

Women in Mathematics Special Interest Group (WIMSIG)

2018 Annual Report to the Australian Mathematical Society

November 2, 2018

Contents

1	Executive Committee	2
2	Events	2
2.1	Women in Maths Gatherings	2
2.2	Embedded events	2
2.3	Endorsed events	3
3	Advocacy	3
3.1	Presentations	3
3.2	Women in STEM Decadal Plan	4
3.3	Connections with other organisations	4
3.4	Newsletter	4
3.5	Website	5
4	Projects	5
4.1	Travel Awards	5
4.2	New Award for International Students	7
4.3	Change of Rules of Procedure	7
4.4	WIMSIG Conference 2020	7
4.5	Mentoring Scheme	7
5	Membership	8
6	Elections	8
7	Funds	8
A	Travel Award Reports, Rounds 7–8	10

This report includes activities from November 2017 to October 2018.

1 Executive Committee

- Yvonne Stokes, Chair
- Giang Nguyen, Treasurer
- Catherine Penington, Secretary
- Ngamta (Natalie) Thamwattana, Committee Member
- Deborah Cromer, Committee Member
- Jessica Purcell, Incoming Chair

2 Events

2.1 Women in Maths Gatherings

Women in Maths Gatherings around the country in 2018 are as follows.

- University of South Australia, 24 May 2018, organised by Elizabeth Bradford.
- University of Newcastle, 15 November 2018, organised by Natalie Thamwattana as part of the Workshop on Mathematical Thinking.

These Gatherings are open to people of any gender. They provide a venue for discussion of gender equity and are a great way to build informal networks.

The Gatherings are well supported by the host organisations. In each case the host organisation provides a venue and catering.

2.2 Embedded events

Pleasingly, it has become an established component of the national AustMS and ANZIAM conferences to hold a Women in Mathematics dinner or lunch, respectively. Members of the WIMSIG Executive Committee take lead roles in the organisation and running of these events. The following events have been held in the last year.

- December 2017: Women in Mathematics Dinner at 61st AustMS Annual Meeting, Macquarie University (Funded by Nalini Joshi's ARC Georgina Sweet Laureate Fellowship).

- February 2018: Women in Mathematics Lunch at ANZIAM Annual Conference, Hobart (Funded by Nalini Joshi's ARC Georgina Sweet Laureate Fellowship).

Planning is under way for the following Women in Maths events, to be held in the next few months.

- December 2018: Women in Mathematics Dinner at 62nd AustMS Annual Meeting, The University of Adelaide (funded by Kate Smith-Miles' ARC Georgina Sweet Laureate Fellowship and ACEMS).
- February 2018: Women in Mathematics Lunch at ANZIAM Annual Conference, Nelson, New Zealand (funded by Kate Smith-Miles' ARC Georgina Sweet Laureate Fellowship).

We once again express our gratitude to Professor Nalini Joshi for the support she has given from her ARC Georgina Sweet Laureate Fellowship for these events over the past 5 years and to Professor Kate Smith-Miles for her agreement to fund these events through to the beginning of 2021.

2.3 Endorsed events

Please see the web site (<http://www.austms.org.au/WIMSIG+Events>) for events organised by others that were endorsed and advertised by WIMSIG. The web site also contains WIMSIG's advice sheet for organisers of such events.

3 Advocacy

3.1 Presentations

This year the Chair of WIMSIG, Yvonne Stokes, was asked to send a written report on WIMSIG activities for inclusion in the papers for the Annual Council of Heads of Schools of Mathematical Sciences (ACHMS) meeting. She was also invited to give a verbal presentation on the 2017 WIMSIG Conference celebrating women in the Australian Mathematical Sciences. The written report summarised the highlights of 2017, including the WIMSIG Conference and the survey on the mentoring scheme and, in addition, outlined the future plans of WIMSIG, namely

- A detailed analysis of results from the survey on the proposed mentoring scheme;
- Setting up a mentoring scheme;
- Finding a venue and keen local organisers for the next WIMSIG Conference in 2019 or 2020;

- Continuing the travel awards, newsletter, Women in Mathematical Sciences dinners and lunches at conference.

The verbal presentation was used to give a summary of results from the 103 responses to the WIMSIG conference survey. This demonstrated that the conference was highly successful and that there is strong support to continue it every 2–3 years which, it was noted, would mean all PhD students would have the opportunity to attend at least one. Hence Yvonne concluded her presentation with WIMSIG's intention to organise another WIMSIG conference in 2019 or 2020, suggested it should be held outside of SA (the venue of the first conference), and asking for support and expressions of interest in hosting the conference.

3.2 Women in STEM Decadal Plan

WIMSIG was invited to make a submission to the Decadal Plan for Women in STEM proposed by the Australian Academy of Science. Given the short time given for a response WIMSIG contributed to the submission of AustMS, providing comments to the AustMS Chair, Professor Kate Smith-Miles.

3.3 Connections with other organisations

- WIMSIG Chair Yvonne Stokes was invited to give a presentation to the students attending the AMSI Choose Maths event at the AMSI Summer School in January 2018.
- Yvonne also assisted with the AMSI Choose Maths day in SA for year 9 girls, for which she ran an activity.

3.4 Newsletter

The WIMSIG Newsletter is published every month on the WIMSIG website (<http://www.austms.org.au/WIMSIG+News>)

News, events and job opportunities and media links of interest to the WIMSIG community are all included. We love to spread the word about our members doing interesting research, teaching or outreach work. We inform our members about the issues surrounding career progression of professional mathematicians. We highlight events and opportunities in the hope of boosting the participation rates of women in events and hiring short lists. The monthly newsletter is an important project of WIMSIG, and supports all of WIMSIG's other projects.

A text version of the newsletter is also sent out the the WIMSIG mailing list. Managing a mailing list is a difficult task. The mailing list needs to be frequently reconfigured to stay ahead of spam blocking software. This is particularly an issue with the WIMSIG mail server as it is a low volume

mailing list, and hence most spam blockers will not white list. We are looking into new systems and greater institutional tech support. If you are not receiving the mailing list, please be patient, we will try to add you all back again when a new server has been set up.

The submission deadline is the 27th of each month, with publication of the newsletter occurring on the first day of each month, or soon after. Please send through your news, job adds, events and media articles to the WIMSIG Newsletter Editor Joanne Hall at WIMSIG-news@women.austms.org.au.

3.5 Website

The WIMSIG website (www.austms.org.au/Women+in+Mathematics+group) continues to be maintained by WIMSIG Webmaster Amy Glen. The website contains newsletters, event advertisements, job advertisements, a funding directory, resources on gender equity in STEM, Q&A with female mathematicians, information about the Hanna Neumann Lecturers and links to the Cheryl E. Praeger and Anne Penfold Street Awards.

4 Projects

4.1 Travel Awards

In 2018, WIMSIG EC held significant discussion and consequently implemented modifications on the rules for the AustMS WIMSIG Cheryl E Praeger Travel Award and Anne Penfold Street Award. Specifically, the rules for both awards were modified to allow applicants to request funding for events in either the two rounds prior to the event or in the round immediately following the event. In addition, the rules for the Anne Penfold Street Award were extended to allow for applications by conference organisers as well as individuals. While this has been possible for some time, the rules on the website did not properly reflect access to funding by conference organisers. The rules for both of these awards have now been updated on the website.

Since the 2017 Annual Report, there have been two rounds of AustMS-WIMSIG Awards, with closing dates of 1 April 2018 for Round 8 and 1 October 2018 for Round 9. We include in Appendix A the reports received so far for these two rounds as well as for Round 7 (closing 1 October 2017), which was still being finalised at the time of the previous Annual Report.

In the three rounds (R7–R9), we received 16 applications for the Cheryl E. Praeger Travel Awards and 2 applications for the Anne Penfold Street Awards. We have not yet received applications for Street Awards from event organisers for funding to support childcare at their events.

The Selection Committees consisted of:

- Jessica Purcell (Chair), Jessica Kasza, Cecilia Gonzalez Tokman – R7.

- Jessica Kasza, Cecilia Gonzalez Tokman, Valentina Wheeler – R8.
- Cecilia Gonzalez Tokman, Valentina Wheeler, Jennifer Flegg – R9.

For Rounds 7–9, there were 13 Praeger Travel and 2 Street Travel awardees:

AustMS WIMSIG Cheryl E. Praeger Travel Award:

- R7 Bregje Pauwels (ANU), AustMS 2017, Sydney, 12–15 December 2017;
- R7 Valentina Wheeler (Wollongong), 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Taiwan, July 2018;
- R7 Marcy Robertson (Melbourne), Infinity-Categories, Infinity-Operads, and their Applications, Mexico, 6–11 May, 2018;
- R7 Sara Herke (UQ), ACCMCC, 4–9 December 2017;
- R7 Jie Yen Fan (Monash), AustMS 2017, Sydney, 12–15 December 2017.
- R8 Zahra Afsar (USyd), Women in Operator Algebras (Canada), 18 November 2018;
- R8 Amy Glenn (MurdochU), 41st ACCMCC (NZ), 18 December 2018;
- R8 Maria Kleshnina (UQ), GTM 2018 (Russia) and ISDG2018 (France), June–July 2018;
- R8 Mythreye Krishnan (UWA), ANZIAM 2018 (TAS), February 2018;
- R8 Tianshu Liu (UMelb), XIX ICMP (Canada), July 2018;
- R8 Melanie Roberts (IBM Research), ANZIAM 2018 (Tas), February 2018;
- R8 Narjess Afzaly (ANU), Stellenbosch Uni (South Africa), Aug–Sept 2018;
- R9 Becky Armstrong (USyd), Women in Operator Algebras (Canada), 18 November 2018.

AustMS WIMSIG Anne Penfold Street Award:

- R8 Mythreye Krishnan (UWA), ANZIAM 2018 (Tas), February 2018;
- R9 Sevvandi Kandanaarachchi (Monash), ACEMS 2018, (Vic), Oct–Nov 2018.

4.2 New Award for International Students

This year the WMSIG Executive Committee devoted time to the drafting of rules for a new award for international female students, to be known as the Maryam Mirzakhani Award. It is designed to support international female students pursuing a postgraduate degree in mathematics in Australia and will take the form of a top-up scholarship. The rules are currently awaiting formal approval by the Council of the Australian Mathematical Society but we hope to call for applications early next year, in time for a first award in April-May of 2019.

4.3 Change of Rules of Procedure

At the WMSIG General Meeting, 11 December 2017, the matter of a student member on the WMSIG Executive Committee was discussed. Although the Rules of Procedure did not exclude students nominating for positions on the Executive Committee, no student had ever nominated and it was felt that creating a specific position for a student would clearly demonstrate that WMSIG welcomed student input to and involvement in its activities. There was general support among attendees at the General Meeting for inclusion of a student and it was felt that a student perspective on the committee would be beneficial. This, however, required a change to the Rules of Procedure which had to be approved by a majority of votes cast by WMSIG members. Hence, in 2018, the WMSIG Executive Committee discussed and decided the details of this new position, and organised a vote on the proposed changes to the rules. WMSIG is very thankful to Birgit Loch for acting as returning officer. The outcome of this vote was unanimous support for a student member with a one year term, so that an election for the student member will be held every year.

4.4 WMSIG Conference 2020

Following the success of the first WMSIG conference in September 2017, we are in the initial stages of organising a second WMSIG conference, which likely will be held in early October 2020. Associate Professor Jessica Purcell will be the Conference Director and Monash University has agreed to be the host institution. We are currently looking for people who would be keen to help to organise the conference.

4.5 Mentoring Scheme

The WMSIG Executive Committee had some discussion early in the year on how to proceed with setting up a mentoring scheme for WMSIG members, following the strong support for this indicated by the survey conducted in

2017. However, other matters have been given priority so that progress on this has been slow. We hope to give this more attention in 2019.

5 Membership

The WIMSIG membership list and mailing list are maintained by WIMSIG Secretary Catherine Penington. As at 24 October 2018, WIMSIG membership had grown to 330, of whom 291 are members of AustMS. Membership is approximately 85% female and 15% male, as far as we know since gender data is not collected with membership at present.

6 Elections

At the end of 2017 Associate Professor Jessica Purcell, Monash University, was elected as the Incoming Chair for 2018, replacing Lesley Ward whose term on the Executive Committee came to an end.

In September 2018 an election was held to change the Rules of Procedure to include a Student Representative on the Executive Committee. The change was unanimously approved by all members who voted, so that an election for the first Student Representative will occur alongside the election of other members of the Executive Committee at the end of this year. The Student Representative is a one year position, which we hope will bring more student input into WIMSIG affairs and, consequently, addressing of issues that are important to the next generation of mathematicians. We also hope this increases student membership of WIMSIG.

The 2018 WIMSIG Election round is now underway, to elect the new Secretary, Treasurer, and two Ordinary Members for the two years 2019–2020 and also the new Student Member for 2019. On 1 February 2019 Jessica Purcell will move from the role of Incoming Chair to Chair, and Yvonne Stokes will move from Chair to the role of Immediate Past Chair.

7 Funds

In 2017, WIMSIG submitted a funding proposal for 2017–2019, and was approved funding for

- \$3,200 for operational purposes, including travel money to attend events for advocacy (the session 2017–2018)
- \$20,000 for the Cheryl E. Praeger Travel Awards (FY 2018–2019)
- \$3,000 for the Anne Penfold Street Awards (FY 2018–2019).

Women in Mathematics Special Interest Group

A summary of expenditures, and WIMSIG's future funding request, have been prepared as a separate document by the WIMSIG Treasurer Giang Nguyen.

Catherine Penington
Secretary
Women in Mathematics Special Interest Group
Australian Mathematical Society
2 November 2018

A Travel Award Reports, Rounds 7–8

On the following pages we present the reports by recipients of the AustMS-WIMSIG Cheryl E. Praeger Travel Award and the AustMS-WIMSIG Anne Penfold Street Award in R7 and R8. Some reports from R8 award recipients have yet to be received.

R7 Bregje Pauwels (P)

I attended the

- Future Directions in Representation Theory conference at the University of Sydney (4-8 Dec 2017)
- Annual Meeting of the Australian Mathematical Society at Macquarie University (12-15 Dec 2017).

The conference ‘Future Directions in Representation Theory’ was very interesting. I did not give a talk. Many of the talks were very informative and I met a lot of people that are important in my field. One of the talks overlapped with my own research, and may lead to a joint project.

The ‘61st Annual Meeting of the Australian Mathematical Society’ was instructive in many ways. I organized the Algebra session, together with James Parkinson. This was my first time organising a conference/session and I believe this type of experience is important. I gave a talk in the ‘Representation Theory’-session. When I wasn’t hosting the algebra session, I attended talks in the ‘Representation Theory’-session and the ‘Category Theory, Algebraic Topology, K- Theory’-session.

R7 Jie Yen Fan (P)

The 61st annual meeting of the Australian Mathematical Society was held at Macquarie University on 12-15 December 2017. It was attended by more than 300 mathematicians from around the world. More than 250 talks were presented, including 13 plenary and featured lectures, with 21 special sessions. I gave a talk titled “Measure-valued population processes and their asymptotics” in the special session Probability Theory and Stochastic Processes on 14 December. I attended also the Women in Mathematics Dinner that was held on 11 December. It was inspiring and encouraging to see a good number of female mathematicians and to listen to some of them sharing their experiences. There were also other events taken place along with the conference, including the inaugural AustMS debate. These events gave us the opportunity to discuss issues that we are facing. Attending this conference has given me the opportunity to network and to discuss my work with other experts in the field. I have also learned new techniques from the

talks presented by others. I am very grateful to be awarded a Cheryl E. Praeger Travel Award supporting my travel to this conference.

R7 Sara Herke (P)

I attended the 5th International Combinatorics Conference (5ICC) from 4-9 December 2017 at Monash University with the support of a Cheryl E. Praeger Travel award. I presented a talk on the morning of Friday 8 December as part of the Anne Penfold Street Memorial Session. In terms of PhD supervision, Anne Street was my academic grandmother, and I was very pleased to be invited to present within this session. My talk was titled The worst case for k -independence; I presented some new analysis of the MAX algorithm for k -independent sets in multigraphs, which has applications to improving the known bounds on the size of coverings (which are a generalisation of designs). The annual general meeting for the CMSA (Combinatorial Mathematics Society of Australasia) was held on the afternoon of 4 December. I had been nominated for the position of Treasurer of the CMSA for 2018 and was voted into the CMSA council at this meeting. At the 5ICC I also had the opportunity to connect with some of my current collaborators and potential future collaborators. I am very pleased to have had my travel supported by a Cheryl E. Praeger Travel Award and appreciate the role this travel grant plays in supporting the visibility and promotion of female mathematicians.

R7 Valentina Wheeler (P)

The travel award allowed me to attend two very prestigious conferences over the course of nine days and give three talks. Without the support of WIMSIG the cost of these events would have prohibited me from attending.

The first was “Geometric and Nonlinear Partial Differential Equations in Suzhou” held at the Soochow University and the University of Sydney Centre in China, Suzhou, China during 2-6 of July, 2018 (<http://www.maths.usyd.edu.au/u/haotianw/sz18pde.html>). Here I gave the talk “A model flow for Ideal Submanifolds” in which I announced a new result just freshly obtained last month and to be submitted online next week. The audience was very interested and I have received many positive comments on various related problems that can be approached with our newly developed method. I hope these will be crystallised later on in collaborations. I am also very happy to have been representing the contributions of female mathematicians, especially at such specialised and prestigious events where there is an obvious gender gap.

The second was the 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, in Taipei, Taiwan, 5-9 of July, 2018 (<http://aims.org/conferences/2018/>). This is the first time I

attend such a massive event and I was truly grateful for the support of WIMSIG. It was a fantastic experience with over 150 parallel sessions and many interesting talks. I have reconnected with collaborators and colleagues from all over the world: Korea, Germany, United States, New Zealand, France and Italy and many more.

I gave two talks (maximum allowed) in two sessions: “On Chen submanifolds and the Chen conjecture” in Recent advances in the calculus of variations and elliptic PDE session (SS128) and “Mean curvature flow with free boundary supported a double cone” in Geometric Analysis special session (SS88). Both the talks had a very positive reception. I am hopeful that the follow up discussions will generate new projects and visits/collaborations.

I am grateful to WIMSIG for the support that has enabled my participations in these events.

R7 Marcy Robertson (P)

Activity: Travel to the BIRS conference Infinity-Categories, Infinity-Operads, and their Applications (18w5147).

I gave an invited talk: Title: Presheaf modules for infinity modular operads

Abstract: Modular operads were originally constructed by Getzler and Kapronov to model operations similar to the gluing of boundaries of a genus g Riemann surface with n boundaries. Variations on this original definition have found importance in various geometric problems. In this talk we give two models for up to homotopy, or ∞ , versions of modular operads. This is joint work with Philip Hackney and Donald Yau.

This conference provided a good opportunity to interact with the leaders of my subject area, and lead to two potential collaborations, and three invited talks (US and Europe). Was invited to take an additional two days visiting Omar Antolín Camarena in Mexico City at UNAM.

R8 Maria Kleshninan (P)

I would like to acknowledge WIMSIG and The Cheryl E. Praeger Travel Awards, which allowed me to attend two leading conferences in game theory and travel with a research visit to INRIA, France. I have attended and presented at the Game Theory and Management Conference 2018 (St. Petersburg, Russia) and International Symposium on Dynamic Games and Applications 2018 (Grenoble, France). These conferences provided me great opportunities to present and discuss my research project with the leaders in the evolutionary game theory field. I presented a talk on incompetence in evolutionary games, which was followed by a very helpful discussion, and received a valuable feedback. The research visit gave me an opportunity to work in a great research environment at INRIA (Sophia Antipolis, France)

and collaborate with Dr. Konstantin Avrachenkov. We are working on the stochastic perturbations in the discrete replicator dynamics and planning to publish a paper based on this work. I am thankful to AustMS and WIMSIG for the support that has made this exciting and productive trip possible.

R8 Melanie Roberts (P)

I attended the ANZIAM 2018 conference in Hobart, Tasmania together with the AMSI-AustMS sponsored ANZIAM Early Career Workshop. As a co-organiser of the Early Career Workshop, I arrived at the conference venue on the Saturday morning to assist with the organisation and coordination of the event. As a member of the panel discussion, and through participation in the activities of the workshop, I provided my perspective on working as a mathematician in industry. In particular, providing advice on how to move into a career outside of academia while remaining connected with the academic community.

Following the workshop, which ran Saturday afternoon through to Sunday morning, I attended the ANZIAM Executive meeting, filling in for the Secretary in her absence. As Returning Officer for ANZIAM, I reported on the election and constitutional amendment ballot, as well as participating in general discussion of executive matters. I also performed these roles at the AGM and subsequent Executive meeting (having been re-appointed Returning Officer for 2018) on the Tuesday evening.

The conference provided many opportunities to network and strengthen connections with the applied and industrial mathematics community in Australia and New Zealand, providing me with numerous leads to follow up on after the conference. The seven plenary speakers were exceptional. I found Louise Ryan's plenary especially interesting, as this focussed in the area of machine learning/data science and how the statistical (and mathematical) communities differ from the computer science communities in this space. This is particularly relevant to me, as my research interests span the intersection of data and mathematical modelling, and I work in a commercial research environment with a strong focus on computer science and artificial intelligence.

I presented a research talk on Fine-grained multi-factor hail damage modelling, research I undertook in collaboration with my colleague Shrihari Vasudevan, as well as chairing a session on industrial mathematics. I received valuable feedback on my research and presentation, which generated interesting discussions.

The ANZIAM conference maintains a strong focus on supporting women in mathematics. Four of the seven plenary speakers were female (two of whom were award winners in 2017), and the speakers committee and Executive have a consistent focus on ensuring women are equitably included in the list of invited speakers. 2018 saw two of the three society medals awarded to

female mathematicians, with Prof. Yvonne Stokes being awarded the E.O. Tuck Medal and A/Prof. Claire Postlethwaite recognised as the JH Michell Medalist. In addition, the TM Cherry prize was jointly awarded to Eloise Trendenick. As with previous years, a Women in Mathematics lunch was held to highlight the achievements of the female plenary speakers.

I am grateful to WIMSIG and the Cheryl E. Praeger Travel Awards for supporting my participation in ANZIAM2018. This grant significantly assists me in defraying the costs of this conference.

R8 Mythreye Krishnan (P & S)

I recently travelled to Hobart, Tasmania to participate in the Australia-New Zealand Industrial and Applied Mathematics (ANZIAM), 2018 conference, which exposed me to the latest applied mathematical research and facilitated an opportunity to present my ongoing research work to a larger scientific community. The conference took place in Hobart between the 4th of February and the 9th of February 2018. I attended about 30 talks including guest lectures from various invited speakers for the conference. I was fascinated by the amount of applied mathematical work taking place in biological studies. In particular, I was very much interested in the talks given by Dr. Alys Clark on “Pregnancy and beyond: how mathematical modelling could improve early life health”, in which she discussed using mathematical models to study the oxygen intake for the new-born babies. I was also interested in the models to study the propagation of virus diffusion and in aiding the cancer cells destruction by Adrienne Jenner in the talk on “The effect of tumour heterogeneity on cancer treatments: the ninja virus”. All these talks enhanced my knowledge in the application of different mathematical modelling methods in studying various biological phenomenon. In addition, I also presented my ongoing work on “Network using Michaelis-Menton kinetics: an algorithm to find target genes from expression data”. This was my first time presenting my results on an international stage and it helped me appreciate and experience in discussing my results, which I deem as an important factor in further pursuing my career in research. I also attended the Women in Mathematics lunch and the conference dinner, which again helped me in networking with a scientific community. My attendance in the conference has enhanced my knowledge and experience and it will aid me in the completion of my ongoing paper, my thesis and my research thereafter.

R8 Tianshu Liu (P)

I would like to thank the WIMSIG Cheryl Praeger travel award for its support in my recent fruitful trip to Canada. There were a few events of my interests happening in July 2018, the workshop on ‘Algebraic methods’, the XIX International Congress in Mathematical Physics (ICMP) and its

associated Young researcher symposium, all being held in Montreal. In these conferences, I was given the opportunity to speak about my recent research on the affine Kac-Moody algebra $osp(1-2)$ and how to construct its minimal models using well-studied theories. The talks were followed by insightful questions and discussions from the audience, which certainly have engaged me to think from different aspects about my research. My knowledge in mathematics and physics were broadened by attending talks given by other speakers. They provided new ideas and directions for my future career. I also took this opportunity to meet my oversea collaborators, we worked efficiently on the paper we were working on together and managed to get it submitted during the meeting.