AMSI AUSTRALIAN MATHEMATICAL SCIENCES INSTITUTE

ANNUAL REPORT **2024**

Our Vision & Mission

Vision

Australia has a vibrant mathematical culture that is valued as a national asset. That the mathematical sciences enrich Australian society and are recognised as a fundamental driver of its economy.

That all Australians have the opportunity to develop their mathematics skills and knowledge, to enhance their careers, acquire essential life skills and to enrich their lives.

Mission

AMSI will champion the mathematical sciences in Australia, by:

Sustained advocacy of the mathematical sciences through the provision of authoritative information and influence of national policy.

Enhancing mathematical sciences education and research to support the development of world-class mathematical scientists.

Influencing the mathematical sciences student pipeline to increase the number and diversity of students studying mathematics at school and university.

Facilitating employment linkages for graduates in the mathematical sciences.

Engaging stakeholders in the mathematical sciences ecosystem to strengthen the impact of the Mission, enhance reputation and global profile.

Contents

AMSI Members

Full Members

- La Trobe University
- Monash University
- QUT
- RMIT University
- Australian National University
- The University of Melbourne
- The University of Newcastle Australia
- The University Of Queensland Australia
- The University of Sydney
- The University of Western Australia
- The University of Adelaide
- UNSW Australia

Associate Members

- ATSIMA
- aip Australian Institute of Physics www.aip.org.au
- ANZIAM
- Aust MS Australian Mathematical Society
- ANZAMP
- Australian Bureau of Statistics
- Australian Government Australian Signals Directorate
- CITADEL | Securities
- CORE Computing Research & Education
- Curtin University
- Deakin University
- Flinders University
- Griffith University
- James Cook University Australia
- Jane Street
- Macquarie University
- The Mathematical Association of Victoria
- ERGA Mathematics Education Research Group of Australasia
- Murdoch University
- NZMS
- The New Zealand Statistical Association
- Optiver
- Reserve Bank of Australia
- Statistical Society of Australia
- Swinburne University of Technology
- University of New England
- University of South Australia
- University of Southern Queensland
- University of Tasmania
- UTS
- University of Wollongong Australia
- Victoria University Melbourne Australia
- Western Sydney University

From the Chair

The 2024 year saw AMSI undertake two key additional initiatives. The first was refreshing its strategic planning with the development of the 2024–2027 AMSI Strategy. This involved extensive consultation with key stakeholders and resulted in AMSI establishing specific goals around advocacy of the mathematical sciences, research and higher education, secondary school participation rates, diversity, equity and inclusion, employability of graduates; and widening stakeholder and funding relationships. AMSI's annual business planning was linked explicitly to achieving these goals.

The second area related to the latter goal of widening stakeholder involvement, and concentrated on revitalising the AMSI Foundation as a vehicle for philanthropic donations to advance the mathematical sciences. The refreshed AMSI Foundation officially launched externally on International Pi Day in 2024. Since then, AMSI has been delighted to receive a major gift to establish the Praeger-Henstridge Awards and Prizes in April 2024. These support and amplify female early career researchers in maths, through the Australian Mathematical Society (AustMS), and encourage young people to pursue statistics, through Statistical Society of Australia (SSA). In June, AMSI was equally delighted to receive another major gift to commence the Yuille-Umbers Female Specialist Maths High School Scholarships, supporting female students from under-represented groups studying specialist mathematics in Years 11 and 12.

I would like to acknowledge the support and generosity of both sets of founding donors; Prof. Cheryl Praeger and Dr John Henstridge for the Praeger-Henstridge Awards and Prizes aimed at strengthening participation in the mathematical sciences in Australia, with a particular focus on encouraging women and young people to engage in mathematics and statistics; and Prof. Tim Brown and Catriona De Vere, whose gift honours the legacies of their grandmothers, Ethel ("Elsie") Yuille and Catherine Mary ("Maimie") Umbers, and aims to empower future generations of women through educational opportunities. Both major gifts create an enduring legacy and emphasise the continuing importance of fostering efforts to close the gender gap in the mathematical sciences.

A range of other fundraising campaigns were executed in 2024, including the annual End-of-Financial Year and Christmas Campaigns, providing donors with a seamless way to make annual tax-deductible gifts. These individual donations are vital in supporting AMSI's programs and advocacy for the mathematical sciences pipeline and publication of important AMSI reports. Particular examples are the Year 12 Participation Report Card and AMSI's flagship publication, the AMSI Discipline Profile, a comprehensive view of the state of the mathematical sciences.

AMSI Foundation donations were also used to increase the number of undergraduate students awarded an AMSI Summer Research Scholarship. These help scholars undertake research, build a project, submit a blog post, write up their findings in a formal research report and present to their peers and supervisors at AMSIConnect, the exclusive student conference held in February each year.

The annual AMSI Summer School continued its success in 2024, attracting 163 honours and postgraduate students, early career researchers and industry professionals from 28 universities and organisations.

In October, APR.Intern partnered with Western Sydney University to host the Women in STEM Careers and Entrepreneurship Masterclass as part of the WiSE grant, featuring sessions on leadership in startups, career pathways in R&D, and a Hackathon Challenge where participants pitched solutions to industry leaders. The Masterclass highlighted research commercialisation and innovation while building a strong community of female STEM leaders.

AMSI's School Program continued its strong contribution to maths teacher and career advisor professional development, through the successful delivery of the Teacher Professional Development in Industry Day in May. The day was a huge success and we thank our funding partner Toyota Community Trust, our delivery partner the Australian Centre for Career Education (ACCE), and our industry partners Champion Data and Aurecon, for their significant contributions.

All these achievements would not have been possible without the enthusiastic commitment, assistance and support of the AMSI Board and the Joint Venture Partner universities, as well as the AMSI members and alumni more generally.

I would like to particularly acknowledge the efforts of Prof. James McCoy, in the second of his two years as the Deputy Director, effective 1 February 2023. He was a source of great support to me in my role. I am also grateful to Prof. Inge Koch, Dr Thomas Barlow and Ms Anne Baly as retiring Board members, and welcome new members Prof. Andrew Eberhard and Dr Virginia Wheway to the Board. The role of the University of Melbourne as Lead Agent is also gratefully appreciated for providing its ongoing support and expertise to AMSI across many of its functions.

And most importantly, I would like to acknowledge the significant efforts of the AMSI Executive and staff this year, led by Prof. Tim Marchant, to both continue to deliver AMSI's normal operational programs while also introducing a range of new initiatives to strengthen AMSI's offerings, ones that are already showing many positive impacts.

Dr Les Trudzik
AMSI Chair

From the Director

The AMSI Board and JVP approved the new *AMSI Strategy 2024-27*, after an extensive consultation process with its stakeholders. The six Strategic Goals of the Strategy will help focus AMSI activities and programs, for the future benefit of the mathematical sciences in Australia.

The AMSI Foundation received a major gift from Prof Cheryl Praeger AC and Dr John Henstridge, for AMSI to support perpetual prizes in mathematics and statistics, in partnership with the Australian Mathematical Society and the Statistical Society of Australia. AMSI expresses its thanks to Cheryl and John for their extremely generous gift, which will provide a strong ongoing benefit to the mathematical sciences community.

AMSI held a Teacher Professional Learning in Industry Day, which was funded by the Toyota Community Trust. The motivation for the Day was to increase future student interest in maths through connecting maths teachers and career advisors with industry, so they confidently inform students of their career options. The day was a pilot, commencing in Victoria, with the intention of expanding to other states.

The first round of Yuille-Umbers scholarships have been awarded to young women studying *Specialist Mathematics*, at high schools in regional and low SES Victoria. The awards are supported by private donations to the AMSI Foundation. As chair of the selection panel, I was inspired by the applicants' mathematical achievements and their focus, in overcoming very significant disadvantage.

AMSI released two major reports, the *State of the Mathematical Sciences: Discipline Profile of Mathematics & Statistics in Australia* and the *Year 12 Mathematics Participation Report Card.* The *Discipline Profile* provides a detailed snapshot of the mathematical sciences in Australia, from schools and higher education through to research, workforce utilisation and innovation by commerce and industry. Both reports attracted extensive media interest for AMSI and the mathematical sciences, particularly on the topic of out-of-field mathematics teaching.

AMSI made a submission to the Tertiary Institutions Service Centre (TISC) Consultation on Year 12 course incentives for WA students. We argued that an ATAR bonus, for the study of *Specialist Maths* and *Maths Methods*, is vital to ensure that a sufficient pool of students have the background to undertake degrees in the mathematical sciences. As a result of the consultation process TISC decided to extend course incentives for the 2027 student cohort and undertake further consultations on the issue.

The AMSI higher education program delivers world-class research training, for the benefit of students and early careers researchers in the mathematical sciences. In 2024 the Summer School was held at the Australian National University, while the Winter School was hosted by the University of Queensland, with the theme of *Mathematics for Decision Making Under Uncertainty*.

AMSI relies on the continued commitment of its members, in order to advance the mathematical sciences in Australia.

It also relies on the hard work and commitment of its staff. I have enjoyed working with all the AMSI members and stakeholders over the year-thank you for your support.

Professor Tim Marchant

Major Achievements 2020–2024

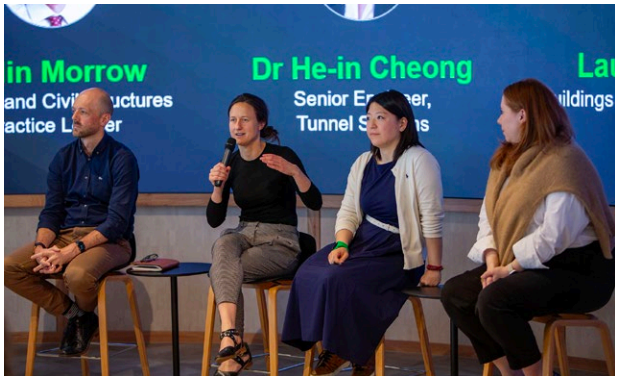
- **$9.3M** in government funding and **$2.2M** in philanthropic funding generated by **$7.6M** in member subscriptions
- **2,316** participants at **23** AMSI flagship events
- More than **5,000** participants at **64** AMSI-sponsored scientific workshops
- **367** travel grants awarded to students
- **325** International speakers featured at AMSI sponsored workshop
- **83** students placed into industry internships, generating **$77,350** in research funding for universities, nationally
- APR.Intern partnered with **25** Universities, **57** different industry partners, **32** new to the program
- Over **500** Industry Partners connected to University
- Publication of AMSI's flagship report, **The State of Mathematical Sciences**, conveying key issues affecting the role and stature of mathematics in Australia
- Publication of additional reports; **4** Occasional Papers, **2** Gender Reports and **6** Survey Data Reports including data on Year 12 mathematics participation
- **Consistent advocacy** to Government on the vital role of the mathematical sciences for Australia's advancement

Fundraising & Engagement

In 2024 AMSI extended its commitment to diversification of income streams and stakeholder engagement by creating a Fundraising and Engagement division, led by the AMSI Associate Director. The division encompasses leadership of the AMSI Foundation, corporate membership and sponsorship, philanthropic grants and partnerships, government grants, and stakeholder relations. The efforts of the team are aligned with AMSI strategy and designed to benefit all parts of the organisation.

Emphasis in 2024 was on fully activating he AMSI Foundation. Launched on International Pi Day, it received major corporate and individual donor gifts, as well as bequests, demonstrating that people and organisations understand the mathematical sciences pipeline issues, and care deeply about the future of the mathematical sciences.

AMSI welcomed two new corporate sponsors in 2024 – Jane Street and Citadel Securities, who partnered with AMSI to promote careers in industry and professionally develop young mathematicians. They also joined the AMSI membership to lend a corporate voice to discussion of the issues in mathematical sciences.



Above: Teacher Professional Development in Industry Day speakers

The fundraising and engagement team also delivered AMSI's pilot Teacher Professional Development in Industry Day in May, made possible by a significant philanthropic grant from the Toyota Community Foundation. The day was delivered to Victorian based maths teachers and career advisors, in partnership with Melbourne University, RMIT and Monash University, as well as the Australian Centre for Career Education, Champion Data and Aurecon. The day was developed to help student retention in the mathematical sciences pipeline, by supporting teachers to link the maths being taught in the classroom to the rapidly expanding scope of careers in industry.

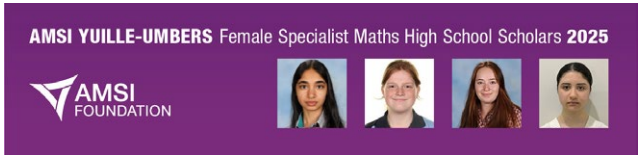
The team also made a significant contribution to grant applications, managed stakeholder and donor engagement, led the development of marketing and communications campaigns, refreshed the corporate sponsorship prospectus, and developed an Alumni engagement program, a mentoring program and an online careers webinar.

AMSI Foundation 2024

The AMSI Foundation Trust is a DGR2 status Public Ancillary Fund. Established in 2016 and registered with the Australian Charities and Not-For-profit Commission (ACNC), its mission is to raise funds for AMSI and the mathematical sciences.

2024 saw a major leap forward for the Foundation, where the activation activities implemented by the Fundraising and Engagement team increased its profile and income from donations. The Foundation received a mix of corporate, family and individual donations, as well as bequests.

In particular, the Foundation received a major gift to establish the Praeger-Henstridge perpetual fund, with returns going to the Australian Mathematics Society (AustMS) and the Statistical Society of Australia (SSA) to provide annual awards and prizes. It also received a major gift to establish the Yuille-Umbers Female Specialist Maths Scholarships to encourage and support underprivileged females to study specialist maths in years 11 and 12.



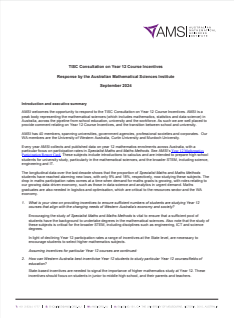
Strategic oversight of all activities including appointment of an investment advisor, an auditor and implementation of an investment strategy was undertaken by the AMSI Foundation Board of Directors, comprising Dr Les Trudzik (Chair), Professor Tim Marchant (Director, AMSI), Dr Adelle Howse, and Professor Tim Brown. Secretariat duties and day to day operational leadership of the AMSI Foundation was undertaken by Lisa Farrar, AMSI Associate Director.

The Foundation operates on a financial year basis, and as of June 30 2024 the reviewed financials confirm a surplus of $835,973.44.

Policy & Advocacy

Policy Submissions and Reports

AMSI advocates for the mathematical sciences through submissions to national consultations and the publication of reports, papers and reviews.

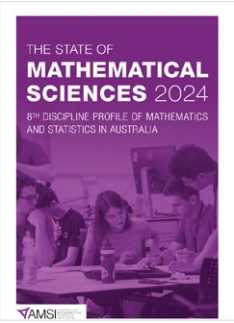


Submission to the Tertiary Institutions Service Centre (TISC) WA Consultation

In September 2024, AMSI, provided a written submission to the TISC WA consultation on incentives for students to study Maths Methods and Maths Specialist in Year 12. The submission highlighted declining participation in higher-level mathematics despite growing demand for mathematically skilled graduates in sectors such as data science, analytics, logistics and optimisation – areas critical to the resources sector and WA's economy.

AMSI recommended retaining or replacing the ATAR bonus system to maintain incentives, aligning incentives with government and workforce priorities, and undertaking a state-based analysis of growth sectors and skill shortages. AMSI also proposed hosting an Industry Teacher Day in Perth to connect educators with universities and industry, promoting mathematics career opportunities and pathways to students.

https://amsi.org.au/submission-tisc-consultation-yr-12-incentives



The State of the Mathematical Sciences 2024

The eighth edition of *AMSI's Discipline Profile of Mathematics and Statistics in Australia* provided a comprehensive snapshot of the mathematical sciences across school, higher education, research and industry. Drawing on diverse sources, including the 2022 PISA survey and AMSI's own research, the report also examined university prerequisites, participation trends, and workforce data to inform national policy and planning.

https://amsi.org.au/discipline-profile-2024

Research Investment and Expenditure in the Mathematical Sciences

In partnership with MATRIX, AMSI released a report analysing national investment in mathematics sciences research between 2011 and 2022. The study revealed significant declines in funding and called for the inclusion of mathematical sciences within Australia's National Research Infrastructure to support innovation and economic resilience.

Key findings showed that HERD expenditure on the mathematical sciences declined from 1.86% in 2018 to 1.26% in 2022, while university research funding increasingly favoured applied research, with the mathematical sciences seeing limited benefited from earlier funding surges and further declines by 2022. The report also noted the absence of dedicated mathematical sciences projects under the $1.38 billion NCRIS investment.

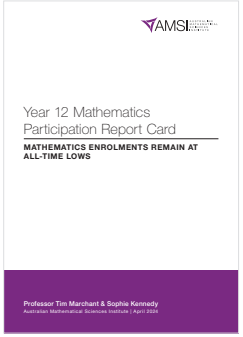
https://amsi.org.au/research-investment-expenditure-2024

Analysis of Out-of-Field Secondary Mathematics Teacher Upskilling Initiatives

Co-published with AustMS, MERGA, SSA, and the Actuaries Institute, this report mapped and analysed key initiatives to upskill out-of-field (OOF) secondary mathematics teachers across Australia and internationally. It reviewed national and state accreditation standards, identified gaps in current offerings, and highlighted effective program models from Ireland and the UK.

The report, along with related materials and media, contributed to ongoing efforts to address Australia's shortage of qualified mathematics teachers.

https://amsi.org.au/oof-upskilling-initiatives



Year 12 Mathematics Participation Report Card

The 2024 Year 12 Mathematics Report Card found that participation in calculus based (higher-level) mathematics remained at record lows in 2011-22, following the sharp drop in 2020.

The report received strong media coverage, including in The Australian, Sydney Morning Herald, and The Educator Australia. Its findings were also cited by the Department of Industry, Science and Resources in the STEM Equity Monitor and by the Grattan Institute in The Maths Guarantee: How to Boost Students' Learning in Primary School.

https://amsi.org.au/year12-participation-2024

PANEL DISCUSSIONS

AMSI hosted two panel discussions at its 2024 biannual member meetings, fostering collaboration and discussion on key issues in the mathematical sciences.

The first, Findings of the AMSI-SSA Data Science Review: Outcomes and Future Actions, featured insights from AMSI, The Statistical Society of Australia, the ABS, La Trobe University and Telstra, on data science education, accreditation, and workforce pathways.

The second panel, Implementing the AMSI Strategy 2024–2027, introduced AMSI's renewed strategic direction, with members contributing feedback on key strategic goals, future priorities and opportunities for collaboration.

https://amsi.org.au/about-us/

Schools

2024 has been marked by innovative educational initiatives, significant partnerships, and our continuing commitment to advancing mathematics education in Australia. We have identified key challenges impeding excellence in mathematics teaching and learning, including the pervasive issue of mathematics anxiety among teachers, students, and the broader community, as well as the heavy reliance on out-of-field teachers, particularly in middle school classrooms. With these themes in mind, we worked to develop targeted solutions aimed at addressing these obstacles, fostering a supportive environment, and enhancing the overall quality of mathematics education.

MathsTalk Podcast

The MathsTalk podcast continued to be a valuable resource for the education community in 2024, attaining around 7,000 downloads for the year. The podcast's reach and influence extended beyond previous boundaries, with listenership in the United States and the United Kingdom doubling to comprise around 14 percent of the audience, demonstrating AMSI Schools instrumentality in providing continuous professional development to educators, not just nationwide, but across the globe.

ChooseMATHS

The ChooseMATHS project generously funded by the BHP Foundation continued to make an impactful contribution to AMSI Schools educational outreach, with the addition of the AMSI Mathematics Textbook to the portfolio of ChooseMATHS initiatives. ChooseMATHS funded the updated editions from Years 5 to 10, with the unique inclusion of Indigenous content to align with the Australian curriculum. The new editions were written by a team of dedicated maths teachers and academics and will be available to schools and students in 2026.

Student Career Awareness

We have expanded our career awareness programs to better illustrate the vast career opportunities available through the pursuit of mathematical sciences. These events successfully integrated real-world mathematical applications into educational contexts, motivating students to explore a variety of mathematical careers. By highlighting real-world examples of individuals who have leveraged their mathematical skills to achieve success in various fields, we aim to inspire the next generation of mathematically literate innovators.

Teacher Professional Development

To deepen the understanding of careers available to students who continue to study maths, AMSI developed and delivered the inaugural Teacher Professional Learning in Industry Day, generously funded by the Toyota Community Foundation. In addition to participation and support on the day, AMSI Schools prepared ready-to-teach lessons that were consistent with the Victorian/Australian curriculum and included examples and problems from careers in which the topic would be used.

Leanne McMahon at the Teacher Professional Learning in Industry Day

Conference Attendance

A significant conference for the international mathematics education community was held in Sydney in July, ICME-15 (International Congress on Mathematical Education) is the largest international conference on mathematics education in the world. This quadrennial event explores current global trends in mathematics education research and mathematics teaching practices at all levels. AMSI was proud to be a part of The Consortium for Mathematics Education (CoME), created to bid for the opportunity to host ICME-15 in Sydney in 2024 and it was pleasing to see many AMSI alumni sharing their wealth of experience, including former ChooseMATHS award winners and outreach officers, AMSI event participants, and AMSI partners,

September saw AMSI Schools invited to join the RMIT to present at the WIMSIG conference in Sydney. The team’s presentations were all around improving the confidence of students in mathematics, and AMSI presented on the role of teachers in building students' self-efficacy. AMSI Schools were also in attendance at Edutech, the 12th Kids’ conference, the MAV conference and numerous smaller networking activities.

Research & Higher Education

KEY STATISTICS

460 AMSI Flagship event participants
33% female participants in flagship events
73 Student travel grants awarded
16 sponsored workshops
673 workshop participants
103 international workshop speakers

In 2024, AMSI's Research and Higher Education (RHED) portfolio delivered another year of impact and growth, connecting students, researchers, and industry professionals across Australia and beyond. A full calendar of events offered world-class training, networking, and career development opportunities, strengthening the mathematical sciences pipeline. Flagship events saw increased participation and industry involvement, and AMSI's workshop funding program continued to spark new collaborations and knowledge exchange.

AMSI Summer School 2024

8 January-2 February | Australian National University and online

Hosted by ANU, AMSI Summer School 2024 welcomed 163 participants from 21 AMSI Member Universities and seven industry and international institutions, marking a strong return to the four-week residential format.

The hybrid program offered nine honours/masters level subjects, complemented by a keynote lecture from Distinguished Professor Susan Scott, guest lectures, and industry talks from Optiver and the Australian Signals Directorate.

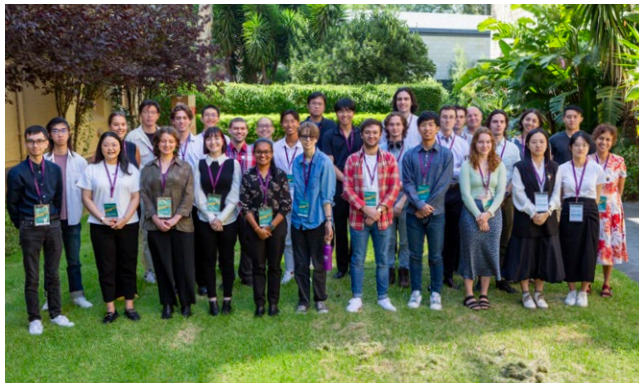
Participants also shared their own work through short presentations, fostering a vibrant learning and networking environment. A total of 82 students sat exams for course credit, reflecting the academic rigour and ongoing institutional support for the program.

AMSI Summer Research Scholarships 2023-24 and AMSIConnect 2024

November – February

The 2023–24 AMSI Summer Research Scholarship (SRS) program supported 26 scholars from 16 member universities, providing hands-on research experience in the mathematical sciences. Scholars came together in Melbourne for AMSIConnect 2024, where they presented their research, built professional networks, and honed their science communication skills.

A new initiative saw three additional students from external summer research programs join the conference, broadening engagement and collaboration. The event featured careers talks and a virtual Estimathon hosted by Jane Street. Scholars completed their AMSI SRS experience by submitting research reports and blog posts summarising their projects.



Above: Participants at AMSIConnect

AMSI Winter School 2024

24 June – 5 July | The University of Queensland and online

AMSI Winter School 2024, hosted by The University of Queensland, provided an enriching two-week experience for 46 honours, masters, and PhD students, and early-career researchers from 13 universities and industry. Focused on Mathematics for Decision-Making Under Uncertainty, participants explored topics including financial data analytics, martingales, reinforcement learning, and robotics with leading international and national experts. Program extras included special lectures, participant talks, networking sessions, an Optiver Trade-a-thon, a presentation from QCIF and a Diversity in STEM panel.

AMSI BioInfoSummer 2024

3-5 December | The University of Melbourne and online

After a break in 2023, AMSI BioInfoSummer returned in 2024, hosted in collaboration with Melbourne Integrative Genomics, the ARC Centre of Excellence for the Mathematical Analysis of Cellular Systems (MACSYS), and WEHI from 3–5 December. The event brought together 142 participants (52% women) from 26 institutions for a showcase of innovation in bioinformatics and the mathematical sciences. The program featured nine hands-on workshops, three international speakers from Stanford, Brown, and Johns Hopkins and cutting-edge research talks on whole-cell modelling, machine learning and AI for genomics, and emerging technologies. Emerging talent was highlighted with 26 student and early-career researcher posters and 23 Fast Forward Talks.

Online learning

AMSI ACE Network 2024: Delivered 13 honours and masters-level mathematical sciences subjects virtually to 83 students across Australia, fostering national collaboration and expanding access to advanced coursework. Topics included data security, numerical analysis, optimisation, cryptology, partial differential equations, differential geometry, and data science.

AMSI Third-Year Collaboration 2024: Promoted seven specialised third-year undergraduate mathematical sciences subjects for cross-institutional enrolment, enhancing learning opportunities and strengthening collaboration within the AMSI member community.

Outreach activities

Mahler Lecture Tour: The 2024 AMSI-AustMS Mahler Lecture Tour, featuring Professor Matthew Emerton (University of Chicago), brought cutting-edge number theory to audiences across Australia. Spanning 13 events at member universities in NSW, QLD, ACT, VIC and WA from 24 June – 29 July, the tour engaged researchers, students, and the public with insights into symmetries in number theory, the Langlands program, and mathematical history.

Public Lectures: In a two-part public lecture series at Summer School 2024, ARC Laureate Fellow Andrew Hassell delivered the first lecture on scattering theory, while in the second talk, Dr. Kathryn Turner explored algebraic topology and persistent homology, and its applications in topics as diverse as font classification and brain tumour prognosis.

Distinguished Professor Kerrie Mengersen's Winter School public lecture addressed how statisticians can maintain data privacy through federated learning and synthetic data generation techniques, using the Australian Cancer Atlas as a case study example.

Professor Daniel MacArthur's thought-provoking BioInfoSummer 2024 public lecture explored genomic medicine's transformative power, and the steps Australia must take to ensure accessibility.

Careers Events

In 2024, AMSI RHED delivered four successful careers events in Canberra, Melbourne and Brisbane, connecting mathematical sciences students with industry professionals.

- AMSI Careers Day at ANU, where 120 students (including the AMSI Summer School 2024 cohort) networked with employers including Optiver, Reserve Bank of Australia, EY, Australian Signals Directorate, Australian Bureau of Statistics, Bureau of Meteorology, APR.Intern, Australian Geospatial-Intelligence Organisation and Penten. Dr. Elizabeth Ferme's talk on maths teaching sparked student interest.

- At AMSIConnect, students explored research careers with talks by PhD candidate Matthias Fresacher (WSU) and Professor Asha Rao (RMIT), and an interactive session on postgraduate study and career planning strategies led by AMSI Director Tim Marchant.

- A new industry speed networking format at Winter School connected 60 students with professionals from Australian Retirement Trust, You.Smart.Thing, Jacobi Strategies, CleanCo Queensland, CSIRO, SIG, Optiver, and Pinnacle, through a combination of small group discussions and open networking.

- The AMSI BioInfoSummer 2024 Careers and Industry Networking Session linked participants with experts from CSL, WEHI, Cell Bauhaus, Illumina and Peter MacCallum Cancer Centre to explore how their mathematical skills could be applied in bioinformatics and related fields.

Above: Participants at AMSI Careers Day at ANU

AMSI-Sponsored Scientific Workshops

The AMSI Workshop Funding program provides support for workshops and conferences that drive research advancement and collaboration in the mathematical sciences. In 2024, the program funded a diverse selection of events across Australia, facilitating knowledge sharing, networking, and engagement within both academic and industry communities.

MATRIX Research Program: New deformations of quantum field and gravity theories
22 January – 2 February, MATRIX

Symposium on Geometric Analysis and Nonlinear Partial Differential Equations
29 January – 2 February, The University of Sydney

MATRIX Research Program: Instabilities of flow in porous media
3-19 April, MATRIX

MATRIX Research Program: Low Dimensional Topology – Invariants of Links, Homology Theories, and Complexity
3-22 June, MATRIX

Pacific Rim Conference in Mathematics
17-21 June, Darwin Convention Centre (ANU)

Harmonic analysis and differential equations-in honour of Prof. Jill Pipher
23-29 June, Macquarie University

MATRIX Research Program: Mathematics and Physics of Integrability
30 June – 19 July, MATRIX

MATRIX Research Program: Multivariate Dependence Modeling: Theory and Applications
22 July – 2 August, MATRIX

MATRIX Research Program: Mathematical models for lipids and cells in atherosclerotic plaques
19-30 August, MATRIX

Australia-China-Japan-Singapore-U.S. Index Theory Conference
24-26 June, The University of Adelaide

Harmonic analysis in Australia
19-30 August, Australian National University

MATRIX Research Program: The Geometry of Moduli Spaces in String Theory
2-13 September, MATRIX

Geometry and topology in low dimensions
11-15 November, The University of Melbourne

MATRIX Research Program: Applications of Topological Data Analysis to Mathematical Biology
11-15 November, MATRIX

Zero-dimensional Symmetry in honour of George Willis
18-22 November, The University of Newcastle

Sydney Workshop on Mathematics of Data Science
4-6 December, The University of Sydney

Thank You

Thank you to the following people for their leadership in 2024: Summer School Directors Associate Professor Po Lam Yung, Dr Vigleik Angeltveit (Australian National University), Winter School Director Dr Kazutoshi Yamazaki (University of Queensland), BioInfoSummer Programming Committee members from Melbourne Integrative Genomics and MACSYS (The University of Melbourne), ACE Network Director Associate Professor Stephen Davis (RMIT University), Research Committee Chair Professor James McCoy (University of Newcastle) and Research Committee Deputy Chair Emeritus Professor Phil Broadbridge (La Trobe University). We also acknowledge the contributions of our committee members, program speakers and lecturers, Summer Research Scholarship supervisors and support staff. We are grateful for their generosity in giving their time to ensure the success of our RHED events.

Sponsors

- Australian Mathematical Society (AustMS)
- Australian & New Zealand Association of Mathematical Physics (ANZAMP)
- Optiver
- Jane Street
- AMSI Foundation
- JST-ERATO Yamauchi Materials Space-Tectonics Project
- QCIF
- Pinnacle
- Jacobi Strategies
- SIG
- ARC Centre of Excellence for the Mathematical Analysis of Cellular Systems (MACSYS)
- Melbourne Integrative Genomics
- Australian BioCommons
- The University of Melbourne School of Mathematics & Statistics

APR.Intern

2024 was a year of consolidation for APR.Intern with 78 internships fully executed, five fewer than 2023. This result shows robust demand for the Program given these internships were completed without the benefit of the MTP Connect subsidy, which was successfully concluded in 2023.

APR collaborates closely with, and deeply values, its relationships with its university partners. APR placed interns from 22 different universities across Australia In 2024.

It is great that long-time clients are committing to multiple internships, and clearly appreciate the program's value proposition. Major repeat clients that participated in the program in 2024 include Aurecon (3 in '24 and 37 all time), Dolby (9 in '24 and 17 all time), Telstra (7 in '24 and 30 all time), CSL (1 in '24, 4 scoping and 21 all time). In addition to these corporates, smaller firms such as Speed 3D are currently advertising for an intern after a couple of years' break and 8 internships all time.

Strategic Initiatives for 2025

In 2025, APR will continue actively pursuing funding and grant opportunities designed to incentivise business engagement with its programs. The Department of Industry, Science and Resources has indicated an extension of the WiSE program, and given the program's current success, APR is well-positioned to capitalise on this opportunity. Consistent communication with the department will be essential to ensuring continued success.

Additionally, APR will enhance its collaboration with subscribing universities to maximise the value they receive from the partnership. Starting in 2025, APR will exclusively profile students from subscribing universities and will directly share new internship opportunities with Graduate Research Schools (GRS) and faculties, streamlining the process and strengthening these relationships.

Women in STEM & Entrepreneurship Masterclass

APR continues to facilitate the Women in STEM and Entrepreneurship (WiSE) grant. To date, APR has placed 66 women into stem PhD internships. In conjunction with this work AMSI/APR and the Western Sydney University co-hosted a WiSE Masterclass, a three-day event 21–23 October at the WSU Parramatta City Campus. This initiative provided participants with critical insights into research commercialisation, innovation, and entrepreneurship which are key areas crucial for advancing Australia's research and economic landscape.

Key topics such as navigating career pathways in STEM, leading startups, and transforming research into impactful ventures were delivered by industry leaders who showcased the significant contributions women can make to Australia's STEM ecosystem. These sessions not only encouraged participants to aspire to senior roles in industry and academia but also modelled how research can translate into real-world innovations that address societal challenges.

The active involvement of APR WiSE interns underscored the transformative role internships play in preparing women for impactful careers in STEM. As former APR intern and WiSE subsidy recipient Dr. Courtney Wallingford reflected: "I was immediately struck by how different this event felt. It provided a dynamic snapshot of various industries and job roles, offering practical advice and real-life examples of pathways into such careers."

AMSI/APR will host another WiSE Masterclass in Melbourne in 2025.

In 2024, APR collaborated with organisations and universities to place interns. In conjunction with the University of Wollongong's LIFT program, APR placed 13 interns in 2024 with a diverse range of companies including Cox Architecture, Warrigal Care and Bisalloy Steels. APR will complete this Program in Q1 2025.

APR continues to work with longstanding partner, the Victorian Defence Science Institute. Through this collaboration, APR placed 7 interns into defence related SMEs in 2024. Other internships have been developed through partnerships with the WA Defence Science Centre and the NSW Space Research Network.

Building Trust in Human-Machine Teams: A PhD Intern's Journey into Applied AI

Nicole Toomey is a recipient of the DSI and WiSE subsidies. She is completing a PhD from Deakin University

For Nicole Toomey, a PhD candidate at Deakin University, trust isn't just a feeling, it's a measurable factor in high-risk human-automation interactions. Her research delves into understanding and optimising trust between humans and machines, a concept that took on new dimensions when she stepped into the real-world setting of Agent-Oriented Software (AOS) Pty Ltd.

AOS collaborates with industries spanning defence, agriculture, mining, and aerospace, pushing the boundaries of intelligent software and autonomous robotics. Through her internship, Nicole found herself at the heart of innovation, applying her expertise in trust to tangible software systems and user interfaces designed to enhance human-machine teaming.

> ***"During the internship, I had the opportunity to meet with Defence personnel and gain insight into their expectations of autonomy in specific settings," Nicole shared. "This experience was invaluable in shaping my understanding of how user expectations influence the development of automated systems, ensuring they foster appropriate trust and reliance."***

At AOS, Nicole worked alongside software engineers, immersing herself in their problem-solving approach and team dynamics. One of her greatest challenges was shifting from an academic mindset, where problems are explored through extensive literature reviews, to an industry-driven approach focused on delivering immediate, practical solutions. This transition not only built her confidence but also reinforced her ability to propose research-backed outcomes in real time.

Nicole's biggest achievement was developing user interface solutions that optimise trust in human-machine interactions without the need for exhaustive theoretical groundwork. This shift in mindset, from academia to industry, proved to be a turning point in her professional journey.

Nicole's internship at AOS was more than just an academic exercise, it was a step toward bridging the gap between research and real-world application. By integrating human-centered design principles with advanced AI and automation, her work contributes to a broader movement ensuring that autonomous technologies remain as safe, reliable, and intuitive as possible.

Her experience underscores the critical role of multidisciplinary collaboration in shaping the future of AI and automation, where trust is not just an abstract concept but a fundamental component of innovation.

Above: Nicole Toomey, a PhD candidate at Deakin University

Governance

AMSI Members

In 2024, AMSI welcomed Citadel Securities and Jane Street as corporate members and the Simon Marais Math Competition as an associate member. La Trobe University changed from a full member to an associate member; and the University of Wollongong and Optiver finished their memberships.

AMSI's Organisational Structure

As of 2024, AMSI's full membership totalled 12 universities, including all of the Group of Eight. The University of Melbourne acts as AMSI's lead agent in the JVA. Beyond the full membership, our extended membership is made up of an additional 16 universities, 3 government agencies and 9 STEM learned societies and 3 corporate members.

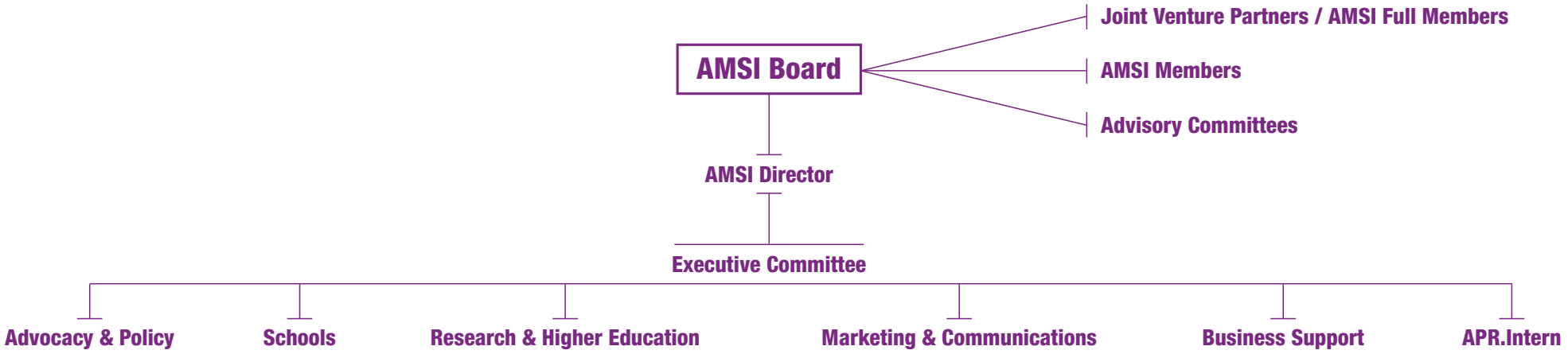
Board Meetings

In 2024, scheduled Board meetings were held on the following dates:

Date	Location
Thu 15 February	Video conference
Thu 16 May	Video conference
Thu 3 October	Video conference
Thu 5 December	Video conference

ATTENDANCE:

Dr Les Trudzik (4/4)
Professor Tim Marchant (4/4)
Professor James McCoy (4/4)
Professor Deborah King (4/4)
Professor Anthony Dooley (3/4)
Professor Bronwyn Hajek (2/4)
Associate Professor Sanjeeva Balasuriya (4/4)
Professor Inge Koch (2/2)
Professor Andrew Eberhard (1/2)
Dr Virginia Wheway (1/3)
Dr Thomas Barlow (2/2)
Ms Monica Ly (2/4)
Dr Michael Forbes (3/4)
Professor Peter Taylor (3/4)



Committees & Stakeholders

Board Members

Dr Les Trudzik *Chair*
Professor Tim Marchant *AMSI Director*
Professor James McCoy *AMSI Deputy Director* (University of Newcastle)
Professor Deborah King *Lead Agent Representative* (University of Melbourne)
Professor Bronwyn Hajek *AMSI Associate Member Representative* (University of South Australia)
Professor Anthony Dooley *AMSI Associate Member Representative* (University of Technology Sydney)
Professor Inge Koch *AMSI Full Member Representative* (RMIT University) – until August 2024
Professor Andrew Eberhard *AMSI Full Member Representative* (RMIT University) – from August 2024
Assoc. Prof. Sanjeeva Balasuriya *AMSI Full Member Representative* (University of Adelaide)
Professor Peter Taylor *Independent member* (University of Melbourne)
Mr Michael Forbes *Independent member* (University of Queensland)
Ms Monica Ly *Independent member* (EdgeRed)
Dr Virginia Wheway *Independent member* (Optiver)- from May 2024
Dr Thomas Barlow *Independent member* (Barlow Advisory) – until February 2024
Ms Anne Baly *Independent member* (Nous Group) – until February 2024

Board Observers

The President of the Australian Mathematical Society, the President of the Statistical Society of Australia, and the Chair of the National Committee for the Mathematical Sciences (NCMS) are also invited onto the Board as observers.

Professor Ian Gordon President of Statistical Society of Australia
Professor Jessica Purcell President of AustMS
Professor Adrian Baddeley Chair of National Committee for Mathematical Sciences

AMSI Research & Higher Education Committee

Professor James McCoy *Chair*
Emeritus Professor Phil Broadbridge *Deputy Chair*
Professor Tim Marchant *AMSI Director*
Angela Coughlin *AMSI RHED National Program Manager*
Associate Professor Stephen Davis *ACE Network Director*
Professor Scott Sisson *University of New South Wales*
Professor Mary Myerscough *University of Sydney*
Associate Professor John Bamberg *University of Western Australia*
Dr Ramiro Lafuente *University of Queensland*
Professor Lesley Ward *University of South Australia*
Professor Aidan Sims *University of Wollongong*
Professor Ezra Getzler *Northwestern University*
Professor Terry Tao *UCLA / Clay Mathematics Institute*
Professor Yasuhide Fukumoto *Kyushu University*
Professor Linda Cummings *New Jersey Institute of Technology*

AMSI Advisory Panel

Emeritus Professor Bruce Henry *University of New South Wales*
Dr Gary Glonek *ATO*
Professor Tim Brown *AMSI Director 2019-20 Emeritus*
Professor Cheryl Praeger *University of Western Australia*
Professor Jacqui Ramagge *University of South Australia*
Dr Ron Sandland *AMSI Chair 2011-19*
Professor Hugh Possingham *University of Queensland – until November 2024*
Professor Doreen Thomas *University of Melbourne*
Ms Jan Thomas *AMSI Honorary / AMSI Executive Officer 2002-11 – until June 2024*
Dr Michael Evans *AMSI Schools Programs Manager 2004-13 / AMSI Honorary*
Associate Professor Mary Coupland *University of Technology Sydney*
Professor Gilah Leder *Monash University / La Trobe University*
Dr Mark Lawrence *Mark Lawrence Group / AMSI Board 2012-19*
Dr Eileen Doyle *AMSI Board 2010-18 / FAICD - until November 2024*
Dr. John Henstridge *Managing Director, Data Analysis Australia*
Professor Merrilyn Goos *The University of the Sunshine Coast*

Our Staff

Executive

Professor Tim Marchant Director, AMSI
Ms Lisa Farrar AMSI Associate Director and AMSI Foundation Secretary
Mr Glen Sheldon APR.Intern National Program Manager
Ms Angela Coughlin RHED National Program Manager

Finance, Advocacy and Administration

Darla Trejo Finance Coordinator
Sophie Kennedy Senior Policy and Advocacy Officer
Elena Panfilova Executive Assistant

Engagement

Sarah Ramantanis Marketing, Communications & Events Coordinator
Michael Shaw Art Director & Multimedia Manager
Margo Brown Philanthropy Coordinator

Schools

Leanne McMahon School Mathematics Advisor

Research & Higher Education

Angela Coughlin National Program Manager
Anna Muscara Project Coordinator
Shamvi Berry Program Administration Officer

APR.Intern

Glen Sheldon National Program Manager
Margo Brown Senior Program Coordinator
Mark Ovens Business Development Officer
Justin Mabbutt Business Development Officer
Stacey Hansen Business Development and Administration Officer
Michael Valentine Business Development Officer – from June 2024
Zak Blayney CRM and Project Officer
Filip Rutkowski Administrative Support Officer

Honorary Staff

Dr Michael Evans Senior Consultant
Ms Jan Thomas OAM Research Fellow
Ms Kally Yuen Statistician

Financials

AMSI's financial records are managed and administered by AMSI Finance staff in accordance with the accounting policies and financial systems of the University of Melbourne.

All financial statements are reconciled to the University of Melbourne's integrated financial system to ensure compliance with relevant policies and to confirm the amount of cash reserves held by the University of Melbourne on behalf of AMSI at the end of each financial year. The University of Melbourne undertakes to provide audited financial statements for all contractually funded activities when required by the relevant funding body

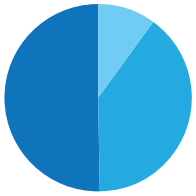
AMSI's revenue for the year ended 31 December 2024 comprised:

Membership income	$1,398,975
Trading revenue	$1,107,455
Other income (other project income, sponsorships & interest)	$281,658
Total Income	**$2,788,088**

AMSI's expenditure for the year ended 31 December 2024 comprised:

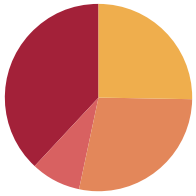
Core business - including Governance and Outreach	$882,831
Research and Higher Education	$984,895
Schools Program including CHOOSEMATHS	$298,710
APR.Intern	$1,322,433
Total Expenses	**$3,488,869**

Institute Income



- Membership income
- Trading revenue
- Other income (other project income, sponsorships and interest)

Institute Expenditure



- APR.Intern
- Schools Program including ChooseMATHS
- Research and Higher Education
- Core Business - Including Governance and Outreach

Statement of Financial Position		**As at 31 December 2024**
ASSETS		$
Funds on Hand:		1,257,848
	Net Assets	1,257,848
EQUITY		
Retained income brought forward after prior period adjustments		1,958,629
Total Operating Result (income less expenses)		-700,781
	Net Equity	1,257,848

Professor Tim Marchant
AMSI Director

Darla Trejo
AMSI Finance Coordinator

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