

AMSI

23

# WINTERSCHOOL

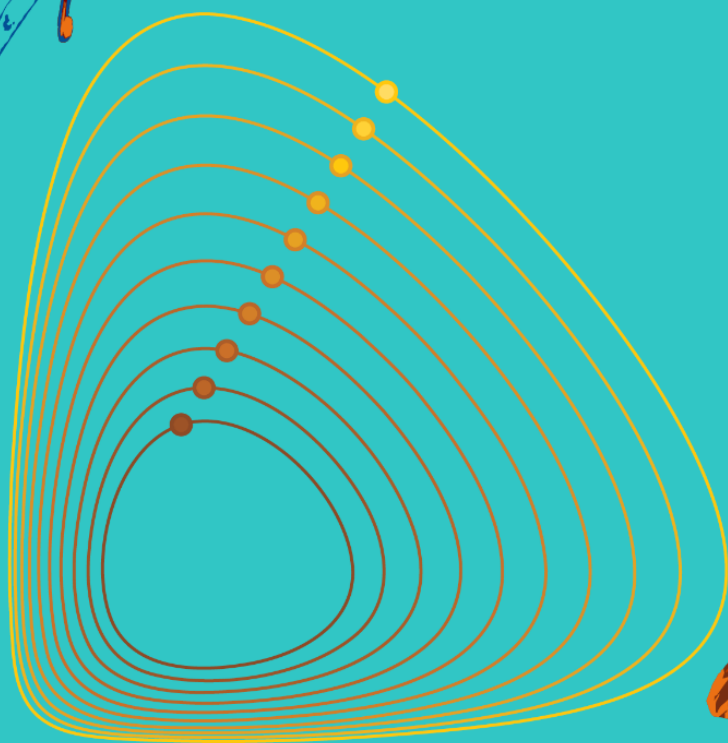
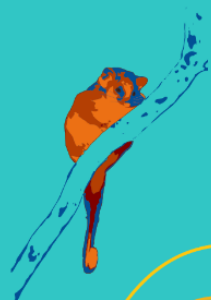
MODELLING OUR 

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 CHANGING BIOSPHERE

3-14 JULY 2023 | HYBRID EVENT  
QUEENSLAND UNIVERSITY OF TECHNOLOGY

## EVENT REPORT



$$\frac{dx}{dt} = \alpha x - \beta xy,$$

$$\frac{dy}{dt} = \delta xy - \gamma y,$$



Thank you to the following **AMSI Winter School 2023** sponsors



# AMSI Winter School 2023

## Modelling our Changing Biosphere

Queensland University of Technology  
3–14 July 2023

|                                |           |
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## FOREWORD

One of AMSI's premier annual flagship events, AMSI Winter School develops the next generation of mathematical scientists to thrive in tomorrow's information age.

Now in its seventeenth year, the school focuses on a specific theme, chosen from emerging national and international research trends and priorities, and provides a scaffolded introduction to current research, presenting open problems or cutting-edge techniques. The program draws upon the knowledge of national and international lecturers at the forefront of their fields, and attracts postgraduate students, early career researchers and industry professionals from around Australia.

To complement the academic program and maximise the experience, several program extras including social activities, specialist lectures, diversity events, participants talks, and career presentations are held over the two-week school allowing participants to expand their skills and knowledge while building collaborative national networks.

*AMSI Winter School 2023 was funded by the Australian Mathematical Sciences Institute, hosted by the Queensland University of Technology (QUT) School of Mathematical Sciences, and supported by Optiver, the QUT Centre for Data Science, and the Applied Mathematical Ecology Group (AMEG).*

## EVENT DIRECTOR'S REPORT



**Professor Michael Bode**  
**Queensland University of Technology**

A successful 2023 AMSI Winter School on Modelling our Changing Biosphere was held in the world-class facilities of the QUT Gardens Point Campus, from Monday July 3 to 14. There were 42 participants from across the nation, including PhD students, honours students, masters students, undergraduates, early-career researchers, and academics. 45% of them were women; the overwhelming majority were from Queensland.

The Winter School program was scheduled over two weeks, across four main lecture streams in Evolutionary Game Theory by Dr Nadiah Kristensen, Reinforcement Learning by Associate Professor Carl Boettiger, Sloppy Modelling, by Dr Matthew Adams, and Natural Resource Modelling, by Dr Nokuthaba Sibanda. The Winter School was also held in close collaboration with the AMSI SMC Down Under workshop, run by QUT collaborators Dr Joshua Bon, Mx Sarah Vollert, and Mx Adam Bretherton. The two AMSI events were closely connected by theme – Matthew Adams' lectures depended heavily on SMC techniques, for example, and Carl Boettiger's methods had parallel foundations. All the lecture content was very well received by the participants, who remarked on the high quality of the lecturers and their material.

Several of the events were run and supported by amazing volunteers from the School of Mathematical Sciences, from QUT more broadly, and from across Queensland. Christine Williams gave an amazing opening address. Hugh Possingham gave a public lecture which captured the zeitgeist of the whole Winter School. The contributions of Iadine Chadès from CSIRO, Nicholas Matigan from QCIF, Mark Baxendale from Origin Energy, Kate Helmstedt and Ryu Lippman from QUT, Glen Sheldon from APR.intern, Virginia Wheway from Optiver, Jorgen Rasmussen from UQ, Tim Marchant from AMSI, were really valuable – without them the program could not have run, and I am eternally grateful they returned my calls.

Directing and hosting the 2023 AMSI Winter School at QUT was a memorable experience. It taught me a lot, and I'm looking forward to offering a surfeit of free advice to the next potential QUT Director. I want to extend my deep and heartfelt appreciation to the dedicated QUT staff who played pivotal roles in ensuring the resounding success of this event. First and foremost, Katrina Treloar carried most of the difficult and thankless work, supported by Sarie Gould, who seems to have an endless capacity for problem solving. Katrina also contributed irreplaceably to the planning of the academic and personal development aspects of the program. I am grateful for the unwavering support and advice provided by Professor Tony Roberts, Head of the QUT School of Mathematical Sciences, in hosting this event. His commitment was instrumental in the event's success. The collaboration with AMSI staff members – Angela Coughlin, Anna Muscara, and Darla Trejo – was a true partnership, and their unwavering support at every stage of planning and execution was essential for the delivery.

Lastly, but certainly not least, my sincere appreciation goes out to the Winter School participants. Your active involvement made the Winter School a truly unforgettable success. Hosting you at QUT during the event was an absolute pleasure, and I look forward to the possibility of future meetings and collaborations.

## PARTICIPANT PROFILE



### **Amelia Grigson Flinders University**

With a passion for applied mathematics specifically relating to ecological systems, Amelia Grigson is interested in broadening her horizons to understand how best to incorporate mathematics into her studies and environmental research.

In her final year of a Bachelor of Science in Mathematics and Ecology at Flinders University, Amelia is currently completing research understanding trophic ecology in the Port Adelaide River System. Coming from a university with a smaller mathematics program, Amelia appreciated the opportunity to attend AMSI Winter School to collaborate with others with similar interests, particularly with a focus on environmental problems.

“For me personally, AMSI Winter School has opened a wide range of opportunities in terms of my career trajectory following the completion of my degree and options for postgraduate projects.”

As an AMSI travel grant recipient, Amelia highly recommends the program to all students who share her passion for mathematics. “If you have an interest in maths, then this is the place for you. Despite being described as a ‘school’ there is no focus on academic achievement, rather a focus on furthering your understanding and being provided with new ideas.”

Amelia’s lecturer, Dr Hayden Tronnolone, said that Amelia has shown a strong desire to expand her knowledge and develop as a learner and how AMSI Winter School provided an excellent opportunity for Amelia to continue this growth.

“The program features international experts speaking on the theme of ‘Modelling Our Changing Biosphere.’ This perfectly aligns with Amelia’s interests in mathematical modelling and biological systems and provides exposure to cutting-edge ideas. Beyond this, the Winter School provides networking opportunities, which will not only connect Amelia with colleagues and experts in the field but will greatly develop her communication and leadership abilities.”

In the future, Amelia aims to continue studying mathematics at a postgraduate level and pursue a career in either academia or industry focusing on ecological issues.

# PROGRAM

## THEME

The AMSI Winter School 2023 on Modelling our Changing Biosphere program centred around the planet's biosphere (the coupled system of physical and biological systems that support human life), and how mathematical modelling can help conserve and sustain it in the face of anthropogenic change.

## COURSES

| LECTURER   | TITLE  | ORGANISATION                           |
|--|--|--|
| <b>WEEK ONE</b>                                  |  |  |
| Dr Nokuthaba Sibanda                             | Natural Resources Modelling: Focus on Fisheries Modelling                          | Victoria University of Wellington NZ   |
| Dr Nadiah Kristensen                             | Evolutionary Game Theory: Mathematical Approaches to Understanding Cooperation     | National University of Singapore       |
| <b>WEEK TWO</b>                                  |  |  |
| Dr Carl Boettiger                                | From Theory to Practice: Reinforcement Learning for Realistic Ecosystem Management | The University of California, Berkeley |
| Dr Matthew Adams                                 | Analysing Sloppiness of Simulation Models: Examples in Ecology                     | Queensland University of Technology    |
| Dr Matthew Sutton<br>Imke Botha<br>Dr Joshua Bon | Sequential Monte Carlo (SMC) methods   | QUT Centre for Data Science            |



“The lectures were fantastic. It was incredible to hear from the speakers and on such a diverse set of interesting approaches.”

Cailan Jaynes-Smith  
Queensland University of Technology



## Natural Resources Modelling: Focus on Fisheries Modelling



**Dr Nokuthaba Sibanda**  
**Victoria University of Wellington NZ**

This course gave an introductory overview of mathematical models used to describe fish population dynamics and discussed how these models are applied in modelling fish stocks. It started with an exploration of some of the key fish population dynamics models and showed how these are translated into real-world problems. Then considered estimation methods used to fit the models and illustrate these models through application to example datasets.

“Nokuthaba’s course was interesting. I appreciated her passion for her research and the new contexts it presented beyond standard fisheries science.”

Nick Outram  
**Queensland University of Technology**



# Evolutionary Game Theory: Mathematical Approaches to Understanding Cooperation



**Dr Nadiah Kristensen**  
**National University of Singapore**

Many social and environmental problems today, such as climate change, require cooperation to solve. However, cooperation can be difficult to achieve when it conflicts with our short-term self-interest. This course used mathematical models to explore the challenges and potential solutions to cooperation problems. It delved into non-cooperative game theory, evolutionary game theory, and replicator dynamics to understand how cooperation can evolve in populations. Also explored was the role of kin selection and the Wright's Infinite Islands model, with an example of conserving natural resources for future generations. Finally, social learning models were presented as a means of understanding how individuals acquire knowledge and behaviours from others. Participants gained insights into why cooperation can be difficult, but also how evolution has furnished humans with a unique ability to cooperate, which can help us solve some of the most pressing challenges we face as a society.

## Topics

- Non-cooperative game theory.
- Introduction to evolutionary game theory and replicator dynamics.
- Iterated games and reciprocity as a solution to cooperative dilemmas.
- Public goods games and games with nonlinear benefits.
- Kin selection and the Wright's Infinite Islands model, with an example of conserving natural resources for future generations.
- Social learning models.

*"Nadiah's evolutionary game theory course was fascinating and very engaging."*

Christopher Brown  
**The University of Queensland**

# From Theory to Practice: Reinforcement Learning for Realistic Ecosystem Management



**Dr Carl Boettiger**  
**The University of California, Berkeley**

Ecological, environmental, and social systems are complex, incompletely understood, and only partially observed. How then do we make effective management decisions in the face of such multiple and often irreducible uncertainty? This course introduced fundamental concepts of decision theory to address these challenges. While this approach has long had a compelling theoretical basis, practical implementation has to date relied almost entirely on highly stylised models and simplifying assumptions to make that theory computationally tractable. Today, advances in an important area of artificial intelligence known as reinforcement learning are suddenly making this theory readily applicable to vastly more complex and realistic models.

We will begin with classic sequential decision problems in conservation and ecosystem management as well as traditional algorithms for exact solutions such as stochastic dynamic programming. We will see how these algorithms buckle under the ‘curse of dimensionality’ for more realistic problems, before turning our attention to draw on recent methods in AI that can break this curse, but will also sacrifice the promise of optimality for something far more slippery. As these approaches frequently rely on intensive computing, we will also introduce fundamentals of reproducible, portable, and scalable cloud computing using modern, secure, and user-friendly toolchains.

## Topics

- Markov Decision Problems
- Optimal Harvesting Theory
- Stochastic dynamic programming
- Deep reinforcement learning in the context of conservation policy
- Low-friction cloud computing (containers, environments, dependency management, codespaces)
- GitHub Version control / collaboration / workflow

“I really enjoyed Carl Boettiger’s awesome series of super hands-on lectures that focused on coding and learning by doing. Building a reinforcement learning agent in 4 modules was so engaging compared to standard maths lectures with slides and equations and showed me how I can apply these techniques to my work.”

Frankie Cho  
**The University of Queensland**

# Analysing Sloppiness of Simulation Models: Examples in Ecology



**Dr Matthew Adams**  
**Queensland University of Technology**

Once a model is fitted to a dataset, it is hoped that new information is gleaned from the model that would otherwise not be possible with the data alone. Parameter identifiability is a common goal of such an analysis, although by itself may not be sufficient to reveal the informativeness of the dataset or inform future data collection activities. This course introduced the analysis of sloppiness as a tool for unveiling parameter uncertainty when mathematical models are fitted to data and demonstrate examples

in ecology where this tool can inform future data collection activities and/or inform future model designs.

## Topics

- Model-data calibration using Bayesian and frequentist approaches.
- Visualisation of calibration outputs.
- Analysis of model sloppiness.
- Interpreting model sloppiness outputs, and connections to other data-informing approaches.

*“Dr Adams was a fantastic lecturer, and the whole course was really well thought out!”*

Larissa Lubiana Botelho  
**Queensland University of Technology**

## An Introduction to Sequential Monte Carlo



**Dr Joshua Bon, Dr Matthew Sutton and Imke Botha  
Queensland University of Technology**

Sequential Monte Carlo (SMC) is a versatile algorithmic tool for data science, machine learning and statistics. It can be used for a myriad of inferential problems dealing with latent state prediction and parameter estimation. SMC Samplers provide robust parameter inference with uncertainty quantification for static Bayesian models. Whilst Particle filters, a subset of SMC algorithms, are popular for efficient estimation of latent states in hidden Markov models, beyond the limitations of the Kalman filter.

This one-day introduction orientated participants to the world of SMC, demystified notation, and provided some hands-on coding experience with SMC in Julia.

### Topics

- An introduction to SMC Samplers
- An introduction to Particle Filters
- An introduction to general SMC

“The SMC course raised a lot of interesting ideas... now I can take these notes and conduct further research with them elsewhere.”

Madhav Padmakumar  
**Climate Friendly**



## PARTICIPANT BREAKDOWN

| UNIVERSITY/INSTITUTION                        |    |
|---|----|
| Climate Friendly                              | 1  |
| CSIRO   | 1  |
| Department of Agriculture and Fisheries (QLD) | 1  |
| Flinders University                           | 1  |
| Griffith University                           | 1  |
| Queensland University of Technology           | 22 |
| The University of Melbourne                   | 2  |
| The University of Queensland                  | 11 |
| The University of Sydney                      | 1  |
| University of São Paulo                       | 1  |

| GENDER                 |    |     |
|------------------------|----|-----|
| Female                 | 19 | 45% |
| Male                   | 23 | 55% |
| Other                  | 0  | 0%  |
| Prefer not to disclose | 0  | 0%  |

| RESIDENCY STATUS   |    |     |
|--------------------|----|-----|
| Australian Citizen | 27 | 64% |
| Student Visa       | 12 | 29% |
| Permanent Resident | 2  | 5%  |
| International      | 1  | 2%  |

| ABORIGINAL AND TORRES STRAIT ISLANDER |    |      |
|---------------------------------------|----|------|
| No                                    | 42 | 100% |
| Yes                                   | 0  | 0%   |

| STATE/TERRITORY |    |     |
|-----------------|----|-----|
| ACT             | 0  | 0%  |
| NSW             | 1  | 2%  |
| QLD             | 36 | 86% |
| SA              | 1  | 2%  |
| TAS             | 0  | 0%  |
| VIC             | 3  | 7%  |
| WA              | 0  | 0%  |
| International   | 1  | 2%  |

| PARTICIPANT TYPE        |    |     |
|-------------------------|----|-----|
| Undergraduate           | 2  | 5%  |
| Honours                 | 1  | 2%  |
| Masters (by Coursework) | 0  | 0%  |
| Masters (by Research)   | 6  | 14% |
| PhD                     | 28 | 67% |
| Early-Career Researcher | 2  | 5%  |
| Industry                | 2  | 5%  |
| Research Assistant      | 1  | 2%  |



**42** participants

**45%** female participation

## TRAVEL GRANTS

AMSI Travel Grants support mathematical sciences students at AMSI Member Universities to build and extend their skills and professional networks by providing full or partial accommodation and travel support to participate in AMSI Flagship Events.

In 2023, AMSI partnered with the QUT Centre for Data Science, to award four students (3 female, one male) from three AMSI Member Universities with an AMSI Winter School Travel or Family Grant:

- Yining Ding  
**The University of Sydney**
- Amelia Grigson  
**Flinders University**
- Christine Li  
**The University of Melbourne**
- Gouri Mondal  
**The University of Melbourne**



“Without this grant, it would not be possible for me to attend in person. As a mother of two little kids, it was not easy to leave them in another state for two weeks of professional development. The travel and accommodation support this grant provided allowed me to bring my young family with me.”

Gouri Mondal  
**The University of Melbourne**

## PROGRAM EXTRAS

### OPENING CEREMONY

The program kicked off on Monday 14 July with the opening ceremony where Professor Michael Bode, Winter School 2023 Event Director and Deputy Head of the QUT School of Mathematical Sciences, welcomed all participants on behalf of host university QUT. Michael began with an acknowledgment of country noting the importance of land, land care and sustainability in the Australian First Nations culture. He highlighted that mathematics plays an essential role in understanding and forecasting the environment and our use of it, and described how each of the courses over the two-week school would explore this.

Professor Jorgen Rasmussen, Deputy Head of the University of Queensland (UQ) School of Mathematics and Physics and AMSI Director Professor Tim Marchant delivered their own welcome on behalf of UQ (AMSI Winter School founding university partner) and AMSI respectively, wishing participants well in their mathematical sciences careers and encouraging them to participate fully in the program.



The keynote address was delivered by Adjunct Professor Christine Williams, Chair of Life Sciences Queensland who shared her varied mathematical economics career journey spanning academia, industry and government including a term as the Queensland Chief Scientist. Christine covered many career considerations including the importance of doing something you enjoy, being a good team player, working with people across disciplines, building networks, being able to communicate to a variety of audiences and the exciting possibilities for mathematical scientists.

Dr Deborah Akinlotan, Research Fellow at the QUT Centre for Data Science (CDS) and Applied Mathematical Ecology Group closed the opening session with a talk on the research carried out by the CDS.

### NETWORKING EVENTS



A welcome lunch was held directly after the opening ceremony to allow participants to meet each other and the lecturers ahead of the courses. Additional catered social events were held over the two weeks including speed networking, a mixer sponsored by AMEG and a Friday night social dinner to encourage the exchanging of ideas and networking building.

## CELEBRATION OF DIVERSITY

To celebrate and highlight the diversity that exists in the mathematical sciences there were two casual coffee meetups in week two; LGBTIQ+ and allies on Tuesday morning followed by Women in Maths on Wednesday morning, as well as a lunch celebrating this diversity.



## CAREERS

Two career sessions were featured in the program, the first an interactive panel on post-PhD jobs for mathematicians. Attendees heard from a diverse line up of speakers from a range of companies about the current jobs market and opportunities for maths grads outside of academia. They also discussed the benefits of industry internships and the importance of networking to building your career.

### Panellists

- Iadine Chades, **CSIRO**
- Nicholas Matigan, **Queensland Cyber Infrastructure Foundation (QCIF)**
- Mark Bexendale, **Origin Energy**
- Ryu Lippmann, **QUT**
- Glen Shelden, **APR.Intern**

The careers second event was a lunchtime lecture by Optiver's Head of Global Data Virginia Wheway on the *Life and Times of a Data Scientist*. Virginia regaled the audience with an array of problems she has worked on over many industries in her 35+ year career that were solved using techniques from

high school mathematics to PhD level machine learning including 777 aircraft, medical research mining, e-commerce, and cricket ovals. Her talk highlighted the variety of exciting jobs where maths, stats and data science skills are needed in a range of industries nationally and internationally.



“The careers panel and lunchtime lecture were highlights of the Winter School for me.”

Cailan Jeynes-Smith  
Queensland University of Technology

## PUBLISHING IN NON-MATHEMATICAL JOURNALS

A session on publishing mathematical modelling papers in non-mathematical journals was held at the end of week one. This covered an overview of the peer review system, bibliometrics and how publishing affects academic careers (e.g. jobs, grants) as well as the role of mathematical and statistical methods in applied ecology, approaches to including them in manuscripts, and impacts on publication and citation prospects.

“I enjoyed having the experience of learning from qualified people in a relaxed, friendly and easy-going environment. The lecture about publishing was especially useful.”

Irina Lerna  
University of São Paulo

## PARTICIPANT TALKS

A participant talks session sponsored by Optiver was held in the first week so attendees could share their research with their peers, exchange ideas and explore how other are using mathematics to solve real world problems.

All participants were encouraged to put their science communication skills to the test with 39 students and early career researchers taking up the challenge to convey their research in a 12-

minute talk. Presentation topics ranged from applied and computational mathematics, mathematical ecology, biostatistics, urban water management and quantitative ecology, to name a few.

Attendees voted for their favourite participant talks with the following four identified as the top presenters:

- **Montana Wickens, Department of Agriculture and Fisheries (QLD)**  
Delay Difference Fishery Models
- **Patrick Grant, Queensland University of Technology**  
Constructing a Virtual Representation of Laminated Timber Products
- **Larissa Lubiana Botelho, Applied Mathematical Ecology Group, QUT**  
Structure and Dynamics of Antarctic Governance
- **Liam Timms Manufacturing Future Research Institute, The University of Queensland**  
Rangers or real estate: optimising conservation for poached species



## PUBLIC LECTURE

Conservation scientist and mathematician Professor Hugh Possingham delivered the Winter School 2023 public lecture. Professor Possingham shared several key examples of how the application of mathematics to real-world systems has impacted policy and management or not. These included the rezoning of the Greater Barrier Reef, the creation of a network of Commonwealth marine parks and the Threatened Species Policy where mathematics was an essential element of achieving on-ground benefits for species and ecosystems. He also highlighted that good mathematics does not necessarily always translate into good outcomes, and the most sophisticated and complex mathematics – the sort that we love to do in university maths departments – was not necessarily the most useful. Hugh’s passion for conservation and mathematics, and the important role these can play in solving problems presented by climate change really shone through.

Over 60 people attended this free evening public lecture on 13 July, either in person at QUT or online via Zoom. Additionally, the lecture recording on AMSI’s YouTube channel has gained more than 100 views.

FREE PUBLIC LECTURE PART OF **AMSI WINTERSCHOOL<sup>23</sup>**

**HOW MATHEMATICS CAN INFORM POLICY – OR NOT**

**PROF. HUGH POSSINGHAM**  
THE UNIVERSITY OF QUEENSLAND

**THURSDAY 13 JULY 6PM AEST**  
**NETWORKING & REFRESHMENTS FROM 5.15PM P514, SCIENCE & ENG CENTRE, QUT & ONLINE VIA ZOOM**

“The public lecture was an excellent way to ground everyone after the two weeks of theory and remind us of what we were actually trying to achieve.”

Nicholas Dendle  
Queensland University of Technology

# FEEDBACK

# 50%

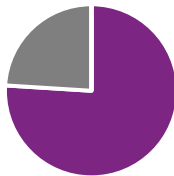
Fifty per cent of attendees at AMSI Winter School 2023 completed the online survey to provide their feedback and comments on the event.

# 8.7

In rating their overall experience at the event on a scale of 1 to 10, where 1 is poor and 10 is excellent, the respondents' average rating was 8.7.

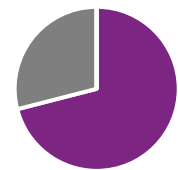
## WINTER SCHOOL WAS OF A HIGH STANDARD

|                   |     |
|-------------------|-----|
| Strongly Agree    | 76% |
| Agree             | 24% |
| Neutral           | 0%  |
| Disagree          | 0%  |
| Strongly Disagree | 0%  |



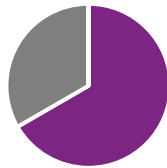
## WINTER SCHOOL WAS WELL ORGANISED

|                   |     |
|-------------------|-----|
| Strongly Agree    | 71% |
| Agree             | 29% |
| Neutral           | 0%  |
| Disagree          | 0%  |
| Strongly Disagree | 0%  |



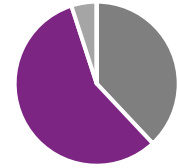
## THE LECTURERS WERE PROFESSIONAL AND ENGAGING

|                   |     |
|-------------------|-----|
| Strongly Agree    | 67% |
| Agree             | 33% |
| Neutral           | 0%  |
| Disagree          | 0%  |
| Strongly Disagree | 0%  |



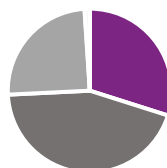
## WINTER SCHOOL WAS USEFUL FOR ME PROFESSIONALLY

|                   |     |
|-------------------|-----|
| Strongly Agree    | 38% |
| Agree             | 57% |
| Neutral           | 5%  |
| Disagree          | 0%  |
| Strongly Disagree | 0%  |



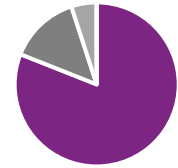
## THE COURSES WERE RELEVANT TO MY CURRENT RESEARCH

|                   |     |
|-------------------|-----|
| Strongly Agree    | 29% |
| Agree             | 43% |
| Neutral           | 24% |
| Disagree          | 5%  |
| Strongly Disagree | 0%  |



## I WOULD RECOMMEND WINTER SCHOOL TO OTHERS

|                   |     |
|-------------------|-----|
| Strongly Agree    | 81% |
| Agree             | 14% |
| Neutral           | 5%  |
| Disagree          | 0%  |
| Strongly Disagree | 0%  |



“AMSI Winter School has opened up opportunities in terms of my direction following the completion of my degree and gave me a range of options for projects for postgraduate study.”

Amelia Grigson  
Flinders University



## COMMITTEES

AMSI wishes to acknowledge the generous donation of time and scientific advice by the following committees—without their contribution this event would not have been a success:

### STANDING COMMITTEE

- **Professor Michael Bode** (Event Director), Queensland University of Technology
- **Professor Joseph Grotowski**, The University of Queensland
- **Professor Tony Roberts**, Queensland University of Technology
- **Professor Tim Marchant**, Australian Mathematical Sciences Institute
- **Angela Coughlin**, Australian Mathematical Sciences Institute
- **Anna Muscara** (Secretariat), Australian Mathematical Sciences Institute

### ORGANISING COMMITTEE

- **Professor Michael Bode** (Event Director), Queensland University of Technology
- **Dr Katrina Treloar**, Queensland University of Technology
- **Angela Coughlin**, Australian Mathematical Sciences Institute
- **Darla Trejo**, Australian Mathematical Sciences Institute



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