



Australian Academy of Technological Sciences and Engineering (ATSE)

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PRELIMINARY SUBMISSION

National Strategic Review of Mathematical Sciences Research in Australia

The Australian Academy of Technological Sciences and Engineering (ATSE) has a vital interest in research into the mathematical sciences and strongly endorses this Review. In due course it is intended that a broad range of Fellows will be consulted on the topic to seek their views on this issue, but in the meantime ATSE would like to indicate its interest and provide some very preliminary observations.

The need to publicise capabilities

There is world class mathematical research being undertaken in Australia but many of the potential beneficiaries of this work remain ignorant of what capacity exists, what this could mean to them and how to go about accessing the necessary expertise.

An expanded and more relevant research base in mathematical sciences will require an expanded effort to market capabilities but more in terms of 'what we can do for you' rather than 'look at what we can provide'. It is recognised that the Australian Mathematical Sciences Institute (AMSI) and the ARC Centre of Excellence for Mathematics and Statistics of Complex Systems (MASCOS) and some others have already embarked on this type of program but more needs to be done to ensure potential users of mathematical services and supporters of research are aware of how they could be helped. Industry 'does not know what they do not know' and until more is done to educate them, further research in its own right is unlikely to be rewarding. A serious investment needs to be made to identify opportunities, publicise successes (in lay rather than mathematical terms) and in innovative marketing, such as reducing risk in sponsoring research through cost sharing and rewards being mainly based on results.

Promoting interdisciplinary activities

While sophisticated purchasers of mathematical services may be able to define their needs in purely mathematical terms, most non-academic users see their problems in real life terms – increasing the life of a component, understanding an ecosystem or a potential pandemic, improving energy efficiency of a building etc. – which will demand a combination of mathematical skills with other disciplines. For these potential users and funders the mathematical sciences fraternity needs to team up with other disciplines to provide integrated solutions rather than leave it to the customer to piece the parts together.

Joining CRC applications or existing CRCs headed by other university departments or CSIRO should be encouraged as an easy way to participate in multidisciplinary research directed at technological problems. Someone with a mathematics connection could well serve on advisory or governing bodies of a wide range of technical, social, environmental and cultural research centres as a means of identifying where opportunities for collaboration might lie.

Developing new mathematicians and mathematical literacy in other disciplines

The Academy has been on record many times expressing concerns about the decline in the number and quality of teachers in the enabling sciences and mathematics and, although it seems to be tangential to this Review's terms of reference, it is an issue that cannot be ignored.

ATSE is in no position to judge whether there is a shortage of mathematicians in Australia but is concerned that the grounding in mathematics many higher education graduates receive makes them incapable of understanding how powerful the application of mathematical techniques in their specialist disciplines might be. Even though they may never use the skills themselves it appears more could be done in undergraduate education to create a better understanding of how mathematical modelling, advanced statistical analysis, simulation, etc, can assist in resolving practical problems. If anything this need is expanding as risk management emerges as one of the prime preoccupations of business and government.

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