



**Nalini Joshi\***

## **Advancing Women In Mathematics?**

The London Mathematical Society (LMS) published the report *Advancing Women in Mathematics: Good Practice in UK University Departments* in February this year.<sup>1</sup> This report is only one facet of many actions being carried out world-wide on behalf of women scientists and mathematicians and I would like to ask you to consider whether similar actions are needed in Australia.

To whet your appetite, consider some of the questions that are quoted below from a questionnaire that departments can use to assess their practices, which was prepared by Professor Rachel Kuske.<sup>2</sup> This, and many other resources can be found at the website titled 'Diversity in the Mathematics and Scientific Community',<sup>3</sup> which grew out of a Banff Research Station Workshop on supporting diversity in mathematics. I quote one question from each of the first five major headings (in italics) in the questionnaire:

- *Hiring and Recruitment Strategies*: What specific efforts do you make to ensure a diverse pool of candidates for 1. temporary positions, 2. tenure-track positions, 3. senior hires? Are they successful?
- *Professional Development*: How do you mentor junior faculty when new? Over time? Define mentoring.
- *Work-life balance*: What is your policy on family leave and are people using it?
- *Governance*: Is there committed leadership on diversity issues at the Department level?
- *Policies and grievances*: Is there an Ombudsperson/Ombudscommittee available to all?

I did not know the answers to all of the above questions for my School or University. Do you?

There are also many personal reflections and descriptions of experiences by leading women in mathematics and statistics. I refer you to three recent articles by Professors Nancy Reid 'The whole women thing', Louise M. Ryan 'Reflections on Diversity' and Mary E. Thompson 'Reflections on women in statistics in Canada',

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<sup>1</sup>A copy of this report can be downloaded from a link at <http://www.lms.ac.uk/women/good-practice-scheme>

<sup>2</sup>[http://mathdiversity.wesleyan.edu/dept\\_quest.pdf](http://mathdiversity.wesleyan.edu/dept_quest.pdf)

<sup>3</sup><http://mathdiversity.wesleyan.edu>

which are to appear in a book to be published by the Council of Presidents of Statistical Societies.<sup>4</sup>

In 1999, the LMS established a Women in Mathematics committee. Its aims and concerns were focussed on ‘the loss of women from mathematics, particularly at the higher levels of research and teaching, and at the disadvantages, and missed opportunities that this represents for the advancement of mathematics’.<sup>5</sup> The committee’s role was to bring about suggestions and policies to stem this loss. The 2010 International Review of Mathematical Sciences in the UK (commissioned by the EPSRC) highlighted the need for ‘urgent action’ on this front.<sup>6</sup>

In the period between these two events, the UK Scientific Women’s Academic Network (SWAN) formulated a Charter of Principles for its Athena Project to ‘advance the representation of women in science, engineering and technology’.<sup>7</sup> In 2005, it launched the Charter, which comprises six principles aimed at organisations. More than half of the higher education organisations in the UK that are active in Science, Technology, Engineering, Mathematics and Medicine areas have joined the Charter. The accompanying Athena SWAN awards recognise good practice by organisations and departments and are awarded at three levels: bronze, silver, and gold. They received a huge impetus from the announcement by the UK Chief Medical Officer that the National Institute for Health Research would only expect to shortlist a school for funding if it holds a Silver Athena SWAN award.

To consider whether similar actions may be needed in Australia, I had a look at AMSI’s 2013 discipline profile of the mathematical sciences.<sup>8</sup> This profile reports undergraduate and higher degree student numbers, as well as staff numbers at different levels by gender from surveys of member institutions (reported on the census date in Semester I, 2012). Longer time-period data for completion of honours and higher degrees completed in mathematics and statistics are also included for the period 1959–2011.

This report shows that approximately 33.8% of all undergraduate students enrolled in a mathematics subject at an AMSI member institution on the Semester 1 2012 census date were female.<sup>9</sup> At honours level in mathematical sciences, approximately 23.9% of all domestic students are female, whilst at the PhD level,

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<sup>4</sup>The book *Past, Present and Future of Statistical Science*, celebrates the Council’s 50th anniversary and is to be published by Chapman and Hall, 2014. Preliminary versions of these articles can be read at <http://www.math.mcgill.ca/copss/Contributions/Reid.pdf>, <http://www.math.mcgill.ca/copss/Contributions/Thompson.pdf> and <http://www.math.mcgill.ca/copse/Contributions/Ryan.pdf>.

<sup>5</sup>*Advancing Women in Mathematics: Good Practice in UK University Departments*, LMS, 2013, p.7

<sup>6</sup>quoted on p.7 *ibid.*

<sup>7</sup><http://www.athenaswan.org.uk/content/history-and-principles>

<sup>8</sup><http://www.amsi.org.au/index.php/publications-mainmenu/amsi-publications/148-publications/advocacy/1029-discipline-profile-of-the-mathematical-sciences-2013>

<sup>9</sup>Table 2.2.1.3, Discipline Profile of the Mathematical Sciences, AMSI, 2013  
<http://www.amsi.org.au/index.php/publications-mainmenu/amsi-publications/148-publications/advocacy/1029-discipline-profile-of-the-mathematical-sciences-2013>

the proportion of female domestic students drops to 17.8%.<sup>10</sup> In the mathematical workforce at an AMSI member institution, the proportion of female staff members starts at 48% for casual staff, 38% at Level A, 34% at Level B/C and drops to 14% at Level D/E.<sup>11</sup>

Corresponding statistics for the UK can be found in the LMS report mentioned at the beginning of this column. These figures are drawn for all institutions in the UK and therefore are calculated with respect to much larger populations. These show<sup>12</sup> that 42% of all undergraduate students in the mathematical sciences are female, while 19% of all PhD students are female. Both of these percentages are higher than the Australian ones quoted above.

With respect to staff, the percentage of lecturers/senior lecturers in the UK who are female is 29%, whilst the corresponding percentage of Professors is 6%. These are not directly comparable to the figures given above for Australia, because academics at Levels C and D in Australia overlap with both Senior Lecturers and Readers in the UK. However, if we infer the same percentages for Level B/C as the Lecturer/Senior Lecturer in the UK setting, the UK percentage of females (29%) appears to be lower than the corresponding percentage (34%) for Australia. If we infer the percentage for Level D/E as the same as that for Professor in the UK setting, the UK percentage of females (6%) is much lower than the corresponding percentage (14%) for Australia.

In the UK, there is a dramatic difference between the percentage of female students in the mathematical sciences pipeline (42%) and the percentage at the top level of academic employment (6%), but the percentage of female students at both undergraduate level and PhD level appear to be higher than the corresponding numbers in Australia. The corresponding change in the pipeline in Australia is less dramatic (from 33.8% to 14%, based on available figures), however, the beginning of the pipeline is narrower, with lower female undergraduate percentages. Nevertheless, there is still a distinct loss of mathematical talent along the way.

Look around you. How many female professors (or equivalent level) of mathematics, statistics or mathematical education work at your institution?



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<sup>10</sup>Table 3.3.3.3, *ibid.* Note that the reported percentages differentiated between domestic and international students, and no overall percentages were available.

<sup>11</sup>Figure 3.1.1, *ibid.*

<sup>12</sup>Figure 1, p. 11, *Advancing Women in Mathematics: Good Practice in UK University Departments*, LMS, 2013.