UNCONFIRMED

Australian Council of Heads of Mathematical Sciences (ACHMS)

Meeting 1/2023

MINUTES

The Annual General Meeting of the Australian Council of Heads of Mathematical Sciences (ACHMS) was held at 2:00pm AEST on Thursday, 18 May 2023 by video conference. The meeting was adjourned from 3:00pm to 3:10pm for a break.

PRESENT

ACHMS Executive Committee

Prof. Finnur Larusson (Chair), Dr Michael Kemp (Deputy Chair), Prof. Linda Galligan.

University Representatives

Prof. Pablo Moscato, A/Prof. Volker Gebhardt, Dr Alan McCarthy, Prof. Inge Koch, A/Prof. Maureen Edwards, Dr Zlatko Jovanoski, Dr David Ompong, Prof. Warwick Tucker, Prof. Kuldeep Kumar, Dr Hayden Tronnolone, A/Prof. Timothy Schaerf, Prof. Dingxuan Zhou, Prof. Michael Giudici, A/Prof. Richard Garner, Prof. Joe Grotowski, Prof. Lilia Ferrario, Prof. Adelle Coster, A/Prof. Tim Gould, Prof. Graeme Hocking, Prof. Howard Bondell, A/Prof. Narelle Brack, A/Prof. Julien Ugon, Prof. Elena Levchenko, Prof. Andrew Bassom, Dr Nargiz Sultanova, Prof. Charles Lemckert, Prof. Marcel Jackson, A/Prof. Bronwyn Hajek.

Friends of the Council

Dr Judy-Anne Osborn, Prof. Jan De Gier, Prof. Steven Weller, Prof. Jennifer Flegg, Mr Allan Dougan, Prof. Stephan Tillmann, Prof. Katie Makar, A/Prof. Honglei Xu, Dr Thomas Britz, Dr Anders Holmberg, Prof. Ngamta (Natalie) Thamwattana.

Guest Speaker: Dr Poh Wah Hillock

Proxies: Prof. Jorgen Rasmussen, A/Prof. Helen Thompson, Prof. Christopher Poulton

AMSI Staff and Honorary: Ms Elena Panfilova (Minute-Taker), Dr Maaike Wienk, Ms Angela Coughlin, Prof. James McCoy, Ms Margo Brown, Mr Michael Shaw, Mr Glen Sheldon, Dr Michael Evans, Ms Jan Thomas.

BUSINESS

1. Welcome

The Chair opened the meeting by greeting the Heads of Schools and Friends of the Council while also acknowledging 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.

The Chair extended a special welcome to new member representatives: Prof. Charles Lemckert from Southern Cross University, Prof. Michael Giudici from University of Western Australia, Dr Hayden Tronnolone from Flinders University, Prof. Inge Koch from RMIT, A/Prof. Timothy Schaerf from the University of New England; and also welcomed three new observers: A/Professor Honglei Xu from the Australian Society for Operations Research (ASOR), Prof. Steven Weller from ARC and Prof. Jennifer Flegg, the Chair of WIMSIG.

1.1 Apologies and Proxies

Apologies were received from Prof. Steven Langford, Prof. Tony Roberts, Prof. Tim Marchant, Dr Deborah Jackson, Prof. Chris Matthews, Prof. Federico Frascoli, Prof. Silvestru Sever Dragomir, A/Prof. Leanne Rylands, Prof. Joseph Grotowski.

The Chair welcomed Prof. Jorgen Rasmussen, A/Prof. Helen Thompson and Prof. Christopher Poulton, who attended as proxies.

1.2 Agenda Changes

The Chair informed the members of one item of Other Business to be discussed at the end of the meeting regarding AMSI Winter School.

1.3 Minutes of the Past Meeting

Minutes of the previous meeting held on Wednesday, 19 October 2022 were confirmed by the Members as a correct record.

1.4 Action List

The Members were presented with the action list from the previous meeting and updated on the progress of the following action items:

2/2022 (item 9): Completed - A reminder email with details on how to join the ACHMS Slack channel was circulated to the members on 20/10/2022.

1/2021 (8): Ongoing - The Chair reminded members about the ongoing action item to support WIMSIG in various ways listed in the action sheet.

2. Appointments to the ACHMS Executive Committee

The Chair thanked Prof. Serena Dipierro and Prof. Linda Galligan for their valuable contributions during their time on the Executive Committee of the Council. Despite

extending the call for expressions of interest, no new nominations were received. The Chair stressed the importance of having a larger and more diverse Executive Committee and indicated the intention to issue another call for nominations prior to the October meeting. Additionally, the Chair shared plans to step down from the role of Chair after the 2024 AGM.

3. Report from the Chair

The Chair's report covered key developments in the Higher Education Sector, encompassing government reviews and initiatives, such as the diversity in STEM review, the National Reconstruction Fund establishment, and the National Science and Research Priorities review. The report highlighted concerns about the decline in Australia's research and development expenditure over the past 15 years, signalling a need for increased advocacy and support for research funding, especially for pure mathematics. Additionally, the shift towards industry funding and applied areas at the expense of basic research raised concerns. The report also addressed issues surrounding domestic Higher Degree by Research (HDR) completions, highlighting a lack of growth over the past decade, gender imbalances in mathematics departments, and challenges faced by female PhD students, including low stipends and limited benefits. The Chair urged the Heads of Schools to take action on these issues and actively promote diversity and inclusion.

4. Reimagining first-year mathematics

The Chair introduced Dr Poh Wah Hillock, the recipient of the 2022 Australian University Teacher of the Year award, recognised for her innovative teaching approach in mathematics at the University of Queensland. Dr Hillock highlighted the critical role of the first year of university, which lays the foundation for students' academic success. She emphasised that first-year mathematics often hinders rather than helps students. Her presentation focused on the University of Queensland's efforts to address these challenges through a strong support network and course transformation.

Dr Hillock identified three key challenges contributing to students' struggles in first-year mathematics: inadequate foundational preparation, the challenging transition from high school to university, and the difficulty in establishing a sense of belonging within a large university. To address these challenges, Dr Hillock's team developed the Support Learning Tutorial, a voluntary weekly one-hour intervention program. It aimed to help students catch up on essential math skills, provide continuous assistance, and create a supportive community. Statistics from 2012 to 2019 showed that students in the program consistently outperformed the general cohort.

Building on this success, the support network expanded to include diagnostic quizzes, basic skills workshops, scaffolded learning resources, various support avenues, and intensive exam revision classes. These efforts helped students bridge foundational gaps and navigate the transition to university-level mathematics successfully.

In 2018, the University of Queensland introduced the UQ2U program to enhance course flexibility and on-campus active learning. Dr Hillock's team used this opportunity to redesign the first-year mathematics course (MATH1051). They adopted a blended learning model

combining online flexibility with on-campus active learning and collaborative activities. The goal was to improve student engagement, as studies showed increased engagement correlated with student success.

The course redesign involved incorporating online lectures via the edX platform, replacing tutorials with collaborative workshops, and integrating MATLAB into these workshops. The key to success was the introduction of collaborative workshops, promoting active engagement and group participation, shifting from a passive learning model.

Dr Hillock discussed the course redesign evaluation, which included formal evaluations, surveys, focus groups, attendance data, and student feedback. Key findings included:

1. Lecture Flexibility: Students appreciated the course's flexibility, allowing them to choose between attending face-to-face lectures and accessing edX videos online. Many students found edX videos useful for pre-study, post-study, and revision, even if they attended face-to-face lectures.

2. Engagement with edX: Approximately 30% to 40% of students engaged with the online resources. They liked the segmented format of edX videos, which made it easier to learn at their own pace.

3. Workshop Benefits: Workshop attendance rates increased significantly, with about 80% engagement after the redesign. Students provided positive feedback about the social aspects of workshops, highlighting opportunities to make friends and connect with peers.

4. Collaboration in Workshops: Students valued the collaborative nature of workshops, emphasising the sense of community and teamwork fostered by these sessions.

Overall, the course redesign received higher ratings, indicating improvements in engagement, flexibility, and the social aspects of learning. Other first-year math courses were also adopting the successful MATH1051 model, with ongoing efforts to enhance assessment practices and address high failure rates.

During the Q&A session following Dr Hillock's presentation, attendees raised various questions regarding the course redesign and its outcomes. These questions prompted the following insights from the speaker:

- The redesign demonstrated a positive correlation between student performance in MATH1051 and engineering courses.
- Initial budget increases were made for the redesigned course, but efforts were made to optimise resources to manage costs effectively.
- For online students, engagement was facilitated through synchronous Zoom sessions during hybrid classes, and recordings of these sessions were made available. It's important to note that participation marks were not solely tied to attendance; they were designed to incentivise collaboration among students.
- Collaborative worksheet activities were intentionally crafted to foster collaboration among students.

- There were no student complaints about the mandatory math-related activities in workshops.
- Students had the flexibility to choose between attending face-to-face lectures or accessing content online.
- Increasing mark allocations for attendance to 15% had a noticeable impact on student engagement.
- It was challenging to monitor online collaborative workshops, and ongoing difficulties were encountered in finding suitable solutions.

The Chair shared a link to Dr Hillock's 2019 paper for those interested in further details: (https://www.tandfonline.com/doi/full/10.1080/0020739X.2019.1656830).

Meeting Break and Zoom Poll

During a 10-minute break, the Chair conducted a Zoom Poll to assess the academic job market in mathematics. Council members were asked about their shcools' anticipated continuing positions in 2023. Results showed that roughly one-third of universities wouldn't fill any positions, over 50% expected to fill one or two, and the remainder aimed to fill three or more.

5. A sustainable national research institute

The Chair introduced Professor Jan De Gier, the Director of MATRIX Institute, from Melbourne University, who discussed the establishment of a sustainable national research institute in mathematical sciences. He began by referring to a 2016 decadal plan recommendation that urged Australian universities to collaborate and secure seed funding for a new national research centre in this field. The primary aim was to boost industry connections and international collaboration. The initiatives that emerged at that time included MATRIX (a residential research program) and SMRI (Sydney Mathematical Research Institute), both contributing to mathematical research infrastructure but with different focuses. Prof. De Gier cautioned against complacency, highlighting the uncertainty of ongoing funding for these initiatives.

He discussed MATRIX's partnerships with universities and international organisations, mentioning seed funding from the ARC Centre of Excellence ACEMS, the Simons Foundation Grant and an ARC LIEF grant. He stressed the need for proactive funding-seeking for mathematical sciences, noting that mathematics is often more timid than other disciplines in this regard. Prof. De Gier emphasised the importance of defining the key elements of national research infrastructure and exploring opportunities to fit within collaborative research schemes such as NCRIS.

In conclusion, Prof. De Gier encouraged universities and individuals to collaborate in supporting mathematical research infrastructure, working towards a more sustainable future for national research institutes in Australia. He also pointed out the potential for community engagement and philanthropic support to strengthen government funding proposals.

Prof. Steven Weller, Executive Director for Engineering and Information Sciences at the Australian Research Council (ARC) recommended exploring funding avenues within the industrial transformation research program, specifically research hubs aligned with industry

needs and Centres of Excellence. Prof. De Gier noted that mentioned schemes have a very narrow focus and that there is no suitable scheme within the ARC for residential research institutes, making long-term funding challenging. Prof, De Gier expressed the difficulty in conveying the importance of mathematical infrastructure to those outside the discipline, highlighting unique challenges faced in Australia compared to other countries.

He expressed willingness to explore a rolling infrastructure support grant with ARC and mentioned previous discussions with Prof. Weller's predecessor who supported the idea. Prof. De Gier emphasised the importance of support from larger schools or departments, inviting them to consider becoming MATRIX associate members or partners. He stressed the risk of losing initiatives such as MATRIX and SMRI without sustained funding. The Chair echoed the significance of these initiatives and encouraged that Heads of Schools and Departments explore opportunities to support and engage with MATRIX.

1. Government initiatives in the mathematical sciences

The Chair introduced the third and final presentation, originally scheduled to be delivered by Tim Merchant, the Director of AMSI, who was unable to attend. Instead, Dr Maaike Wienk, AMSI's Finance, Policy, and Advocacy Manager, stepped in to present insights on government initiatives in the mathematical sciences, highlighting the following key points:

1. Recent Federal Budget: While lacking major education and research initiatives, the budget introduced 4,000 new Commonwealth-supported places for programs related to nuclear submarine development. These places would be allocated through a competitive bidding process, with a substantial portion designated for South Australia. Additionally, there was an increase in post-study work rights for international students, particularly those pursuing PhD and master's degrees, which could benefit mathematical sciences students from abroad. Funding was also allocated for critical technologies such as quantum tech, artificial intelligence, and batteries.

2. Australian Universities Accord: A comprehensive review covering various aspects of teaching and research in universities, is set to conclude in 2023, with significant financial commitments expected to follow. STA submitted a comprehensive proposal emphasising the importance of a substantial investment in Australia's research and development, with a focus on nurturing a specialised STEM-skilled workforce.

3. National Teacher Workforce Action Plan

Dr Wienk also outlined suggestions for the mathematical sciences community in response to these initiatives, including participating in the bidding process for Commonwealth-supported places, encouraging international students to undertake internships, and promoting engagement with international twinning programs. Dr Wienk emphasised the importance of engaging with political representatives and supporting higher education, mentioning AMSI's efforts to secure funding for its higher education events. Dr Wienk encouraged the mathematical sciences community to reach out to local political representatives to emphasise the significance of mathematics and related disciplines in Australia.

Dr Wienk underscored the growing demand for mathematical, statistical, and data science skills across various sectors and the role of the mathematical sciences community in addressing workforce shortages in these critical areas. She called for support and advocacy to ensure the continued success of mathematics in Australia's future.

During the discussion following Dr Wienk's presentation, attendees raised several points and questions:

- Dr Osborn mentioned the need to raise public awareness about the importance of basic research, including mathematics, to gain more political support.
- Professor Stephan Tillmann stressed the importance of inspiring young people with mathematics through outreach and communication.
- Professor James McCoy suggested exploring support from donors in industry and philanthropy to diversify funding sources.
- Attendees highlighted the importance of alumni involvement and giving back to universities and organisations to support the mathematical community.

Overall, the discussion emphasised the need for collective effort and advocacy to ensure sustained support for mathematics and mathematical sciences in Australia.

2. Other Business

Ms Angela Coughlin, Program Manager of the Research and Higher Education Program at AMSI, provided details regarding the AMSI Winter School on "Modelling Our Changing Biosphere." She announced that applications are currently being accepted for this two-week research training program, targeting postgraduate students and early career researchers. The Winter School is scheduled to be held at QUT and offers grant funding to assist with travel and accommodation expenses for participants.

Prof. Michael Giudici, Chair of the Gavin Brown Prize Committee for the AustMS, took the opportunity to remind attendees about the upcoming deadline for nominations for the Gavin Brown Prize and other AustMS awards. He also encouraged Heads of Schools to motivate their faculty members to nominate deserving candidates.

The Chair outlined the Council's future plans, which include soliciting suggestions for meeting topics and seeking nominations for one-year positions on the Executive Committee. It was emphasised that the Committee plays a crucial role in planning the Council's meetings. The meeting concluded with expressions of gratitude to all participants and presenters for their active engagement and informative presentations.

The meeting concluded at 4:14pm.

Signed by the Chair: _____ and dated: _____

DISTRIBUTION

ACHMS Executive Committee
Professor Finnur Larusson, Chair
Dr Michael Kemp, Deputy Chair
Professor Serena Dipierro, Executive Committee Member
Professor Linda Galligan, Executive Committee Member

Members
Associate Professor Bronwyn Hajek, University of South Australia
Professor Dingxuan Zhou, University of Sydney
Professor Andrew Bassom, University of Tasmania
Associate Professor Shaun Belward, James Cook University
Professor Howard Bondell, The University of Melbourne
Associate Professor Adam Butt, ANU, School of Finance, Actuarial Studies & Statistics
Professor Adelle Coster, University of New South Wales
Professor Michael Giudici, The University of Western Australia
Professor Silvestru Sever Dragomir, Victoria University
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Professor Linda Galligan, University of Southern Queensland
Associate Professor Richard Garner, Macquarie University
Associate Professor Volker Gebhardt, Western Sydney University
Associate Professor Tim Gould, Griffith University
Professor Joseph Grotowski, University of Queensland
Professor Graeme Hocking, Murdoch University and ANZIAM
Professor George Athanasopoulos, Monash University, Dep. of Econometrics and Statistics
Dr Zlatko Jovanski, Australian Defence Force Academy (UNSW Canberra)
Dr Michael Kemp, Charles Sturt University
Professor Kuldeep Kumar, Bond University
Prof Charles Lemckert, Southern Cross University
Professor Steven Langford, University of Technology, Sydney
Professor Finnur Larusson, The University of Adelaide
Professor Ryan Loxton, Curtin University
Associate Professor Narelle Brack, La Trobe University
Dr Elena Levchenko, University of Newcastle
Dr Alan McCarthy, University of Notre Dame
Professor Pablo Moscato, University of Newcastle
Dr David Ompong, Charles Darwin University
Professor Inge Koch, RMIT University
Dr Steven Richardson, Edith Cowan University
Professor Tony Roberts, Queensland University of Technology
Professor Timothy Schaerf, University of New England
Dr Nargiz Sultanova, Federation University Australia

Professor Warwick Tucker, Monash University
Associate Professor Julien Ugon, Deakin University
Dr Aaron Wiegand, University of the Sunshine Coast

Friends of the Council

Professor Katie Makar, Mathematics Education Research Group of Australasia (**MERGA**)
A/Professor Honglei Xu, Australian Society for Operations Research (**ASOR**)
Mr Allan Dougan, Australian Association of Mathematics Teachers (**AAMT**)
Mr Nathan Ford, Australian Mathematics Trust (**AMT**)
Professor Jennifer Flegg, Women in Mathematics Special Interest Group (**WIMSIG**)
Professor Ngamta (Natalie) Thamwattana, Australia and NZ Industrial and Applied Mathematics (**ANZIAM**)
Dr Deborah Jackson, Australian Mathematical Society (**AustMS**)
Professor Ian Gordon, Statistical Society of Australia (**SSA**)
Professor Chris Matthews, Aboriginal and Torres Strait Islander Mathematics Alliance (**ATSIMA**)
Dr Thomas Britz, Combinatorial Mathematics Society of Australasia (**CMSA**)
Dr Judy-Anne Osborn, Computer-Assisted Research Mathematics and its Applications (**CARMA**)
Dr Phillip Isaac, Australian and New Zealand Association of Mathematical Physics (**ANZAMP**)
Ms Misha Schubert, Science and Technology Australia (**STA**)
Professor Stephan Tillmann, University of Sydney Mathematical Research Institute (**SMRI**)
Professor Alan Welsh, National Committee for the Mathematical Sciences (**NCMS**)
Professor Jan de Gier, Mathematical Research Institute **MATRIX**
Professor John Rice, Australian Council of Deans of Science (**ACDS**)
TBC, Commonwealth Scientific and Industrial Research Organisation (**CSIRO**)
Dr Anders Holmberg, Australian Bureau of Statistics (**ABS**)
Professor Steven Weller, Australian Research Council (**ARC**)

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Ms Jan Thomas, AMSI Honorary
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Written by E. Panfilova