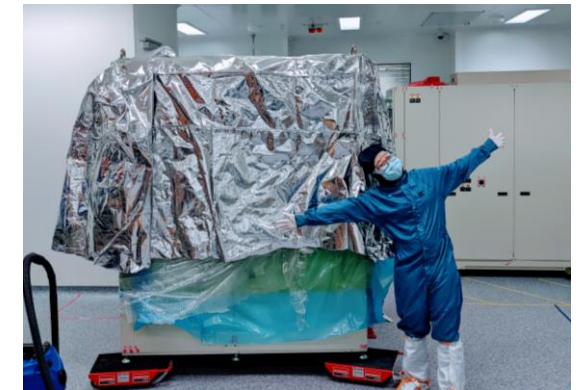
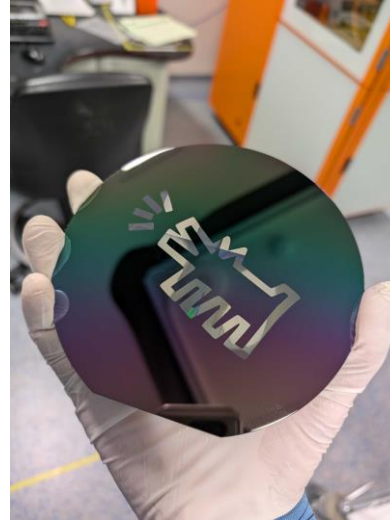
Feel free to reach out!
ines.pinho@vib.be



EMPHASIS

Melbourne Centre for Nanofabrication

- Located on the lands of the Bunurong people of the Kulin Nation.
- Part of the Australian National Fabrication Facility ANFF.
- 500m² of Class 10k cleanrooms.
- 300m² of Class 100 cleanrooms.
- 450m² Wet labs.
- 22 full time staff, 40 resident users and hundreds of walk-up users, annually.
- Joint venture between 7 Victorian Universities and CSIRO.
- \$5M p.a. budget for opex. New capex around \$16M received 2019-2022.
- ISO9001 certified laboratories and systems.
- Fully open access.



ANFF – Victoria Node



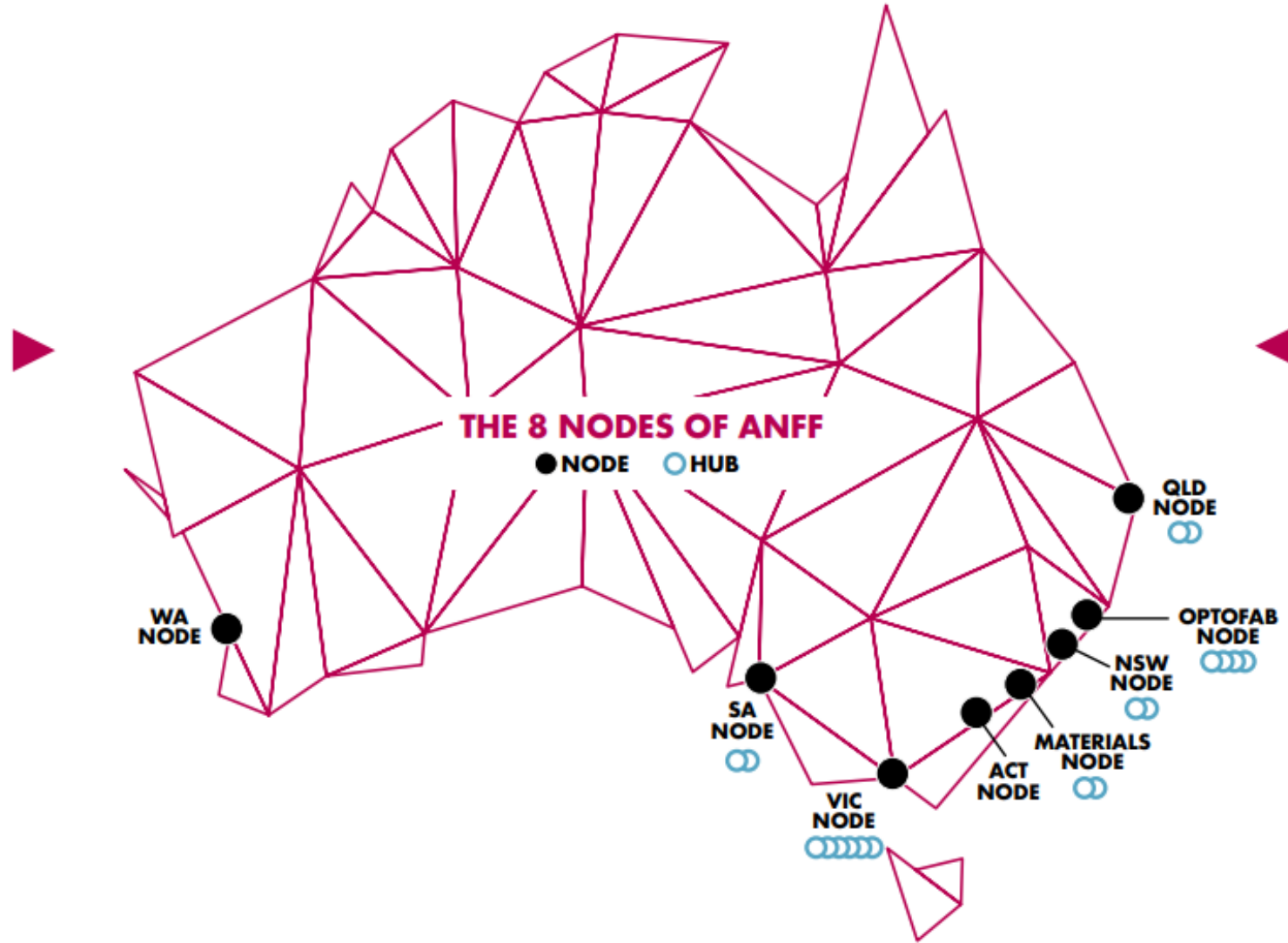
JOINT VENTURE PARTNERS:

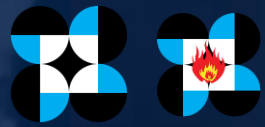
- Joint Venture Partners include 7 Universities and the CSIRO.
- As well as helping to fund MCN, each JV partner offers in-kind capabilities that can be accessed through ANFF-VIC.

FUNDING:

- Initial funding of \$45 million from Commonwealth Government, State Government, and joint venture partners.
- Opened in 2011, MCN is a world-class, open-access, purpose-built facility and headquarters of the Australian National Fabrication Facility (ANFF)







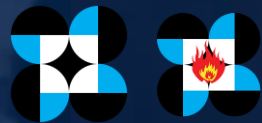
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Research infrastructure and Industry 5.0

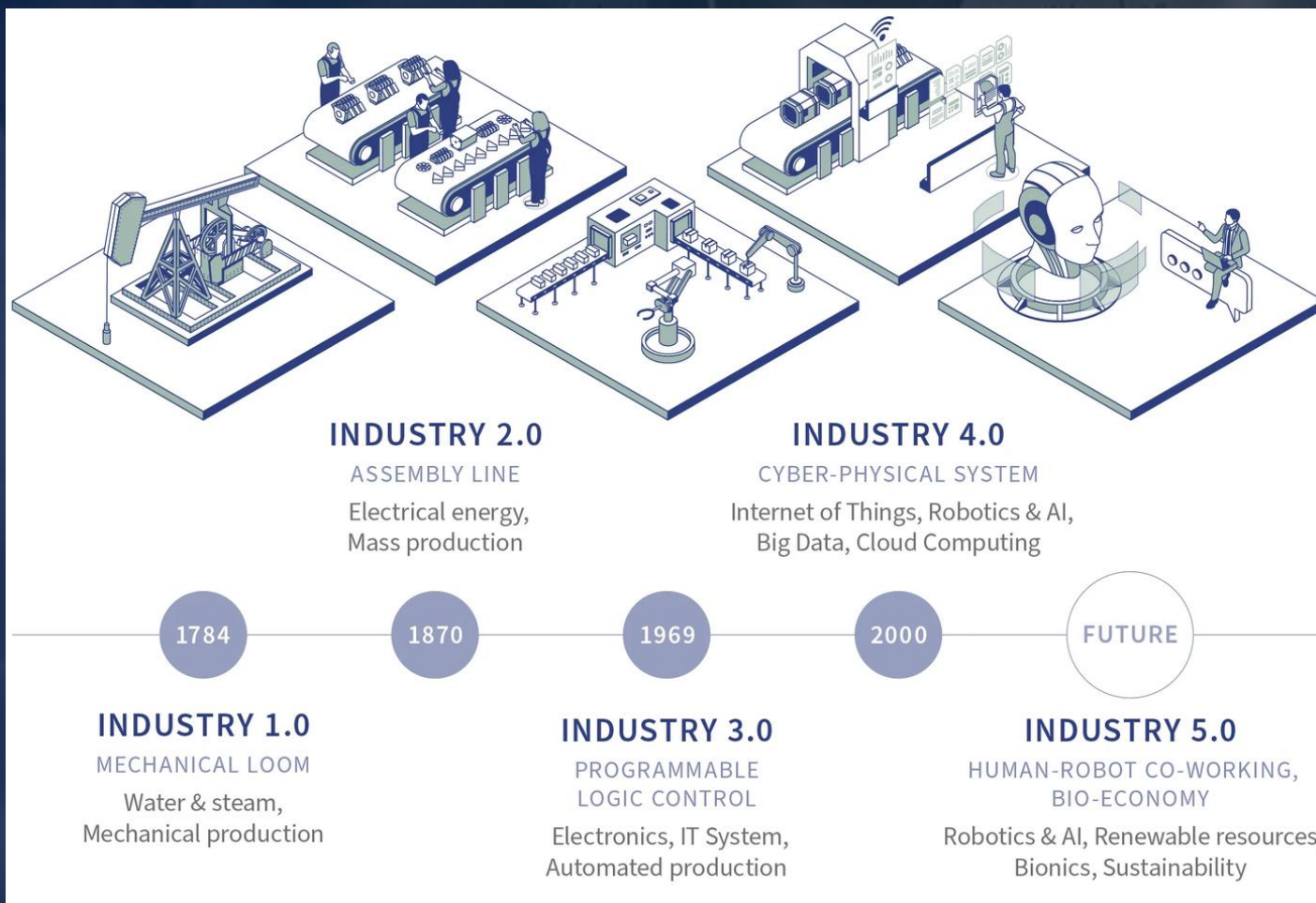
WHAT RESEARCH INFRASTRUCTURE WILL LOOK LIKE IN 2050?



Image: Microsoft Copilot

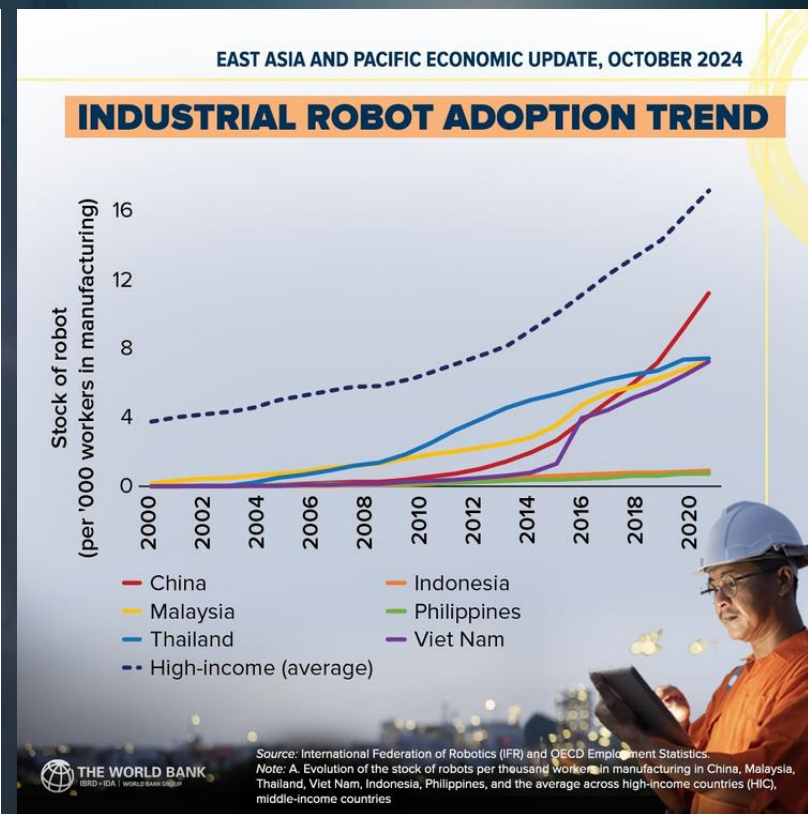


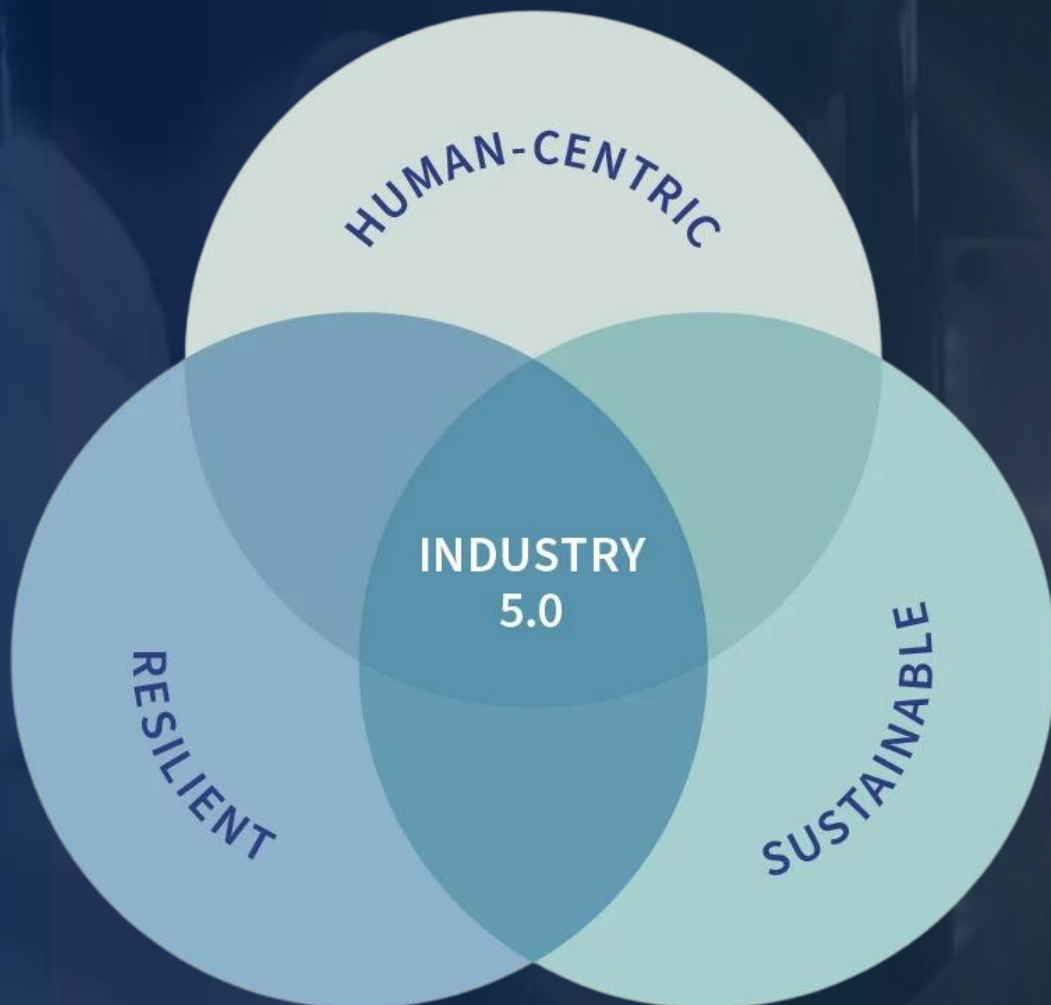
FROM STEAM TO AI...



Source: ResearchGate, Industrial revolutions from Industry 1.0 to Industry 5.0, August 2024.

Image Source: <https://www.rothschildandco.com/>





People/Human-Centricity

- center of the process and decision-making

Sustainability

- New skills for researchers and circular processes

Resilience

- Being able to change quickly to stay ahead of the curve and adopt to changing market dynamics

Image Source:

European Commission: Industry 5.0, 19.08.24.

The Three Pillars of Industry 5.0

Based on the EU publication "Industry 5.0 Human-centric, sustainable and resilient"



INDUSTRY 5.0 IS POISED TO SIGNIFICANTLY TRANSFORM RESEARCH INFRASTRUCTURE BY EMPHASIZING HUMAN-CENTRIC INNOVATION AND ADVANCED TECHNOLOGICAL INTEGRATION

1. Enhanced Human-Machine Collaboration

2. Sustainable Resilient Practices

3. Data Management

4. GLOBAL Digitalization

5. Smart Infrastructure

People

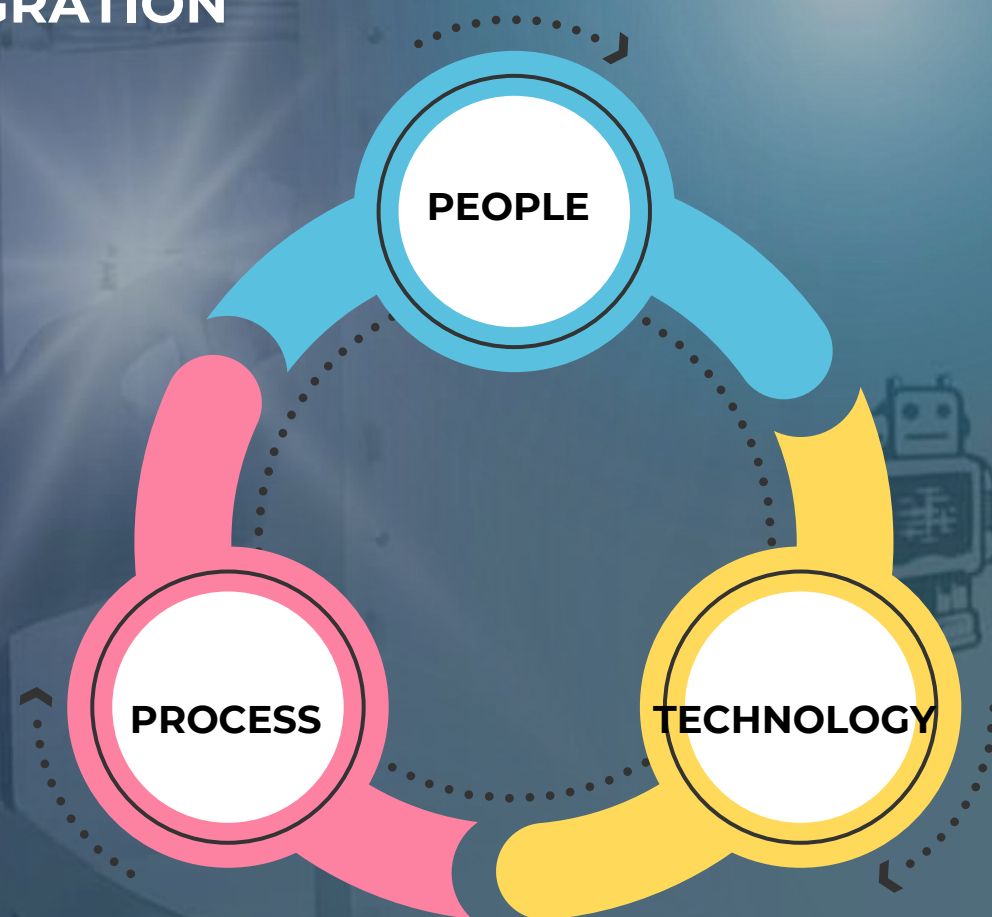
- Skill Gaps
- Resistance to Change
- Diversity and Inclusion

Process

- Integration of New Technologies
- Data Management
- Sustainability Practices

Technology

- Interoperability
- Cybersecurity
- Cost and Investment





REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE SCIENCE HIGH SCHOOL SYSTEM

<VISION>

Research infrastructure and Industry 5.0

WHAT RESEARCH INFRASTRUCTURE WILL LOOK LIKE IN 2050?

ICRI 2024

THANK YOU
MARAMING SALAMAT PO!



กระทรวงการอุดมศึกษา วิทยาศาสตร์ วิจัยและนวัตกรรม
Ministry of Higher Education, Science, Research and Innovation

