



AMSI News

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On 14 April the Minister for Education and Training, Simon Birmingham, announced \$2m in co-funding over four years for AMSI's research training programs.

This renewal of the 2012–2016 grant is a testament to our success for which I acknowledge all the hard work of AMSI members in hosting events, teaching courses and supervising students.

Simi Henderson, AMSI's program manager for research and higher education, also deserves our warm thanks and congratulations.

We are reproducing the Executive Summary of our renewal application in the interests of *Gazette* readers so that you can see what AMSI has planned for the period 2016–2020.

Executive Summary

The Project—'Securing Australia's Mathematical Workforce'

- An estimated 75% of jobs in the fastest growing industries requiring STEM-skilled workers, ensuring students have the skills to equip them for the workforce of the 21st century is critical to maximising Australia's productivity, and ensuring economic and social wellbeing in an increasingly STEM-based and digital economy.
- While Australia's research ranks highly in the OECD on indicators of quality, we rank last for business collaboration with researchers.
- Women occupy fewer than one in five senior researcher positions in Australian universities and research institutes, and around a quarter of the STEM workforce overall.

National Innovation and Science Agenda (Dec 2015)

Australia's innovation agenda cannot be delivered without a growing workforce of talented, mathematically capable professionals.

The Australian Mathematical Sciences Institute (AMSI) has achieved remarkable results in delivering its 'Vacation Schools and Scholarships' program with Australian government support in the years 2012–2016: sixteen national events and 1559 participants in total. As the national collaborative venture in the mathematical sciences AMSI is uniquely placed to continue to train and secure Australia's expanding mathematical sciences workforce.

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AMSI proposes to deliver an extensive program of research training schools and scholarships, industry-research symposia in bioinformatics and optimisation, and PhD industry internships over the period 2016–2020. This education program will grow the nation’s future public and private sector workforce with advanced skills in mathematical sciences and provide opportunities for increasing participation by female and indigenous students. Direct engagement with Australian companies and public agencies will be a strong and effective feature of the program, contributing to collaborations with the research sector.

The *Securing Australia’s Mathematical Workforce* proposal aligns strategically and operationally with AMSI’s \$22m Choose Maths project, funded by the BHP Billiton Foundation, which will increase participation in school mathematics through the promotion of mathematically based careers. Our proposal provides a vital pull factor with a suite of exciting tertiary study and career pathways for this new generation of mathematically aware school students inspired by the Choose Maths program.

The Australian Mathematical Sciences Institute invites the Department of Education and Training to enter into a cost sharing agreement from 2016 to 2020 to deliver this innovative and strategic project.

Project objectives

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

- A. strengthen research training and the work-readiness of advanced mathematical sciences graduates;
- B. promote university-industry collaborations that will encourage the private sector employment of mathematical sciences graduates;
- C. attract and improve the retention of senior undergraduate students in the mathematical sciences, with particular attention to women and Aboriginal and Torres Strait Islanders.

Project justification

Australia has experienced a radical change in science policy. Building STEM into our future has been identified as critical in sustaining innovation and productivity. The mathematical sciences form the foundation for advances in science, technology and engineering along with its own direct and major contribution to the nation’s economy. However, the evidence unequivocally indicates that significant measures are needed to secure workforce supply in mathematics and statistics.

The proposed AMSI program aligns closely with a considerable part of the *National Innovation and Science Agenda* released by the Prime Minister and the Minister for Industry, Science and Innovation in December 2015. In particular, all the policies outlined under the ‘Talent and Skills’ heading and many of those under the ‘Collaboration’ heading are directly served by this proposal from AMSI.

Project implementation

AMSI will evolve and expand its successful Vacation Schools and Scholarships Project 2012-2016, co-funded by the Australian Government, to increase national STEM capacity through:

- embedded internships that integrate research training and commercial R&D and build innovation and entrepreneurial skills in students (project objectives A,B) ;
- industry-research training symposia in bioinformatics and optimisation (project objectives A,B);
- the delivery of the AMSI Summer and Winter Schools and Vacation Research Scholarships (project objectives A,B,C);
- industry focussed summer school subjects aligned to priority areas (project objectives A,B)
- dedicated financial support to increase female and indigenous participation in the mathematical sciences (project objective C).

As a key part of this evolution, we will undertake joint business development of industry-based PhD research internship program, AMSI Intern, and our industry facing events, BioInfoSummer and AMSI Optimise. In this way we will grow commercial engagement through increased business development capacity rather than direct financial subsidy to industry.

Project outcomes

Over the period 2016–2020 AMSI will deliver four Summer Schools, four Winter Schools, four editions of BioInfoSummer and three of AMSI Optimise. We will place more than 200 undergraduate students into research scholarships each summer and 45 PhD students into research internships with Australian companies. Our overall target is 1650 participants over the four years.

Some key measures of success in the period 2016–2020 are:

- increased graduations in the key areas of bioinformatics, optimisation and statistics/data science to meet heightened employer demand (project objectives A, B, C);
- successful delivery of AMSI industry and flagship events (project objectives A, C) measured by attendance and feedback from the participants;
- increased numbers of PhD students undertaking industry-based internships (project objectives A, B);
- increased university-industry collaborations commenced through internships (project objective B);
- increasing engagement of businesses in AMSI industry-research symposia (project objectives A, B);
- increased engagement of women and Indigenous students in AMSI research training programs (project objectives A, C).

Conclusion

The *Securing Australia's Mathematical Workforce* project directly addresses three imperatives identified in the *National Innovation and Science Agenda*, namely improved STEM education, enhanced industry collaboration and increased female and ATSI participation in the STEM workforce. The success of the project will provide significant and enhanced commercial return on the public investment in research training in the mathematical sciences.



I was a Monash undergraduate and took out a La Trobe PhD in 1981 in geometric mechanics and Lie groups. This was followed by a postdoc at the Institute for Advanced Study in Dublin. I've enjoyed teaching at RMIT, UNE and La Trobe. My research interests lie mainly in differential equations, differential geometry and the calculus of variations. I'm a proud Fellow of the Society, currently a Council and Steering Committee Member. I became AMSI director in September 2009.