

PARTICIPATION STRATEGY
SECURING AUSTRALIA'S
MATHEMATICAL WORKFORCE

Progress Report

Stage 1 | 2016/17

Participation Strategy

Securing Australia's Mathematical Workforce

Progress Report Stage 1 | 2016/17

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“The project aligns with the National Innovation and Science Agenda (NISA), and aims to improve outcomes for higher-education students in science, technology, engineering and mathematics (STEM). It will strengthen research training for STEM graduates in Australia, and contribute to a highly-skilled mathematical workforce.”

Department of Education & Training

Australian Government

Source: www.education.gov.au/australian-mathematical-sciences-institute-project.

INTRODUCTION

The Securing Australia's Mathematical Workforce: 2016–2020 project builds on the success of the AMSI Vacation in Schools and Scholarship project (2012–2016) and will continue to grow the nation's future public- and private-sector workforce with advanced skills in the mathematical sciences, while also providing opportunities for increasing participation by female and indigenous students.

The project's overarching objective is to contribute to the preparation of a world-class mathematical sciences workforce in Australia. The specific project objectives are to:

- strengthen research training and the work-readiness of advanced mathematical sciences graduates;
- promote university-industry collaborations that will encourage the private sector employment of mathematical sciences graduates; and
- attract and improve the retention of senior undergraduate students in the mathematical sciences.

In addition to the challenge to achieving overall participation growth, the project aims to progress female and Aboriginal and Torres Strait Islander (ATSI) participation in each of the project activities.

SHORT-TERM OBJECTIVES

- Male and female participants should reflect the current cohort of enrolled mathematical sciences undergraduate and postgraduate students.
- Participants of Aboriginal and Torres Strait Islander (ATSI) descent should reflect the current cohort of enrolled mathematical sciences undergraduate and postgraduate students.

LONG-TERM OBJECTIVES

- Male and female participants are approximately equal in number and of a high calibre
- Significant increases in participation of high-calibre persons of Aboriginal and Torres Strait Islander (ATIS) descent.

This project directly addresses three imperatives identified by the National Innovation and Science Agenda — improved STEM education, enhanced industry collaboration, and increased female and ATSI participation in the STEM workforce — providing significant and enhanced commercial return on the public investment in research training in the mathematical sciences.

This document reports on the implementation of the first year of the Securing Australia's Mathematical Workforce 2016 - 2020 project and should be read with the annual stage reports for this project's activities (AMSI Flagship Events):

- *AMSI Winter School 2016 on Biological and Environmental Modelling*
- *AMSI BioInfoSummer 2016: A Symposium in Bioinformatics*
- *AMSI Summer School 2017 in the Mathematical Sciences*
- *AMSI Vacation Research Scholarships (VRS) 2016/17: A Taste of Life as a Researcher*



PARTICIPATION

The Securing Australia’s Mathematical Workforce: 2016–2020 project aims to have at least 320 domestic participants across four project activities in 2016/17, including 30 per cent female student participation and the participation of one ATSI mathematical sciences student.

The overall participation target has been exceeded, with 462 attendees participating in the project’s activities. This follows the increase in the overall participation success in the Vacation Schools and Scholarships 2012–2016 project over the previous four years.

FIGURE 1: Total participation by project activity over the past 5 years

	Winter School	BioInfoSummer	Summer School	VRS
2012/13	49	120	132	41
2013/14	24	188	155	57
2014/15	30	204	107	56
2015/16	39	228	127	50
2016/17	45	206	168	43

However, the domestic participation target has been exceeded in only two out of the four project activities during the first year of the project. AMSI Winter School 2016 and AMSI BioInfoSummer 2016 were well-attended by domestic participants, meeting the project’s targets. AMSI Summer School 2017 was only one student short of meeting the required 120 domestic participants, with 119 Australian Citizen/Permanent Residents attending the four-week vacation school.

After receiving 69 applications, the final participation numbers in the Vacation Research Scholarship 2016/17 program suffered from a number of students withdrawing from the program after the award of scholarships.

FIGURE 2: Domestic participation target against actual participation in 2016/17 across the project’s activities.

	Target	Actual
Winter School	20	25
BioInfoSummer	130	132
Summer School	120	119
VRS	50	38
TOTAL	320	314

FEMALE PARTICIPATION

The Securing Australia’s Mathematical Workforce: 2016–2020 project aims to have at least 30 per cent female participation in the project activities per year, in line with female representation in the mathematical sciences student cohort. Participants are asked to self-declare their gender at the time of applying to attend.

The female participation target has been exceeded in the first year of the project, with 181 female participants (41 per cent of total participation) self-identifying as female. This follows the increase in the overall gender balance participation success in the Vacation Schools and Scholarships 2012–2016 project over the previous four years.

FIGURE 3: Percentage of female participation by project activity over the past 5 years.

	Winter School	BioInfoSummer	Summer School	VRS	Total
2012/13	12%	44%	24%	17%	29%
2013/14	25%	39%	27%	28%	32%
2014/15	23%	40%	15%	18%	29%
2015/16	8%	46%	33%	30%	37%
2016/17	42%	51%	31%	28%	41%

In 2016/17, 19 females attended AMSI Winter School 2016, 105 females participated in AMSI BioInfoSummer 2016, 51 females attended AMSI Summer School 2017 and 12 females received an AMSI Vacation Research Scholarship in 2016/17.

FIGURE 4: Total female participation target percentages against actual participation in 2016/17 across the project’s activities.

	Target	Actual
Winter School	30%	42%
BioInfoSummer	30%	51%
Summer School	30%	31%
VRS	30%	28%

AMSI is also focused on the importance of achieving a gender balance of lecturers/speakers at each activity, with female participation within the program a key discussion topic and objective in the planning of each event, and achieved at least one-third female representation in 2016/17:

- Winter School — 2 females out of 5 lecturers (40 per cent)
- BioInfoSummer — 7 females out of 13 speakers (47 per cent)
- Summer School — 4 females out of 11 lecturers (36 per cent)

CHOOSEMATHS

The BHP Billiton Foundation and the Australian Mathematical Sciences Institute formed a partnership in April 2015 to deliver the CHOOSEMATHS program, a \$22.2 million investment aiming to promote greater interest and academic achievement of girls in mathematics, leading to an increased participation in STEM subjects and contributing to a more sustainable and competitive economy.

The program increases the impact and reach of AMSI's activities to address pipeline issues from primary school into secondary school and through to university and the workplace. Increasing awareness of the value of mathematics to careers and lifestyle, especially for women, is a program highlight.

The CHOOSEMATHS program also has a high impact in the long-term on Australian student enrolments in undergraduate, honours and PhD mathematical sciences programs, and will significantly increase participation in the AMSI Higher Education programs.

CHOOSEMATHS works with students, parents and teachers over five years through a program of professional development, awareness and reward to turn around community attitudes to participation in mathematics, especially for girls and young women. The program is building self-sustaining education communities where girls and young women share equally in the rewarding careers and rich life experiences that mathematics offers.

Women in STEM Events

AMSI, host universities and the Women in Mathematics Special Interest Group (WIMSIG) of the Australian Mathematical Society (AustMS) continue to collaboratively deliver Women in Maths events within the project activity programs. In 2016/17, three events, open to all participants, were well-attended with over 70 attendees at each event.

Winter School Women in Maths Networking Event

Panel included Professor Kerry Landman (The University of Melbourne), Julia Bruerton (Brisbane Grammar School), and Ellie Foxcroft (Biarri)

BioInfoSummer Women in STEM Lunch Event

Panel included Associate Professor Alicia Oshlack (Murdoch Children's Research Institute) Professor Tanya Monro (University of South Australia), Professor Julie Owens (The University of Adelaide), and Associate Professor Lesley Ward, University of South Australia, and WIMSIG)

Summer School Women in the Mathematical Sciences Panel Event

Panel included Dr Michelle Dunbar (The University of Sydney), Professor Mary Myerscough (The University of Sydney), Professor Kerry Mengersen (Queensland University of Technology), Dr Anne Thomas (The University of Sydney), Professor Jacqui Ramagge (The University of Sydney), and Professor Andrew Mathas (The University of Sydney)

These events across the three project activities followed a similar format, with a panel discussion featuring gender-equality ambassadors and prominent females in the discipline, followed by an informal networking session. This provided an active forum of discussion focused on highlighting the contributions of women in STEM, raising awareness about issues for women, and promoting career pathways.

In addition, the first CHOOSEMATHS Networking Session was held at AMSI Summer School 2017 by CHOOSEMATHS Outreach Officer Dr Julia Collins, inviting all female Summer School students to meet, identify and discuss in an all-female environment:

- issues facing women in the mathematical sciences
- goals of the CHOOSEMATHS program
- career opportunities for women.

This session was also used to generate questions for the Women in the Mathematical Sciences Panel later in the program, and to provide an opportunity for networking with fellow female students.

ATSI PARTICIPATION

The Securing Australia’s Mathematical Workforce: 2016–2020 project aims to have at least one ATSI participant per year, in line with ATSI representation in the mathematical sciences student cohort. Participants are asked to self-declare their ATSI status at the time of applying to attend, with an option not to disclose.

The ATSI participation target has been exceeded in the first year of the project, with three participants (0.65 per cent of total participation) in 2016/17 self-identified as being of Aboriginal and Torres Strait Islander (ATSI) descent — one student attended AMSI Winter School 2016, and two delegates participated in AMSI BioInfoSummer 2016.

This follows the success in attracting ATSI participation in the Vacation Schools and Scholarships 2012-2016 project in the previous four years. However, it must be noted that the high number of students identified as ATSI in 2014/15 and 2015/16 were for the AMSI Summer School activity, which included a large number of international students who may not have fully understood the question upon registration. In 2016/17, the definition of ATSI status was clearly defined, and therefore, more accurate data can be assumed to have been collected.

FIGURE 5: Total participants who have identified as being of Aboriginal and Torres Strait Islander (ATSI) descent by project year over the past 5 years.

	ATSI	Undisclosed
2012/13	1	43
2013/14	2	22
2014/15	12	22
2015/16	16	37
2016/17	3	2

NB: Participants who have elected not to disclose their ATSI status or did not answer the question are included while non-ATSI participants are not shown.

GRANTS

Recognising the need to build professional networks and research collaborations as being vital for a successful academic career in mathematics and cognate disciplines, two types of grants were offered: AMSI Travel Grants and CHOOSEMATHS Grants, dedicated to providing financial support in funding expenses associated with attending AMSI Flagship Events.

AMSI Travel Grants were offered to support AMSI Member University student travel and accommodation to attend AMSI Flagship Events. These grants are funded by this project, as well as the host university, and were awarded on a competitive basis.

In 2016/17, AMSI Travel Grants were awarded to nine females and one ATSI student across the project's activities.

CHOOSEMATHS Grants, an initiative funded by the BHP Billiton Foundation as part of the CHOOSEMATHS program, offered full or partial support for female mathematical sciences students and early-career researchers to attend AMSI's Flagship events by providing financial support in funding travel, accommodation, and caring-responsibility expenses associated with attending AMSI Flagship Events.

In 2016/17, CHOOSEMATHS Grants were awarded to 34 females across the project's activities.

It should be highlighted that three of these grants included significant financial assistance towards the provision of alternative accommodation for the recipient and accompanying family members, as well as towards caring responsibilities for young children, enabling the student to fully participate in the program.



OUTREACH & ENGAGEMENT

SCHOOLS ENGAGEMENT

Through the CHOOSEMATHS project, delivered by AMSI Schools, school engagement occurs across four main components:

- Schools Outreach Activity
- CHOOSEMATHS Awards
- Women in Maths Network
- Careers Awareness Campaign

Schools Outreach Activity

Eight AMSI Schools Outreach Officers worked with over 120 schools in five regions across Australia to enhance teacher knowledge of and confidence in mathematics, with a special focus on young females. Many of these schools are in rural and remote areas where there are significant numbers of students of ATSI descent.

Teachers working with AMSI focus on enhancing content knowledge through the development of classroom-specific materials, planning of lesson activities and linking quality online resources and upcoming events, including public lectures. Professional-development sessions are also offered to schools on a regular basis, aimed at bringing together targeted regional clusters to discuss the curriculum, develop mathematics knowledge and share successful strategies for engaging students in mathematics.

CHOOSEMATHS Awards

STUDENT AWARDS

The CHOOSEMATHS Student Awards encouraged students to get creative as they stepped beyond the classroom to bring their understanding of mathematics to life on film. The aim of these awards was for students to produce a video that explained a mathematical problem or demonstrated an application of mathematics using clear and precise mathematical language, in a creative and entertaining way.

Best Senior Video

Danebank Anglican School for Girls (New South Wales)

Live Free Pi Hard — Everything Around Us

Best Junior Video

Toorak College (Victoria)

Toorak Spirit — Geometry Around the World

TEACHER AWARDS

The CHOOSEMATHS Teacher Awards identified and acknowledged Australia's most engaging and innovative teachers. Two types of awards were up for grabs, the *Mentoring Girls in Mathematics Award*, for demonstrated outstanding achievement in inspiring and fostering the participation of girls in mathematics, and the *Teaching Excellence Awards*, for excellence in demonstrating dedication to fostering student achievement, enjoyment and potential.

Mentoring Girls in Mathematics Awards

- Stacy King, Mabel Park State High School (Queensland)
- Peter Chandler, Penrhos College (Western Australia)

Teaching Excellence Awards

- Greg Anderson, St Leonards College (Victoria)
- Jacki McMahon, Makybe Rise Primary School (Western Australia)
- Lisa Hogan, Mary MacKillop Catholic Regional College (Victoria)
- Norah Parsons, Moura State High School (Queensland)
- Cassandra Portelli, Hunter School of the Performance Arts (New South Wales)
- Janine Stewart, St Columba Anglican School (New South Wales)
- Terry Jacka, St Hilda's School (Queensland)
- Eddie Woo, Cherrybrook Technology High School (New South Wales)

Women in Maths Network

The Women in Maths Network aims to link senior high-school and undergraduate university students with women in industry and academia through a mentoring program. This network of role models will be established to inspire females to seek the opportunities mathematics offers, through:

- a community of high-achieving women
- young women connecting with women working in STEM through shadowing opportunities
- careers events at AMSI Member Universities
- the Maths and Biology Initiative
- scholarships to students to attend higher education events.

Careers Awareness Campaign

The Careers Awareness Campaign was launched on 4 June 2017. Promotional poster packs have been sent to 10,000 schools across Australia. The information in these packs will help raise awareness and interest for students, and also provide teachers with career development materials.

This campaign targets young mathematicians, particularly young women, by presenting a diverse background of mathematically-capable professionals as role models. AMSI communicates to diverse CHOOSEMATHS stakeholders via the following online resources (as of 15 May 2017):

- Facebook: [@choosemaths](#) (245 Likes), [@amsischools](#) (158 Likes)
- Instagram: [@choosemaths1](#) (45 followers)
- Twitter: [@AMSIschools](#) (123 followers)
- CHOOSEMATHS Website (www.choosemaths.org.au)
- Calculate Teacher Resource Portal (www.calculate.org.au)

PUBLIC LECTURES

In 2016/17, the project activities included three public lectures, contributing significantly toward increasing public awareness of the public-lecture program, the project activity, and particularly, the role of the mathematical sciences through an applied theme.



AMSI Winter School 2016 Public Lecture

Is Science Any Use for Saving Species and Habitat?

Professor Hugh Possingham, The University of Queensland

Professor Hugh Possingham, a global leader in mathematical modelling and decision science for nature conservation, delivered a public lecture to an audience of over 350 to this fully-subscribed free event. Professor Possingham questioned the traditional approach to conservation and suggested management of natural assets should be treated much like management of financial assets — striving to strike a balance between risk and reward. The lecture attracted national media attention with an article in *The Guardian*, in addition to generating strong social media buzz.

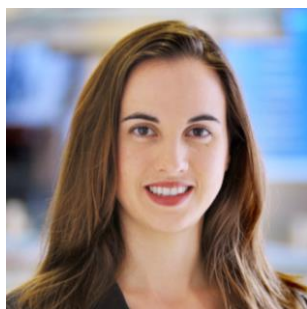
AMSI BioInfoSummer 2016 Public Lecture

Learning More of Diseases and Behaviours Using Amazing Dog Genetic Models

Professor Claire Wade, The University of Sydney

Professor Claire Wade, a geneticist working within the University of Sydney's Faculty of Veterinary Science, asked common questions such as: "What makes greyhounds run so quickly?" and "Why do beagles have such an elevated sense of smell?", drawing the Adelaide audience of over 100 into her lecture on genetic mutations and natural selection. Professor Wade explained that the more we understand how genetics affects the behaviour of dogs, the more we can understand human biology together with improving pet health and welfare.





AMSI Summer School 2017 Public Lecture

Networks for Big Biomedical Data

Dr Genevera Allen, Rice University

Dr. Genevera Allen, the Dobelman Family Junior Chair and member of the Baylor College of Medicine, stated: “As data becomes bigger and more complex, we need to use statistics and mathematics to ensure that seemingly interesting findings are actual true discoveries and not due to chance alone.” At the lecture, which boasted an attendance of over 300 people, Dr Allen discussed how data affects health science, specifically the problems medical science researchers’ face in analysing large amounts of data, and how these problems can be addressed by the use of statistical theory network models.

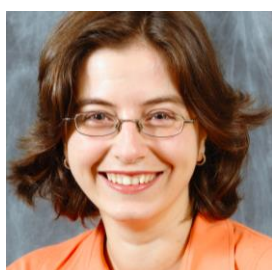
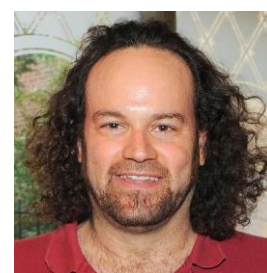
In addition, AMSI hosted two Lecture Tours in 2016/17, with two eminent international researchers delivering a series of specialist and public lectures throughout Australia.

AMSI-SSA Lecturer — December 2016

From Lotteries to Polls to Monte Carlo

Professor Jeffrey Rosenthal, University of Toronto

Professor Rosenthal discussed randomness and probability through Markov Chain Monte Carlo (MCMC) algorithms.



AMSI-ANZIAM Lecturer — February 2017

Queues on Interacting Networks

Associate Professor Maria Vlasidou, Eindhoven University of Technology

Associate Professor Vlasidou focused on queuing theory and stochastic processes, with a group of connected queues as an example of a network.

CAREER AWARENESS

Careers Events

AMSI and the host universities continue to collaboratively deliver careers events within the project-activity programs. In 2016/17, three events were delivered and were well-attended, with over 100 attendees at each event. These events across the three project activities were unique in their format; however, they each promoted career-awareness to attendees and encouraged attendees to network!

BioInfoSummer COMBINE Careers Session

A panel and networking session was held to showcase and highlight career opportunities in bioinformatics, with over 100 attendees. This event featured a panel with diverse backgrounds, and provided a forum for discussion around different pathways within the discipline.

Summer School Careers Afternoon

This event began with employer and early-career researcher presentations highlighting the importance of and need for advanced mathematical and statistical backgrounds, followed by an exhibit networking session with industry specialists.

Representatives from Allan Gray Australia, the Australian Bureau of Statistics, the Australian Signals Directorate, the Commonwealth Bank of Australia, the Defence Science Technology Group, Google, Optiver, and the Reserve Bank of Australia participated in this event.



Vacation Research Scholarship Guest Speakers

Three guest speakers gave careers presentations, sharing their experiences and giving professional advice to the scholarship recipients at AMSIConnect (the two-day student conference):

- Kate Saunders (The University of Melbourne): Life as a PhD Student
- Dr Peter Steinle (Bureau of Meteorology): Life as a Researcher
- Professor Geoff Prince (Australian Mathematical Sciences Institute and La Trobe University): Careers in Maths

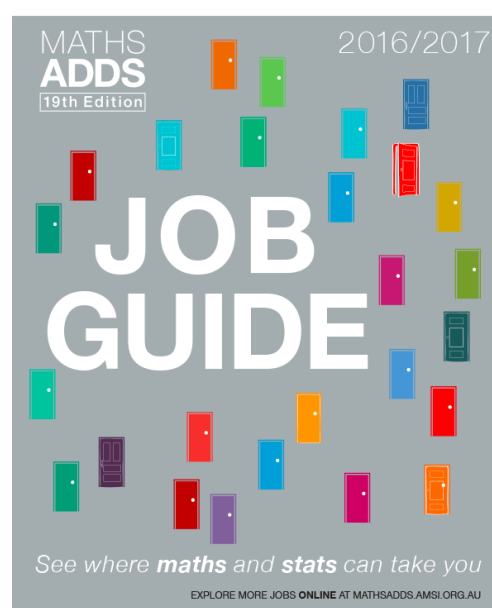
Maths Adds

Maths Adds gathers together a sample of job advertisements from recent years. The common theme of the ads is mathematics and statistics, but the actual jobs vary across a very broad spectrum — from health to computing, data analysis to biology, and meteorology to finance.

Highlighting opportunities available to students who include mathematics or statistics in their degree — which can only add to future career options — this print resource is updated annually and circulated to over 120 schools, in addition to AMSI's 30 Member Universities around Australia. Seventeen thousand brochures were printed in 2016/17.

In addition to job advertisements, Maths Adds features student case-studies and profiles of mathematicians and statisticians, including participants from the Securing Australia's Mathematical Workforce 2016–2020 project.

Targeting senior secondary students and undergraduate students, this resource is prepared by AMSI and La Trobe University and is also available online at www.mathsadds.com.au.



CONNECTING WITH INDUSTRY

At 2–3 per cent, Australia has one of the lowest rates of industry-research engagement in the Organisation for Economic Co-operation and Development (OECD). AMSI sees this challenge as a call to action and an opportunity for reform to support Australia’s elevation on the global innovation stage.

Industry Advisory Committee

AMSI’s Industry Advisory Committee partnered with industry to establish the Industry/Mathematical Sciences Engagement (IMSE) Task Force in 2015, significantly deepening AMSI’s industry engagement.

Membership of the Task Force includes eight industry leaders and eight senior mathematical scientists from AMSI Member Universities. The Task Force targets measures to grow and develop Australia’s mathematical workforce at a time when skills are increasingly in high public- and private-sector demand.

The Task Force’s findings to date indicate a shortage of industry-ready mathematics graduates in Australia, which has led businesses across a wide range of sectors to seek these skills overseas. The IMSE Task Force is leading urgent action to address:

- careers awareness in schools and the community
- industry engagement with the mathematical sciences
- supply of industry-ready mathematical sciences graduates.

AMSI Intern

AMSI Intern provides PhD students with opportunities to apply their research to complex real-world industry challenges. As Australia seeks to strengthen its STEM and innovation capacity, these short-term industry engagements become a vital part of the Australian postgraduate experience.

Mathematical Sciences Internship Placements — Contracts Executed in Financial Year 2016-17

Execution Date	Our Ref	Industry Partner	University	Bio-informatics?	Student Type
16/03/2017	INT – 0276	ABS	ANU		Australian Citizen
29/03/2017	INT – 0224	DST Group	UTS		Australian Citizen
13/10/2016	INT – 0235	CSL Limited	UoM	Yes	Australian Citizen
15/12/2016	INT – 0261	BoM	Monash		Australian Citizen
21/12/2016	INT – 0256	DST Group	UoM		Australian Citizen
11/01/2017	INT – 0265	CSL Limited	UoM	Yes	Postgrad Research Sector Visa (574)
29/01/2017	INT – 0278	DST Group	Monash		Australian Citizen
31/03/2017	INT – 0284	Aurecon	RMIT		Australian Citizen
02/04/2017	INT – 0275	ABS	Monash		Postgrad Research Sector Visa (574)
04/12/2016	INT – 0259	BHP Billiton	Curtin		Australian Citizen
30/03/2017	INT – 0297	BHP Billiton	Edith Cowan		Postgrad Research Sector Visa (574)

Survey Results (responses received in 2016-17)

Interns

Were you satisfied with the service from AMSI Intern?

100% — Yes

How important was the internship in preparing you for future employment?

63.64% — Very important

27.27% — Important

9.09% — Somewhat important

0 — Unimportant

Did you gain or have you been offered employment following the internship?

9.09% — Yes — academic or postdoc position

45.45% — Yes — non-academic position in a role related to study/discipline

0 - Yes — non-academic position in an area unrelated to study/discipline

36.36% — No — continuing study and not currently looking for employment

9.09% — No — not studying, looking for employment

0 — No — not studying, not looking for employment

Would you recommend the AMSI Intern program to others?

90.91% — Would highly recommend

9.09% — Would recommend

0 — Would not recommend

Academic Mentors

Were you satisfied with the service from AMSI Intern?

100% — Yes

Is there an intention to continue the collaboration beyond the end of the internship?

11.11% — Yes — we are seeking co-funding to continue the research

0 — Yes — to implement the outcomes of the research

44.44% — Yes — we are investigating new collaborative projects

44.44% — Not at the present time

Would you recommend the AMSI Intern program to others?

77.78% — Would highly recommend

22.22% — Would recommend

0 — Would not recommend

Industry Partners

Were you satisfied with the service from AMSI Intern?

100% — Yes

To what extent have you previously worked with a university-based researcher prior to the internship?

22.22% — To a great extent

22.22% — To a moderate extent

33.33% — To a low extent

22.22% — No previous experience

Were the project outcomes implemented?

77.78% — Yes

22.22% — No

How important was the R&D Tax Incentive in your ability to proceed with the project?

0 — Very Important

0 — Important

33.33% — Somewhat Important

11.11% — Unimportant

55.56% — Not Applicable

How important was a Subsidy or Voucher Scheme in your ability to proceed with the project?

11.11% — Very Important

11.11% — Important

22.22% — Somewhat Important

11.11% — Unimportant

44.44% — Not Applicable

Would you recommend the AMSI Intern program to others?

33.33% — Would highly recommend

66.67% — Would recommend

0 — Would not recommend

MEDIA

AMSI in the Media

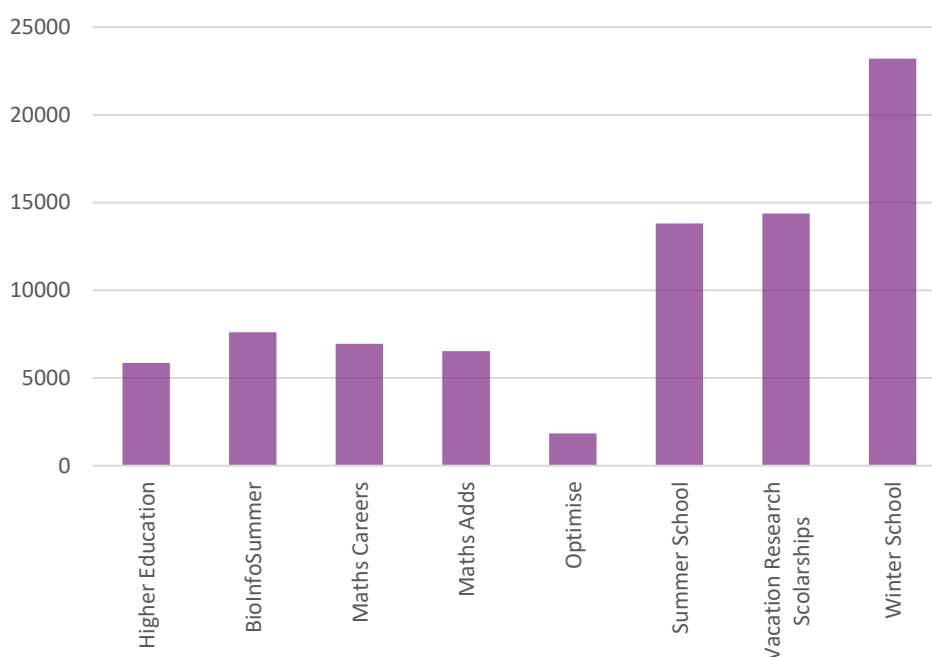
AMSI has continued to achieve significant increases in the number of news articles featured in community, local and national media coverage across different channels and platforms, including print newspapers and online website articles, social media posts and radio interviews. This had an impact on the number of visits to the AMSI website and, in particular, to the event sites.

In 2016/17, AMSI’s Research and Higher Education activities have featured in the media with 21 instances of coverage during the first stage of the Securing Australia’s Mathematical Workforce 2016-2020 project. This success results in a wide reach, increased awareness, and enhanced profile of the project and the program.

A collection of news articles is featured and promoted on AMSI’s website. To find out more about the coverage, reach and profile of AMSI, or to read some of the articles, please visit the website at:

www.amsi.org.au/category/amsi-in-the-news.

FIGURE 6: AMSI websites visits from July 2016 to May 2017



E-News

E-news subscriber numbers to AMSI’s Research and Higher Education monthly newsletter steadily increase, and consistently achieve healthy open rates (averaging 24%) and click rates (throughout the past 11 months).

AMSI promotes its programs and events to direct segments and targeted audiences via this channel, increasing engagement with the wider mathematical sciences audience, and promoting the Securing Australia’s Mathematical Workforce project and activities. The format includes promotion of upcoming events and other opportunities AMSI has to offer, a recap on past events, and links to quirky maths problems and fascinating stories worth sharing.

FIGURE 7: Research & Higher Education e-news subscriber numbers, unique open rate and unique click rate statistics from July 2016 to May 2017

	Number of Subscribers	Open Rate (%)	Click Rate (%)
Jul-16	4283	23%	2%
Aug-16	4258	24%	4%
Sep-16	4328	23%	2%
Oct-16	4305	26%	4%
Nov-16	4281	25%	2%
Dec-16	4260	24%	3%
Jan-17	4232	24%	3%
Feb-17	4211	24%	3%
Mar-17	4268	25%	4%
Apr-17	4451	27%	3%
May-17	4709	25%	4%

Social Media

Social media is an important marketing tool for bringing greater awareness to the mathematical sciences and is an effective platform to promote AMSI and its initiatives, including the Securing Australia’s Mathematical Workforce project activities. AMSI’s social media following continues to expand, allowing a reach to both Australian and international audiences. AMSI has a strong presence on both Facebook (www.facebook.com/DiscoverAMSI) and Twitter (www.twitter.com/DiscoverAMSI).

Facebook groups have contributed to increased engagement, and provide another networking channel for students participating in AMSI’s Research and Higher Education events, fostering a collaborative and social environment. Twitter is particularly important to connect with audiences who were simply not able to attend AMSI events, spreading the message across the globe, and continually maximising the reach of activities beyond the classroom.

Promoting program participants such as VRS students has been an excellent way of connecting with our Facebook readers and showcasing news. These posts have reached over 6,000 people on Facebook.

FIGURE 8: @DiscoverAMSI Facebook page “likes” from 1 July 2016 to 31 May 2017

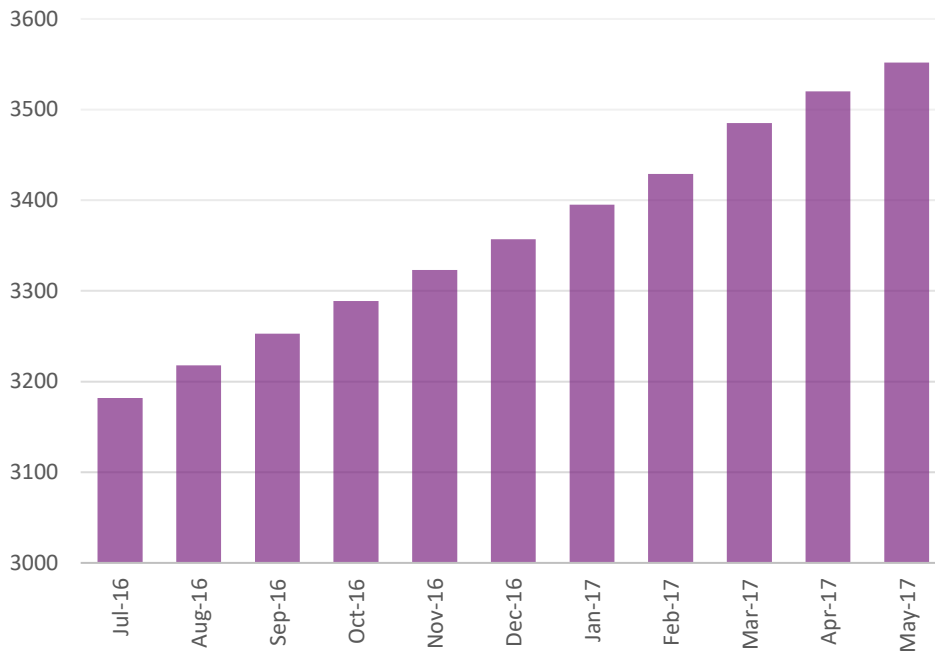
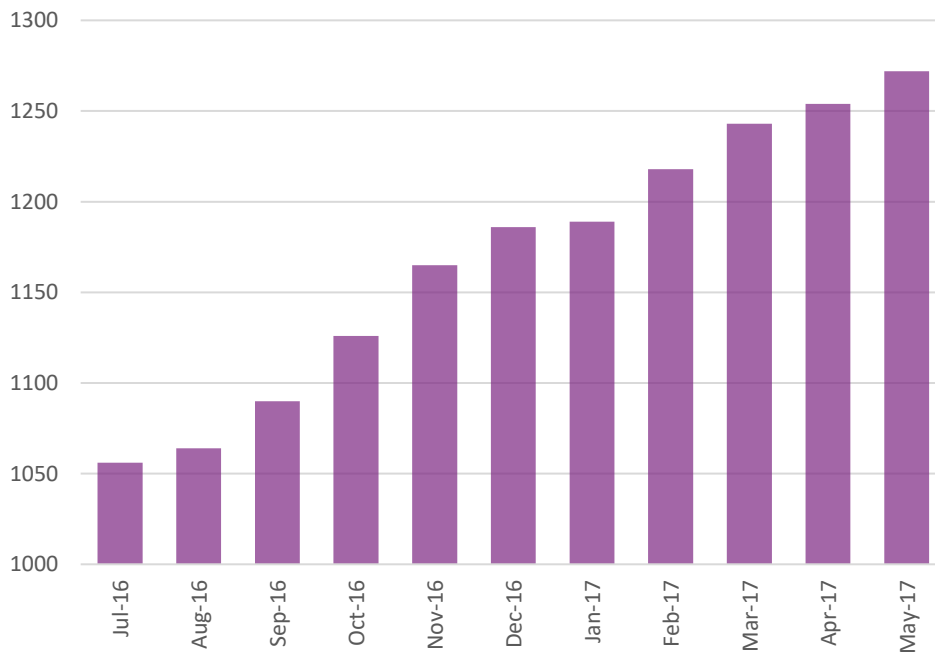
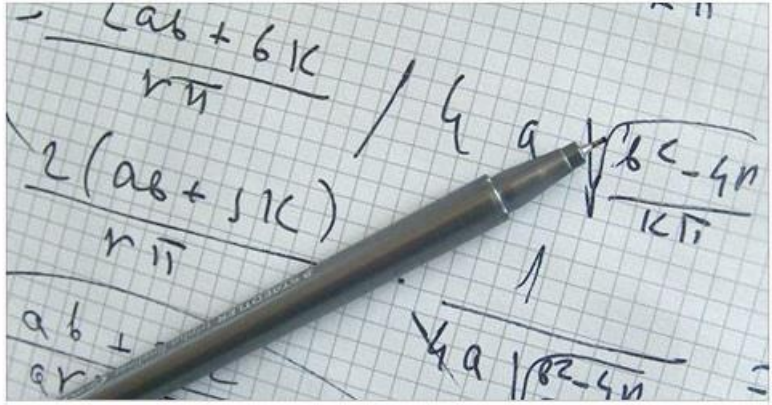


FIGURE 9: @DiscoverAMSI Twitter page “followers” from 1 July 2016 to 31 May 2017



NB: All statistics exclude June 2017 figures as report due date is 30 June 2017.

"The teaching of mathematics through clear, concise, explicit language has been the most interesting thing I have experienced in mathematics."
 My Math Journey, by VRS Scholar, Luke Agosta La Trobe University
 Visit vrs.amsi.org.au to out find more information on Vacation Research Scholarships. <http://wp.me/p4Z37A-13e>



Luke's Maths Journey - AMSI Vacation Research Scholarship

WP.ME

1,088 people reached

Boost post

Like Comment Share

Aaron Kaw, Steven Clark and 7 others

Chronological

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ADVOCACY

The fifth edition of the Discipline Profile of the Mathematical Sciences was released in November 2016. This publication provides a detailed snapshot of the state of the discipline and its impact from the classroom and higher education to research development, workforce trends and industry innovation.

This year's profile includes preliminary data from AMSI's 2015 survey of Australian university mathematical sciences departments, as well as the recent ERA report on research performance in Australia and new mathematical sciences workforce data.

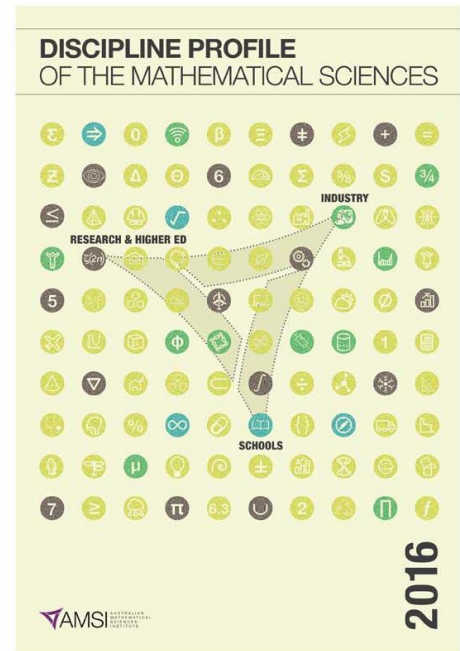
Each year, the discipline profile is accompanied by a publication of policy measures that identify key priorities for government intervention and actions for peak bodies (commercial, educational, scientific and technological) to undertake.

In 2016, AMSI identified five key priorities for intervention:

- **Our Children** — train the unqualified teachers of school mathematics and secure the future supply of properly trained maths teachers.
- **Cultural Change** — restore university maths prerequisites from their historic low and turn around declining school mathematics enrolments.
- **Secure the Future** — increase the rates of graduation in the mathematical sciences, especially among women, to grow and refresh the quantitative professions.
- **World Class** — create world-quality infrastructure on a national scale in the mathematical sciences and increase our international research engagement.
- **Innovation** — boost the engagement of Australian business with mathematical sciences research.

AMSI believes that these priorities must be addressed as the Commonwealth plans and implements its National Innovation and Science Agenda (NISA).

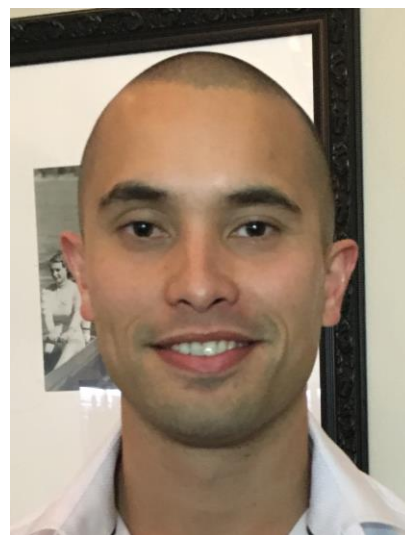
AMSI publication documents, including the *Discipline Profile of the Mathematical Sciences*, can be downloaded from the AMSI website at www.amsi.org.au/publications.



CASE STUDY

WALKING THE INTERSECTION OF SUCCESS WITH BIG DATA

Tui Nolan, University of Technology Sydney



Growing up in Sydney, education was seen as Tui Nolan's gateway to a secure future along with a strong work ethic and determination. Keen to give him something more, his parents also instilled in him the confidence to excel in everything from karate — he has a black belt and two Australian titles — to experimental science.

After completing an undergraduate degree in physics with honours in medical physics, he has found his passion in the mathematical foundations of science and is completing a PhD in Mathematical Statistics.

"My research focuses on development of fast algorithms to manage large datasets using Bayesian Inference. This has a reliance on Computational and Statistical Techniques, something I initially lacked but picked up in my Masters program," he says.

Big-data analysis is perhaps one of the biggest challenges facing business and, to an extent, the sciences. Many areas are experiencing alarming data growth to volumes unmanageable with existing statistical and computational techniques. This has led to the emergence of a bridge between mathematics, statistics and computational science.

"I am working at the intersection of maths, statistics and computational science in an area now referred to as machine learning. These algorithms approximate complex mathematical expressions to deliver timely analysis," Tui explains.

With its focus on biological and environmental modelling, 2016 AMSI Winter School offered learning opportunities beyond Tui's academic program.

"As scientists, continual exposure to different branches of research and broad applications of mathematical skillsets is essential. The opportunity to work with industry- and academia-based mathematicians is invaluable for students and future collaboration."

Tui applauds the Australian Mathematical Sciences Institute's flagship events for helping students develop critical skills needed to take research beyond academic studies.

"Programs such as AMSI's Winter and Summer Schools and the Vacation Research Scholarship Program not only promote mathematics education and career awareness, but open avenues for investigation beyond your studies," he says.

Importantly, these programs also foster work-readiness, along with practical experience. Tui believes that this is essential to ensure students are future-ready, something he knows from personal experience.

A summer scholarship with the Reserve Bank has already given him a taste of what the future could hold. While he is says he is very much a "in-the-now" person, whatever he does in the future, it is certain that Tui will exceed everyone's expectations.

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Lawrence Reeves, The University of Melbourne & Anne Thomas, The University of Sydney

HARMONIC ANALYSIS
Pierre Portal, The Australian National University

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IMAGE: OVERLAYS BETWEEN TWO BIOLOGICAL PROCESSES BY PELLE-OTTEY/ISTOCK/SHUTTER

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