



AMSI News

Philip Broadbridge

I start by reminding you that the Australian Mathematical Sciences Institute continues to offer significant benefits to researchers, such as a continuing program of workshops and conferences. I am pleased to report that at the time of writing, a successful four-week AMSI theme program is running at the University of Melbourne, entitled 'From Statistical Mechanics to Conformal and Quantum Field Theory'.

From 26 November to 14 December, AMSI and MASCOS (Centre of Excellence for Mathematical and Statistics of Complex Systems) will run their first joint theme program, 'Concepts of Entropy and their Applications'. The early part of the theme will re-examine the historical foundations in thermodynamics. However, these concepts have much wider applications. Since 1950, entropy concepts have been closely linked to information theory. From that connection, there have evolved applications in quantum computing, computational complexity, coding, genetics, approximation theory and forecasting. Improvements continue to be made on algorithms involving maximum entropy methods, simulated annealing and earlier Monte Carlo simulation techniques. There is also an increasing role for entropy arguments in the qualitative theory of partial differential equations, having some bearing on well-posedness and stability. I invite anyone interested to contact me. The structure of the program will be determined by your interests.

The report 'Critical Skills for Australia's Future', from the National Strategic Review of Mathematical Sciences Research in Australia, recognises that research performance depends on the health of the education system (<http://www.review.ms.unimelb.edu.au/Report.html>). Because of that interdependence, AMSI works to improve research and education together, along with industry involvement.

A good example is the forthcoming workshop and ICE-EM (International Centre of Excellence for Education in Mathematics) Industry Short Course, 'Mathematics of Electricity Supply and Pricing'. The workshop, organised jointly by AMSI, MASCOS and MITACS (The Mathematics of Information Technology and Complex systems), will be held in Surfers Paradise during the week 22–27 April 2007 (see <http://www.amsi.org.au/Electricity.php> for more information). Registration is offered at a subsidised rate to AMSI members, who may also apply to their Head of Discipline for AMSI travel support.

The relationship with Engineering is very important to the Mathematical Sciences, both in research and in education. All states will be involved in the AMSI-initiated discipline-based scoping project, 'Mathematics for 21st Century Engineering Students', funded by the Carrick Institute. Whether or not you are an AMSI member, I would be pleased to hear from you if you have local examples of engineering service teaching that are exemplary in helping us to determine what is good practice, what is poor practice and what is mediocre practice.

Finally, I am intrigued and disturbed by the way mathematics educators appear to have moved away from interaction with mathematicians and statisticians. It used to be common

for university mathematical scientists to be members of the local and national mathematics teachers' associations. The celebration of the centenary of the Mathematical Association of Victoria in 2006 reminded us all of the crucial role of university mathematicians in the history of that body.

More disturbing is the lack of communication between education faculties and mathematical sciences departments. A study undertaken by ICE-EM found primary BEd courses with little or no mathematical discipline study.

It is important for us to work closely with mathematics education staff who do understand the importance of discipline content as well as pedagogy in the teaching of mathematics. And we need to work hard to address the unfortunate situation that has arisen in too many universities where there are large numbers of teacher education students, and mathematics departments that cannot offer a three-year sequence of mathematics and statistics to these students. I have always found it self-contradictory that teachers are expected to encourage curiosity among their students but to devote no time to developing their own interests in their subject. Ultimately, the state of health of mathematics is a strong indicator of the success of mathematics education.

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His PhD is in mathematical physics (University of Adelaide). He has an unusually broad range of research interests, including mathematical physics, applied nonlinear partial differential equations, hydrology, heat and mass transport, and population genetics. He has published two books and more than 80 refereed papers, including one with 147 ISI citations. He is a member of the editorial boards of three journals and one book series.