UNCONFIRMED

Australian Council of Heads of Mathematical Sciences (ACHMS)

Meeting 2/2022

MINUTES

The biannual meeting of the Australian Council of Heads of Mathematical Sciences (ACHMS) was held at 2:00pm AEST on Wednesday, 19 October 2022 by video conference. The meeting was adjourned from 3:05pm to 3:15pm for a break.

PRESENT

ACHMS Executive Committee

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

University Representatives

Professor Pablo Moscato, Dr Alan McCarthy, Professor Linda Galligan, Prof. Kuldeep Kumar, Prof. Tony Roberts, Dr David Ompong, Prof. Serena Dipierro, A/Prof. Tim Gould, A/Prof. Narelle Brack, Dr. Bishnu Lamichhane, Prof. Dingxuan Zhou, Prof. Asha Rao, A/Prof. Julien Ugon, A/Prof. Federico Frascoli, A/Prof. Maureen Edwards, Prof. Graeme Hocking, A/Prof. Volker Gebhardt, Prof. Joe Grotowski, Prof. Andrew Bassom, A/Prof. Richard Garner, Prof. Gerd Schmalz, Prof. Howard Bondell.

Friends of the Council

Prof. Catherine Attard, Prof. Ole Warnaar, Dr Judy-Anne Osborn, Dr Michael Evans, Ms Angela Coughlin, Ms Elena Panfilova (Minute-Taker), Dr Maaike Wienk, Dr Deborah Jackson, Prof. Marcel Jackson, Prof. John Rice, Prof. James McCoy, Dr Phillip Isaac, Prof. Jan De Gier, Prof. Stephan Tillmann, Dr Thomas Britz, Prof. Inge Koch, Ms Jan Thomas, Ms Misha Schubert, Prof. Anthony Dooley.

Guest Speaker

Prof. Martin Nakata, Prof. Tony Dooley.

Others Attending

Ms Kerri Hill (Curriculum Development Officer, JCU)

BUSINESS

1. Welcome

The Chair opened the meeting by warmly 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 also extended a special welcome to Dr Bishnu Lamichhane from Newcastle University and Prof. Dingxuan Zhou from the University of Sydney, who were participating in their first Council meeting.

1.1 Apologies and Proxies

Apologies were received from Prof. Steven Langford, Prof. Warwick Tucker, A/Prof. Amie Albrecht, Prof. Howard Bondell, Dr Nargiz Sultanova, Dr Simon Barry, Prof. George Athanasopoulos, Prof. Craig Simmons, Dr Maree Lake, Mr Allan Dougan.

Prof. James Brown, Prof. Kais Hamza, A/Prof. Bronwyn Hajek, Prof. Paul Norbury attended as proxies.

1.2 Agenda Changes

The Chair informed the Members of a new item of business to be discussed at the end of the meeting regarding a future conference on "Indigenising University Mathematics" to be held in Newcastle.

1.3 Minutes of the Past Meeting

Minutes of the previous meeting held on Tuesday, 8 February 2021 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:

1/2022 (3.1): Completed - The format of the annual meeting was modified from a single extended meeting in February to two shorter meetings held in May (AGM) and October, in order to avoid overlap with the AMSI governance meetings. While the idea of capital city nodes for face-to-face and online meeting formats was considered, the Chair decided against it due to the challenges of hybrid meetings. Instead, the HoS in each city were encouraged to organise local gatherings after Council meetings.

1/2022 (4): Completed - The Chair informed Members that the Data Science Review is currently underway and suggested the possibility of discussing its progress in a future AMSI meeting or Council meeting next year.

1/2022 (3): Completed - In March, an ACHMS Slack channel was created for

communication. Although there was some activity on the channel in April, it has been inactive since then. The Chair clarified that it was an experimental initiative and is still available for use in the future if the Council decides to do so.

1/2021 (8): Ongoing - The Chair raised the action item to support WIMSIG and proposed keeping it as a reminder for all Heads of School, as well as a discussion topic for a meeting next year.

2. Appointments to the ACHMS Executive Committee

The Chair informed that a call for nominations for the Executive Committee of the Council had been sent to all HoS on March 10th. Two nominations were received, one from Prof. Serena Dipierro of the University of Western Australia and one from Prof. Linda Galligan of the University of Southern Queensland. As only two nominations were received, an election was deemed unnecessary, and the Council was asked to approve the appointments. With no objections received, the Chair moved to approve the appointments of Prof. Dipierro and Prof. Galligan to the Executive Committee for a one-year term until the AGM in 2023.

3. Report from the Chair

The Chair reported on several topics, including the impact of the Federal election on universities, with a renewed focus on basic research. He also discussed the ongoing issue of out-of-field teaching in primary and secondary schools, and informed the Members that a steering group, led by Prof. Geoff Prince, has been commissioned to address this issue. The Chair mentioned a study by Dr. Nicole Mockler that analysed the representation of school teachers in Australian print media from 1996 to 2020. The study revealed a disproportionate negative portrayal of teachers in the media, which could discourage young people from pursuing teaching careers. The Chair also discussed the improving Covid-19 situation but noted that campus communities had not returned to normal, with many undergraduates remaining disengaged. Additionally, academic integrity was highlighted as a major challenge, with recent reports of cheating in universities, and the Chair suggested discussing this at a future meeting of the Council.

4. Post-election outlook

The AMSI Director gave a presentation on the post-election outlook, including the Labor Government's initiatives and priorities related to universities. The Director provided a SWOT analysis of the mathematical sciences, highlighting strengths such as high-quality research and strong international collaborations, as well as weaknesses such as low rates of university-industry collaboration and funding for maths research. Opportunities were identified in the increasing demand for data science and the importance of multidisciplinary collaboration. The Director also expressed concern about declining maths participation rates in Year 12 and the need to increase interest in maths among school children, particularly for supplying maths teachers to regional areas.

The Labor Government's priorities were outlined, including a focus on TAFE with free education for all students and funding to create 500,000 TAFE places in Australia. Additionally, 20,000 extra commonwealth-supported places for undergraduate students were promised, which was deemed a good move, but not sufficient to significantly impact basic undergraduate education at universities. The government is also planning to loan money to a select group of university students to create new businesses and review National Science and Research priorities, with a focus on climate change and First Nations knowledge. Post-study work rights for international students are also set to increase, with a simple visa application process, in an effort to increase diversity in the STEM workforce.

However, funding for new initiatives is expected to be limited, with no major funding initiatives for the university sector in the near future. The Director expressed concern about the potential impact of new industry-focused fellowships on the mathematical sciences and highlighted the gap between fundamental and industry research in the mathematical sciences. The Director also drew attention to the declining enrollments in the highest and middle levels of mathematics in Australian schools and emphasised the importance of well-trained maths teachers to keep kids interested in maths. Overall, the Director suggested working with other disciplines to increase engagement with the Government's action plan.

5. Learning and Teaching: informal discussion using Zoom poll and chat functions

The Chair invited Members to discuss two learning and teaching issues. To facilitate the discussion, the Chair suggested using Zoom features such as poll and chat since there were many participants in the meeting. The first issue discussed was the qualifications required of tutors in first-year courses. The Chair presented a clause from the higher education standards framework that stated that teaching staff with academic oversight responsibilities must have qualifications in the relevant discipline, at least one level higher than the course of study. The second clause allowed exceptions for teachers who teach specialised components of a course of study, such as teachers undergoing training. This gave universities flexibility to interpret the requirement and make exceptions as long as they justify it to TEQSA. Members were then asked to complete a poll on the interpretation of the second clause at their university. The poll options were:

1. must have an honours or a master degree;
2. need only have a bachelor degree; or
3. need not have a bachelor degree but must have completed at least two years of a relevant bachelor program.

The results of the poll were to be discussed after the break.

The second issue discussed was examinations and assessments. The Deputy Chair noted that the COVID-19 pandemic had led to many changes in how assessments were

conducted, some good and some bad. The members were encouraged to discuss the issue in the Zoom chat and answer the following two questions:

Q1: What are the current assessment practices?

Q2: What do you want the assessment practices to be in the future?

After the discussion, the meeting was paused for a 10-minute break.

6. Discussion of results

The Chair provided a summary of the poll results, highlighting that there was a broad range of interpretations of the exception clause from the higher education standards framework across universities. It was noted that almost half of the universities interpret the clause strictly, meaning that tutors must have an honours or a master degree. About 23% of universities interpret the clause cautiously, indicating that tutors only need to have a bachelor degree. However, 30% of universities allow undergraduate students to tutor in undergraduate courses.

The Deputy Chair summarised the chat conversation on examinations and assessments, acknowledging that academic integrity is a significant concern and exams are not the only solution but useful in protecting it. In response to the first question, members reported various assessment practices, such as online exams without proctoring, in-person exams, reports, projects, reflections/journalling, and continuous assessments through online quizzes, which constituted no more than 15% of the total mark. Regarding the second question, some members suggested a mix of assessment methods, including online assessments for formative assessments, invigilated exams to maintain academic integrity, and project-based or take-home assignments. Some members called for a reduction or elimination of exams, while others believed that exams were crucial to test core competencies early in degrees.

7. Building capabilities of Indigenous students in mathematics

The Chair introduced Prof. Martin Nakata, Deputy Vice Chancellor for Indigenous Education and Strategy at James Cook University, who delivered a presentation on improving the mathematics capabilities of Indigenous students. He discussed the outcomes of the Indigenous STEM Project, which his team had worked on for five years, primarily funded by an ARC grant of the Centre of Excellence for Australian Biodiversity and Heritage. Prof. Nakata highlighted the decline in maths and science performance among Australian students, particularly Indigenous students in remote and rural areas. He presented data on Indigenous students' completion rates and discipline choices in Bachelor courses, emphasising the low completion rate for Indigenous students after four years of study.

Prof. Nakata criticised the practice of enrolling students on an equity basis without proper diagnostics of their capabilities. Moreover, he expressed concerns about the current approach to STEM education, which he viewed as lacking longitudinal measures of impact. To address these issues, Prof. Nakata and his team analysed the

Australian curriculum, particularly mathematics and science, and the curriculum's achievement standards and content descriptors. They studied how schools were interpreting and implementing the curriculum, worked with curriculum teams to align assessment tasks with national achievement standards, wrote over 200 assessment tasks and over 4,000 entries into the marking guides. They also built a digital platform called OneSchool to manage assessment tasks and provide teachers with student analytics and early intervention opportunities.

The presentation discussed a new dashboard that Prof. Nakata's team has designed to assist educators in pinpointing areas where students struggle with maths. The dashboard provides a comprehensive overview of students' performance, highlighting areas where they excel as well as those where they fall short of the expected standard. Additionally, Prof. Nakata discussed their latest initiative aimed at cultivating engaged learners. Through studying undergraduate students, they uncovered the importance of instilling self-efficacy, a trait that positively correlates with academic success. Interestingly, they found that schools do not naturally foster effective learning environments, and instead, students must learn the right intellectual behaviours and disposition. Prof. Nakata stressed the significance of promoting a growth mindset among students and providing engaging learning opportunities. To ensure students' success, he's team has incorporated socio-emotional and psycho-social measures into their system to foster growth and engagement. Their research, which analysed sixty thousand data points, has allowed them to identify the characteristics of successful students versus those who struggle.

At the end of his presentation, Prof. Nakata mentioned that their research on building learners' self-efficacy has culminated in a book that will be published next month. The Chair thanked Prof. Nakata for his presentation and asked if he could share his slides or any relevant materials with the Council. Prof. Nakata suggested that his e-book is already available online.

During the discussion, Prof. Galligan asked about the differences in improving mathematics learning for Indigenous students, to which Prof. Nakata replied that the project was based on theories of learning and aimed to build engaged learners by improving the language used in the questions, regardless of cultural factors. The importance of the self-efficacy and growth mindset approach used in the project, which could benefit higher education students as well, was also highlighted.

Prof. Roberts expressed gratitude to the presenter for the fascinating study and highlighted the broad implications of the work in identifying where students drop out of the system. Prof. Nakata responded by discussing new work with a college in engineering and science to identify underprepared students, as well as reviewing the Pathways Enabling Courses for nursing and business students. Prof. Nakata emphasised the importance of attendance to data in making informed decisions about students and mentioned the minimal workload requirement for teachers.

The Deputy Chair inquired about the potential for using the platform to upskill teachers, to which Prof. Nakata highlighted the challenge of getting maths teachers in Australia. Nonetheless, their team has developed a dashboard to support out-of-field teachers in teaching maths and help students improve quickly. The team is currently seeking funding to include more schools in the process. The discussion concluded with the Chair thanking Prof. Nakata for the inspiring presentation and expressing appreciation for his attendance.

8. Wrap up and summary of actions

The Chair provided a summary of the Council's role, which entails organising meetings that focus on crucial topics, facilitate information sharing and discussions that address the concerns of the Heads of Schools. The Chair then invited Members to suggest topics for the next meetings and proposed a list of potential themes, such as academic integrity, gender equity and diversity, and data science. Additionally, the chat participants offered valuable ideas for discussion topics, including industry engagement and employability, tackling the issue of universities that do not offer mathematical sciences degrees, and defining the core competencies expected of mathematical sciences graduates and identifying methods to evaluate them.

9. Other Business

During the meeting, Prof. Osborn announced that preparations were underway for the "Indigenising University Mathematics 2" conference in Newcastle, which is scheduled for November. She inquired if the Heads of Schools were interested in attending the conference in person, to which they agreed to receive a follow-up email regarding the possibility of attendance. In addition, Professor Roberts raised a question about reactivating the ACHMS Slack channel and suggested its use for rapid teaching needs and advertising positions. The Chair responded that the channel is informal and suitable for sharing advertisements for positions or making requests. The Chair also promised to send a reminder email to everyone about the Slack channel and requested the AMSI Executive Assistant to update the Slack member list and send invitations to Heads of Schools who joined after the February meeting.

The meeting concluded at 4:27pm.

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 Amie Albrecht, 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 Serena Dipierro, The University of Western Australia
Professor Silvestru Sever Dragomir, Victoria University
Associate Professor Maureen Edwards, University of Wollongong
Associate Professor Vladimir Ejov, Flinders University
Professor Lilia Ferrario, Australian National University, MSI
Associate Professor Federico Frascoli, Swinburne University of Technology
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
Dr Maree Lake, 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 Bishnu Lamichhane, University of Newcastle
Dr Alan McCarthy, University of Notre Dame
Professor Pablo Moscato, University of Newcastle
Dr David Ompong, Charles Darwin University
Professor Asha Rao, RMIT University
Dr Steven Richardson, Edith Cowan University
Professor Tony Roberts, Queensland University of Technology
Professor Gerd Schmalz, 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 Catherine Attard, Mathematics Education Research Group of Australasia (**MERGA**)
Professor Adrian Barnett, STA Mathematics Cluster Representative
Dr Simon Dunstall, Data61, Australian Society for Operations Research (**ASOR**)
Mr Allan Dougan, Australian Association of Mathematics Teachers (**AAMT**)

Mr Nathan Ford, Australian Mathematics Trust (**AMT**)
Professor Catherine Greenhill, Women in Mathematics Special Interest Group (**WIMSIG**)
Professor Tony Guttmann, Centre of Excellence for Mathematics & Statistics of Complex Systems (**MASCOS**)
Professor Ngamta (Natalie) Thamwattana, Australia and NZ Industrial and Applied Mathematics (**ANZIAM**)
Dr Deborah Jackson, Australian Mathematical Society (**AustMS**)
Professor Ole Warnaar, 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**)
Dr Simon Barry, Commonwealth Scientific and Industrial Research Organisation (**CSIRO**)
Dr Anders Holmberg, Australian Bureau of Statistics (**ABS**)
Professor Craig Simmons, Australian Research Council (**ARC**)
Professor James McCoy, University of Newcastle, JVP Member Rep
Professor Inge Koch, University of Western Australia, JVP Member Rep
Professor Ben Andrews, Australian National University, JVP Member Rep
Professor Marcel Jackson, La Trobe University, JVP Member Rep
Professor Tim Marchant, Australian Mathematical Sciences Institute (AMSI)
Dr Michael Evans, AMSI Honorary
Ms Jan Thomas, AMSI Honorary
Ms Lisa Farrar AMSI COO / National Program Manager, APR.Intern
Ms Anna Muscara, Project Coordinator, Research and Higher Education
Ms Elena Panfilova, Executive Assistant to the AMSI Director
Dr Maaike Wienk, Finance, Advocacy and Policy Manager

Guests

Professor Martin Nakata, Deputy Vice-Chancellor Indigenous Education & Strategy at James Cook University
Professor Tony Dooley, University of Technology Sydney

Written by E. Panfilova 14/03/2023, edited by F. Larusson 15/03/2023.