UNCONFIRMED

**Australian Council of Heads of Mathematical Sciences (ACHMS)**

**Meeting 2/2024**

**MINUTES**

The Meeting of the Australian Council of Heads of Mathematical Sciences (ACHMS) was held at 2:00 pm AEDT on Thursday, 31st October 2024 by video conference.

**PRESENT**

**ACHMS Executive Committee**

Prof. Warwick Tucker (Chair), Prof. Inge Koch (Deputy Chair) and Prof. James Brown (Executive Committee Member).

**University Representatives**

Prof. Kuldeep Kumar, Dr Iman Ardekani, Prof. Andrew Bassom, Prof. Finnur Larusson, A/Prof. Volker Gebhardt, Mr James McBroom, Prof. Joe Grotowski, A/Prof. Sergiy Shelyag, Prof. Dingxuan Zhou, Prof. Howard Bondell, Dr Gabe Sorrentino, Dr Trevor Langlands, A/Prof. Narelle Brack, Prof. Jeffrey Hogan, Dr Michael Kemp, Prof. Graeme Hocking, A/Prof. Timothy Schaerf, A/Prof. Julien Ugon, Prof. Tony Roberts, Dr Nargiz Sultanova, Prof. Bronwyn Hajek, A/Prof. Maureen Edwards, Dr David Ompong, A/Prof. Richard Garner.

**Friends of the Council**

Dr Deborah Jackson, Dr Judy-anne Osborn, Dr Tony Willis, Mr Allan Dougan, Prof. Jennifer Flegg, Prof. Jan De Gier, A/Prof. Lynne Giles, Prof. Katie Makar, Prof. Stephan Tillmann, Prof. Pablo Moscato, Dr Thomas Britz, Prof. Gavin Reid, Prof. Marcel Jackson.

**AMSI Staff**

Prof. Tim Marchant, Ms Elena Panfilova, Dr Michael Evans, Mr Glen Sheldon, Ms Angela Coughlin, Mr Michael Shaw, Ms Sophie Kennedy, Ms Anna Muscara, Ms Sarah Ramantanis, Mr Filip Rutkowski, Ms Lisa Farrar.

**Guest Speakers**

A/Prof. Mary Coupland and A/Prof. Edward Doolittle.

**Proxies**

Prof. Marcy Robertson, Prof. Miccal Matthews, Prof. Christopher Angstmann and Dr Yang Shi.

## BUSINESS

### 1. Welcome

The Chair opened the meeting by greeting the Heads of Schools and Friends of the Council and acknowledged the traditional owners of the many lands on which the attendees were located, paying respects to the Elders past, present and emerging of all Indigenous nations. A special welcome was extended to new representatives:

- Associate Professor Sergiy Shelyag (Flinders University)
- Mr Ryan Winn (Science and Technology Australia - STA)
- Dr Tony Willis (Australian Council of Deans of Science - ACDS)
- Associate Professor Lynne Giles (Statistical Society of Australia - SSA)

#### 1.1. Apologies and Proxies

Apologies were received from Prof. Michael Giudici, Dr Nathan Clisby, Prof. James McCoy, Prof. James McBroom, Prof. Charles Lemckert, Prof. Federico Frascoli and Prof. Andrew Francis.

The Chair welcomed Prof. Marcy Robertson, Prof. Miccal Matthews, Prof. Christopher Angstmann and Dr Yang Shi, who attended as Proxies.

#### 1.2 Agenda Changes

No changes to the agenda were recorded.

#### 1.3 Minutes of the Past Meeting

The minutes of the previous meeting, held on Thursday, 23 May 2024, were confirmed as a correct record by the members.

### 2. Insights from 15th International Congress on Mathematical Education (ICME-15)

A/Prof Mary Coupland provided an overview of the key takeaways from the 15th International Congress on Mathematical Education (ICME-15), held in Sydney from July 24-31. The event brought together educators, researchers, and policymakers to discuss global challenges and advancements in mathematical education.

**Program Highlights**

- The congress included plenary lectures, panels, and invited talks by renowned mathematicians, such as Jill Adler and Jason Sharpe.
- 54 Topic Study Groups (TSGs) ran parallel sessions, acting as mini-conferences on specific mathematics education topics. These included short research presentations and discussions.
- Other activities included discussion groups, workshops, a free-day excursion, and outreach initiatives like a school poster competition.

**Participation Overview**

- The event hosted 2,299 participants from 102 countries, with the majority coming from the USA, Australia, China, Japan, and Germany.
- Attendance was lower than anticipated, possibly due to high registration costs (approximately $900 for the week).
- Participants included accompanying persons and over 100 attendees funded by the Solidarity Fund, which supports participants from developing countries.

**Notable Highlights**

- Jason Sharpe's plenary lecture, which integrated Indigenous perspectives with bushfire modelling mathematics, received widespread acclaim.
- Topic Study Group 32 (Mathematics Education at the Tertiary Level) featured 57 presentations covering themes such as student practices, curriculum, transitions, and attitudes/emotions.
- Discussions highlighted the use of technological tools like STACK for online assessment and the need for increased collaboration between mathematicians and mathematics educators.
- Outreach activities, including the school poster competition and events blending mathematics with art and creativity, garnered significant engagement.

**Bridges Math Art Conference Proposal**

A/Prof Coupland introduced the Bridges Math Art Conference, highlighting efforts to bring the event to Australia. The conference celebrates the intersection of mathematics and art through various forms and serves as a platform for participants of all ages and backgrounds.

**Key Details:**

- The Bridges Conference is held annually or biennially, typically in odd-numbered years.
- A passionate community of mathematical artists is advocating for the event to align with Australia's Science Week next year.
- The conference requires an Australian university to serve as the host venue.

A/Prof Coupland shared the contact details of Kate Barnard, the organiser leading the initiative, and encouraged ACHMS members to reach out via email or through the conference website at bridgesmathart.org.

**Q&A Highlights**

- Prof. Bondell (University of Melbourne) expressed interest in hosting the Bridges Math Art Conference, suggesting a potential connection with their Science Gallery program, which links art and science.
- A/Prof Coupland noted the recognition of two Australians, Prof. Merrilyn Goos and Prof. Kaye Stacey, who received the prestigious ICMI Awards at ICME-15.

- Dr Osborn praised the satellite conferences facilitated by ICME-15, such as the 30-person History & Philosophy of Mathematics Education event.
- Prof. Makar highlighted the prevalence of satellite events around major conferences, citing the upcoming International Conference on Teaching Statistics in Brisbane in 2026.
- A/Prof Coupland encouraged attendance at the next ICME, to be held in Prague in 2028, noting the 38-year gap since Australia last hosted the event in 1984 (Adelaide).

## 3. Research Infrastructure for Mathematical Sciences

The Chair introduced the topic by referencing a recent column by John Hewson in *The Saturday Paper*, which was included in the meeting materials. The article advocated for dedicated research infrastructure for the mathematical sciences field in Australia.

The Chair emphasised Hewson's points regarding the low level of expenditure on mathematical sciences research and the absence of specific research infrastructure support for this field in Australia. In addition, the Chair mentioned a "call to action" initiated by the Australian Mathematical Sciences Institute (AMSI) and MATRIX, available at AMSI's website.

### ARC Perspective on Research Infrastructure

The Chair expressed gratitude to Prof. Gavin Reid, representing the Australian Research Council (ARC), for sharing the ARC's perspective and facilitating a discussion on the issue. Prof. Reid provided the following key insights:

- Prof. Reid presented data and trends from the ARC repository on research funding across disciplines over the past 25 years, which is available on the ARC website.
- Addressing the AMSI-MATRIX call to action, he highlighted that the ARC Act now legislatively defines the ARC's role in funding excellent pure basic research, strategic basic research, and applied research (excluding experimental development).
- Approximately 60% of ARC funding is allocated to the Discovery Program for pure and strategic basic research, while 40% is allocated to the Linkage Program for applied research. This 60:40 split has remained consistent over the past decade.
- From 2011 to 2022, only 1.1% of applications to ARC Linkage projects originated from the mathematical sciences. However, these applications had a higher success rate (38.5%) compared to overall STEM disciplines.
- Despite their higher success rates, applications from the mathematical sciences to Linkage projects have declined significantly over time, potentially reaching a critical low.
- During the same period, only one grant for mathematical sciences research infrastructure support was awarded under the LIEF scheme. This was the result of a single submitted application, which was successful.
- Prof. Reid noted that mathematical sciences applications tend to have higher success rates across ARC funding schemes compared to overall STEM disciplines.
- He encouraged the use of publicly available ARC data to analyse trends and identify opportunities in relevant funding schemes.

**Q&A Session**

- **Prof. Koch:** Asked about the relative importance of team-based versus individual Discovery grant applications in mathematics. Prof. Reid clarified that while there is a trend toward funding more team-based applications, the ARC does not prioritise team projects over individual projects. Both are evaluated equally based on the excellence of the proposed research.
- **Prof. Roberts:** Commented on the National Computational Infrastructure (NCI) and questioned the ARC's lack of involvement in its governance, given the significant utilisation of NCI's resources by mathematicians. Prof. Reid acknowledged this concern, noting that while the ARC is not currently represented in NCI's governance, the ongoing review of the National Competitive Grants Program is examining ways for the ARC to better interface and coordinate with other funding bodies and research infrastructures. The goal is to avoid duplication and ensure seamless transitions.

**4. Decolonization, Indigenization, Reconciliation: What do they mean for Mathematics and Mathematicians?**

The Chair introduced Associate Professor Edward Doolittle from the First Nations University of Canada, a member of the Mohawk nation and a distinguished Indigenous mathematician. Prof. Doolittle was visiting Australia in October and November to collaborate with CARMA. During his talk, he addressed the following key points:

- Indigenisation refers to recognising and treating Indigenous peoples distinctly based on their inherent rights tied to land and culture. This is distinct from equity, diversity, and inclusion.
- In Canada, Indigenous peoples have constitutionally enshrined inherent rights, such as hunting and fishing rights, in addition to human rights.
- Residential schools in Canada deliberately sought to destroy Indigenous languages, cultures, and mathematical traditions over approximately 100 years, with the last school closing in 1995.
- Indigenous mathematics originates from the creation of stories, games, designs, cultural systems (e.g., clan systems), and connections to nature and rhythms.
- An example shared was the Peach Stone Bowl game, which incorporates mathematical concepts such as probability and optimal stopping time.
- Indigenous mathematics predates and is distinct from Western/global mathematics.
- Reviving and valuing Indigenous mathematics is a crucial component of the reconciliation process for harms caused by residential schools.
- Reconciliation between Indigenous and non-Indigenous peoples in Canada is an ongoing process without a defined roadmap.
- Prof. Doolittle proposed the term "global mathematics" instead of "Western mathematics" to avoid inaccurate cultural associations.
- Indigenous worldviews often personify mathematics as a spiritual being, akin to the sun and moon, allowing for interpersonal relationships with mathematics.

- A $10 million grant for language revitalisation awarded to First Nations University and the Saskatchewan Indian Cultural College will involve natural language processing and computerisation of Indigenous languages, which connects to mathematical fields like artificial intelligence.

**Q&A Session**

- **Dr Osborn** asked about indigenising curricula beyond content, including the ways knowledge is discovered and validated. Prof. Doolittle discussed recognising implicit cultural values embedded in mathematics education that may conflict with Indigenous values and recommended Alan Bishop's *Mathematical Enculturation* for further exploration.
- **Prof. Makar** asked if Prof. Chris Matthews' model of viewing mathematics as an abstraction of reality aligns with Indigenous perspectives. Prof. Doolittle was not deeply familiar with the model but agreed that Indigenous ways of knowing embrace multiple perspectives.
- **Prof. Garner** noted that valuing multiple mathematical approaches could benefit all students, but universities often fail to provide adequate resources to implement such ideas effectively.
- **Dr Osborn** highlighted economic pressures leading to larger class sizes, which hinder individualised teaching methods. Prof. Doolittle emphasised the importance of distinguishing equity from indigenisation, as the latter may require disproportionately allocating resources based on Indigenous rights.

## 5. Report from the Chair

The Chair expressed gratitude to the former Chair, Prof. Finnur Larusson, and Deputy Chair, Dr Michael Kemp, for their leadership. He reminded attendees of the council's core purposes: sharing best practices in mathematical sciences education, research, and community interaction, and keeping Heads informed of relevant initiatives.

The Chair encouraged members to collaborate on best practices to address the impact of caps on international student enrolments, which are expected to significantly affect mathematical sciences schools. He noted the recent changes to the ARC's expression of interest model for grant applications, describing the updates as positive. The Chair suggested inviting Prof. Gavin Reid to provide data on the impact of these changes.

He also called for self-nominations or nominations to join the ACHMS executive committee, emphasising the need for more members. The Chair highlighted that executive terms are short to ensure continuous rotation and encouraged broader participation.

## 6. Other Business

The Chair invited members to raise additional topics. One suggestion was to consider returning to some in-person or hybrid meetings in the future. While acknowledging constraints around time, distance, and costs, the Chair proposed circulating a questionnaire to gather feedback on this possibility.

The upcoming AustMS meeting in Auckland and the International Congress of Mathematicians in Philadelphia in 2026 were mentioned as potential opportunities for in-person gatherings. The Chair, as someone relatively new to Australia, expressed a desire to meet more Heads of Schools in person. He extended an open invitation for members to propose discussion topics or suggest guest speakers for future meetings.

No further business was raised. The Chair concluded by thanking attendees for their participation.

The meeting concluded at 3:56 pm.

Signed by the Chair: _____ and dated: _____

To access the Zoom recording follow the link below:

*https://unimelb.zoom.us/rec/share/4EzcUIU9q2Qb0JQrMhEcpbmU9M3uPDS9PS9ktKMtJTatl47Ls0wxazM0wPm3qt2s.K0n3qwQPze0F-TcQ*

*Passcode: Eo4$@p4n*

*(Note: signing into your Zoom account will be required to view the recording. The recording is scheduled for automatic deletion on 31 December 2024, at 11:59 PM.)*

**DISTRIBUTION**

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Professor Inge Koch, Deputy Chair
Professor James Brown, Executive Committee Member

***Members***

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Professor Lilia Ferrario, Australian National University
Associate Professor Adam Butt, ANU School of Finance, Actuarial Studies & Statistics
Professor Kuldeep Kumar, Bond University
Dr David Ompong, Charles Darwin University
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Dr Thomas Britz, Combinatorial Mathematics Society of Australasia CMSA
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Dr Tony Willis, Australian Council of Deans of Science ACDS
Professor Jan de Gier, Mathematical Research Institute MATRIX
Dr Judy-anne Osborn, Computer-Assisted Research Mathematics and its Applications CARMA
Professor Stephan Tillmann, University of Sydney Mathematical Research Institute SMRI
Professor Jennifer Flegg, Women in Mathematics Special Interest Group WIMSIG

Written by E. Panfilova on 13/12/2024.