Doctoral training programs at Oxford University

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A number of universities in the UK have realised the importance of providing a bridge between an Honours degree and undertaking doctoral study. This is especially true when a student is looking to start a PhD in multidisciplinary science. The University of Oxford has recently established two doctoral training programs: the Life Sciences Interface (LSI) Doctoral Training Centre and the Doctoral Training Centre in Systems Biology.

The doctoral training programs provide a comprehensive training program to graduates from both the physical and life sciences who wish to undertake research careers in interdisciplinary fields in the Life Sciences. Students undertake a series of courses, typically about three weeks long. These are given by a number of people with either an experimental or modelling background so that they are exposed to a wide variety of approaches and skills across the breadth of relevant physical and life sciences techniques. This will help the students to be better informed on what are the important scientific research challenges and hence to do better science.

In the LSI program the focus is on bionanotechnology, bioinformatics, medical images and signals and computational biology while in the Systems Biology DTC the focus is on chemosensory networks and whole organism behaviour, signalling pathway modelling, molecules to cells and integrative biology. The programs are linked to a number of departments including Physics, Mathematics, Computer Science, Biochemistry and Engineering Science. At the completion of the program the students undertake PhDs in these departments.

The DTC currently has a student base of 48 students who are working at various stages of the program. The first group of students graduated with their Doctorate degrees in 2006. The background of the students is very widespread including biochemistry, biology, chemistry, computer science, engineering science, human sciences, mathematics, statistics, physics and electronics. The DTC is located within the new interdisciplinary e-Science building in the main science area of the University. Students are based in the building in their first year, returning to it frequently in subsequent years for ongoing training, seminars and reading programs.

Substantial funding to establish these programs came from initiatives from the two funding agencies: the Engineering and Physical Sciences Research Council (EPSRC) and the Biotechnology and Biological Sciences Research council (BBSRC).

I participated in both doctoral training programs and found the students very bright and keen to learn and to engage. In talking with them it is clear that

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they have picked up on many important areas and were very well rounded in their outlook on science. Many of them had had the opportunity to work on experimental aspects even though they had not previously been exposed to this important component of multidisciplinary research.

At the moment there is no doctoral training program in mathematics in Oxford but plans are under way to try and establish such a program. However, it is expensive to establish and run and so needs considerable priming from the relevant research councils.

In a slightly different setting the African Institute for Mathematical Sciences in Cape Town, South Africa provides a type of doctoral training program — see my previous article in the *Gazette* (*Gaz. Aust. Math. Soc.* **34**(2), 92–93) — in which 50–60 of the best African students in mathematics or computer science study a series of subjects over a period of nine months.

Now while various groups in Australia run winter or summer schools for graduate students, this is not the same in scope as the doctoral training programs and does not expose potential PhD students to such a rich environment of ideas and techniques. If Australia is to stay abreast of developments in multidisciplinary science it needs to train its students appropriately either through individual university doctoral training programs or perhaps through the Australian Mathematical Sciences Institute championing some of these ideas and then lobbying the Australian Research Council and state and federal governments. In all of these training programs mathematics is always the key.

Relevant Web sites

http://www.epsrc.ac.uk/
http://www.bbsrc.ac.uk/
http://www.lsi.ox.ac.uk/
http://www.sysbiodtc.ox.ac.uk/
http://www.aims.ac.za/english/

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