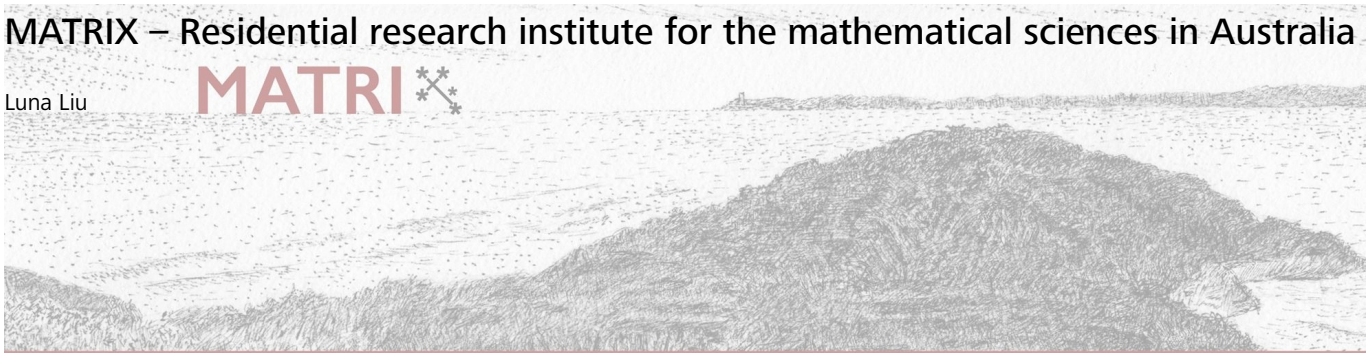
MATRIX – Residential research institute for the mathematical sciences in Australia

Luna Liu



About the institute

MATRIX[1] is Australia's residential research institute for the mathematical sciences, situated on Dja Dja Wurrung traditional land in Creswick, Victoria, Australia. MATRIX offers a uniquely Australian and immersive environment to host research programs for mathematical sciences researchers in Australia and the Asia-Pacific region, their global peers, as well as those in business, industry, and government.



Figure 1. Kangaroos feature on the institute's campus.

MATRIX is supported through a consortium of leading Australian universities. MATRIX has also received support from the Simons Foundation[2] and the Australian Research Council (ARC).[3]

[1] https://www.matrix-inst.org.au/about-us/
[2] https://www.simonsfoundation.org
[3] https://www.arc.gov.au

History of the institute

MATRIX was initiated in 2015 by the Australian Research Council Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS) and launched in 2016 as a partnership between the University of Melbourne and Monash University. The Australian National University joined as a full partner in 2020, followed by the University of Queensland in 2024 after a period as an associate member from 2021 to 2023. MATRIX has continued to expand its partnership, with the University of New South Wales joining as an associate member in 2025, followed by Adelaide University and the University of Sydney in 2026.

Governance and leadership

MATRIX's governance structure includes a Stakeholder Group, Advisory Board, Scientific Committee, and Executive Team. The Executive Team sets strategy and oversees the operation of MATRIX and consists of Jan de Gier (director), David Wood, Joe Grotowski (deputy directors) and Tom Keegan (senior executive officer). The Advisory Board offers strategic advice and recommendations to the Executive Team and Scientific Committee on MATRIX's direction and activities. An independent Scientific Committee selects MATRIX research programs.

Since its launch in 2016, MATRIX has fostered international collaboration through 129 residential research programs, attracting over 3,200 scientists from 49 countries.

Scientific activities

MATRIX research programs[4] encompass a broad spectrum of mathematical sciences, including pure and applied mathematics, statistics, data science, mathematical physics, and computational mathematics. These programs are organised by researchers from

[4] https://www.matrix-inst.org.au/events-01/programs/





Figure 2. Group photos from PhD student-led symposia.

universities across Australia and globally, and delve into diverse areas such as mathematical biology, quantum systems, AI and machine learning, complex systems, discrete mathematics, geometry and topology, finance, and high-dimensional computing.

Recent examples of research programs at MATRIX include the 2025 program *Numerical Analysis of Interface and Multiphysics Problems* on novel numerical methods of relevance to geophysical flows and biomechanics, where moving domains and interface dynamics play major roles. The 2025 program *Bayesian Learning of Very High-Dimensional Physical Process Models* addressed AI/ML advances in complex processes such as computer-generated human conversations or photorealistic images. The 2025 MATRIX-MFO Tandem Workshop on *Machine Learning and AI for Mathematics* focused on how AI methods can help mathematicians advance mathematics, and how problems of mathematics can serve as benchmarks, and the 2026 program *Symmetric Functions and Stochastic Processes* will strengthen ties between integrable probability, symmetric function theory, and stochastic processes.

Past highlights

The geometry of moduli spaces in string theory (2024) with Philip Candelas and Xenia de la Ossa from Oxford.

Algebraic geometry (2024) with Caucher Birkar from Cambridge.

Computational mathematics for high-dimensional data in statistical learning (2023) with Art Owen from Stanford.

Structural graph theory downunder (2019) with Maria Chudnovsky and Paul Seymour from Princeton.

MATRIX also hosts PhD student-led symposia[5] (Figure 2) in partnership with the Australian Mathematical Sciences Institute (AMSI) which have been transformative, offering young mathematicians invaluable opportunities for growth and collaboration.

The MATRIX Book Series[6] (Figure 3), published by Springer, documents research outcomes generated at MATRIX.

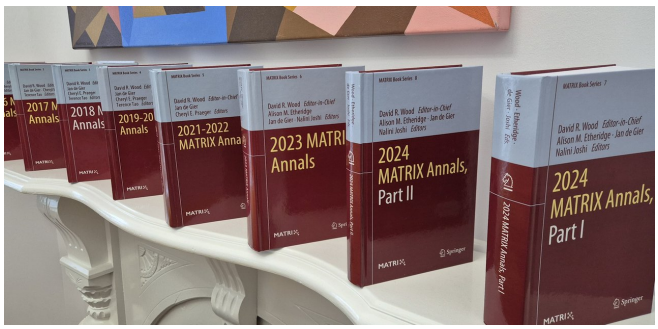


Figure 3. MATRIX Annals.

Research facility and supportive research culture

MATRIX provides a central location where mathematical scientists collaborate through residential research programs for 1–4 weeks. Located in the regional town of Creswick, Victoria, 90 minutes west of Melbourne and surrounded by natural forest (Figure 4), MATRIX offers dedicated research spaces, lecture facilities, on-site



Figure 4. Trees on the campus.

[5] https://www.matrix-inst.org.au/events-01/phd-student-research-symposia/

[6] https://www.matrix-inst.org.au/book-series/



Figure 5. Research environment at MATRIX.

accommodation and meals, and communal areas that encourage informal discussion and knowledge exchange beyond traditional academic settings.

In addition to its residential research facilities (Figure 5), MATRIX is committed to fostering an inclusive and supportive research environment through initiatives such as the MATRIX Family Fund, which assists researchers with carer responsibilities by providing practical support including travel assistance, accommodation support, and access to childcare services when needed. This targeted support addresses a critical barrier faced by researchers with carer responsibilities.



A decade of growth

In 2025, MATRIX celebrated its 10th anniversary,[7] marking a decade of growth from modest beginnings into an internationally recognised hub for the mathematical sciences in Australia. Since its inception, MATRIX has built a global network for knowledge exchange and collaboration, partnering with the Simons Laufer Mathematical Sciences Institute (SLMath)[8] in Berkeley, Mathematisches Forschungsinstitut Oberwolfach (MFO)[9] in Germany, the Institute for Basic Science (IBS)[10] in South Korea, the Research Institute for Mathematical Sciences (RIMS)[11] in Japan and Banff International Research Station (BIRS)[12] in Canada.

This milestone was celebrated together with partner institutions, program organisers, participants, supporters, and the broader mathematical sciences community, reflecting ten years of shared vision, collaboration, and intellectual leadership.

"The vision for MATRIX was to create a place where ideas could flourish through sustained, in-person collaboration," said Jan de Gier, founding director of MATRIX. *"Ten years on, that vision has been realised beyond our expectations. MATRIX is now internationally recognised as a centre for mathematical excellence."*

Over the past decade, MATRIX programs have contributed to new scientific advances and new research partnerships, while strengthening Australia's mathematical sciences ecosystem. As it enters its second decade, MATRIX remains committed to fostering world-class mathematical research in Australia.

Luna Liu is the engagement and development professional at MATRIX, Australia's residential research institute for the mathematical sciences, where she leads communications, philanthropy, and stakeholder engagement activities. She has lived and studied in Asia and Europe and brings over a decade of experience across NGOs and the Australian higher education sector. She values the importance of fundamental science and is passionate about supporting and promoting mathematical research and talent.

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[7] https://www.youtube.com/watch?v=PDWcANR-nLQ
[8] https://www.slmath.org
[9] https://www.mfo.de
[10] https://www.ibs.re.kr/eng/sub02_02.do
[11] https://www.kurims.kyoto-u.ac.jp/en/
[12] https://www.birs.ca