NCMS News

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By now, you will know that Dr Peter Stacey has presented talks about the Decadal Plan for Mathematical Sciences at major cities around Australia. At the first such presentation, attendees from DSTO (Defence Science and Technology Organisation) suggested that additional presentations should be held at locations outside university campuses. This suggestion was also made by members of other government organisations, including CSIRO and ABS. The purpose of this column is to report on the feedback and suggestions that were made at these additional events.

Audience members at these events brought up general points not tied to specific themes identified by subcommittees, but have also responded to several specific themes. I list selected points here. (Please write to me if you would like to have a copy of the full report prepared by Peter Stacey.)

I was particularly happy to see that there was widespread agreement on major issues. Let me offer one striking quote: 'DSTO needs a strong supply of Australian graduates with mathematical science skill sets or else the future is bleak'. It is also important to note that statisticians at government instrumentalitites have highlighted major concerns different to those expressed by mathematicians at universities.

The general points made were:

- The Mathematical Sciences are enabling technologies which are increasingly important to Australia's future.
- The Mathematical Sciences face a number of major challenges, risking a significant diminution in Australia's capabilities.
- There are poor perceptions of the usefulness of mathematics and statistics.
- The number of mathematics and statistics students and lecturers in the university sector is critically low.
- There is underdeveloped mathematical infrastructure for business, industry and research.
- The plan should be to inform government, taking into account that governments come and go, and should not focus on stopgap measures.
- The plan needs to take account of strategic research programs such as *Securing Australia's Future*[1], identified by the Prime Minister's Science, Engineering and Innovation Council and the Chief Scientist.

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[1] http://www.acola.org.au/ACOLA/index.php/projects/securing-australia-s-future

Theme[2] related comments

- **[1.3, 4.2]** The demand and supply of mathematical scientists is similar to that in information technology, which was discussed at a recent NICTA forum on ICT Skills. At the forum, impressive results were reported from Group X[3], a group supporting ICT education in Queensland schools, and it was suggested that the initiative could be extended nationwide.
- **[4.2]** DSTO employs about 2300 staff and most research areas need input from those with mathematical science expertise. While DSTO mainly employs graduates at the honours level, there is a stated aim to increase the percentage of PhDs. Most mathematical scientists in DSTO are not classed as mathematicians: there are 35 DSTO positions with 'mathematician' in the title, which is a vast under-representation. There are about 250 'Operations Research' specialists with about 50% on the mathematical side. Mathematical science expertise need not necessarily be acquired in mathematics or statistics degrees, since broader engineering or IT degrees could provide this. We need to look at the standard of mathematics being used: a person is not a mathematician after completing a first year university subject.
- **[4.2]** The situation of statistics identified in the 2005 review was parlous and it has since worsened. There is no 21st century university department or group and groups are all below critical mass. The statistics of big data is almost totally absent. Universities need to collaborate to gain global mass and need to consider professional doctorates in statistics.
- **[4.2]** If statisticians were accredited in the manner of medical officers then employers, including government agencies, would have an assurance of quality. As described at http://www.amstat.org/, in the USA there is a push to create the position of Chief Statistical Scientist in the office of the NSF Director. The similarities and differences between mathematics and statistics need to be teased out, leading to the consideration of possible roles such as Chief Mathematical Scientist or Chief Statistical Scientist. Breakthroughs in statistics have come from a variety of sources, some outside the mathematical sciences. It is important for the discipline of statistics that it is stimulated by the challenges and opportunities that arise in everyday applications. An 'engineering solutions' type role is important for many practising statisticians. The ability to apply statistical/mathematical science to resolve actual problems is equally as important as the ability to develop new techniques and methods. It may be that the most appropriate preparation for data scientists involves elements not currently in statistics degrees. The plan needs to address both the disciplinary and professional aspects of statistics; in order for recommendations to get traction we need to get agreement from both the discipline and the profession.

[2]The item numbers here refer to themes enumerated (after clicking on 'themes') at http://www.mathscidecadalplan.org.au/committees/
[3]http://groupx.edu.au/

The deadline for submissions on the decadal plan has been extended to 30 April 2013 and I look forward to seeing more submissions as well as comments, possibly on the issues described above, on the website www.mathscidecadalplan.org.au.

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