# PhD studentship in statistics

## School of Mathematics (University of Edinburgh) and Biomathematics and Statistics Scotland (Aberdeen), UK

#### To start: September 2013

We have funding for a 3.5 year PhD studentship in statistics, to develop efficient statistical methods to integrate different types of genomic data.

The aim is to identify the network of genes, proteins and metabolites working together in a cell as a part of a physiological function or a disease. From the statistical point of view, this corresponds to estimating a joint precision matrix, that is likely to be sparse, in a consistent way, under different, possibly non-Gaussian, marginal distributions of the data. An interesting theoretical question is when it is possible, i.e. given the total number of genes, proteins and metabolites, what is the largest size of the network that it is possible to recover consistently.

We will not only study this from a purely mathematical point of view but also consider real biological data from both human nutrition studies (in collaboration with the Rowett Institute of Nutrition and Health, Aberdeen) and also plant biology (in collaboration with the James Hutton Institute, Dundee) where several types of genomic data are collected for the same human or plant samples.

Our statistical research will have direct practical implications for life scientists by not only asking how joint different types of omics data can be integrated to one network analysis, but also what types of networks can be expected to be recovered for a given study design.

### Funding

The studentship is for 3.5 years full time, from September 2013. It includes UK/EU fees and a full maintenance stipend of approximately £13, 726 per annum. The project will be jointly supervised by Dr Natalia Bochkina (University of Edinburgh) and Dr Claus Mayer (BioSS). The student will be based at the School of Mathematics, a thriving research group with over 50 academic staff and over 60 PhD students working in different areas of mathematics. The student will be expected to make regular visits to Aberdeen over the duration of the PhD.

In addition to the fees and stipend funding, the students have an opportunity to apply for a School of Mathematics Teaching Scholarship of up to  $\pounds 1,800$  per year that involves tutoring and related duties over the duration of the PhD.

### Environment

The University of Edinburgh is a historic institution founded in 1583, currently ranked as the 21st top university in the world. Our alumni include Charles Darwin and James Clerk Maxwell. The School of Mathematics is a world renowned centre of excellence in mathematics, with academic staff who are leaders in their areas of research. Our graduates go on to successful careers in academia, industry, and government. A 2009 survey found that being a mathematician is the best job there is!

Further information about the School can be found at:

http://www.maths.ed.ac.uk/pg/

Biomathematics and Statistics Scotland (BioSS) undertakes research, consultancy and training in mathematics and statistics as applied to agriculture, the environment, food and health. BioSS has a distributed staff structure to allow close contact with scientists throughout Scotland, with headquarters on the King's Buildings science campus of the University of Edinburgh and offices in Edinburgh, Aberdeen, Dundee and Ayr. The student will be linked with the BioSS group at the Rowett Institute of Nutrition and Health, which is part of Aberdeen University. BioSS students profit from an interdisciplinary research environment and are integrated to various activities like 3 annual meetings where BioSS staff and students discuss aspects of their statistical work.

## **Entry requirements**

Applicants are expected to have obtained a good undergraduate degree at upper second class honours (2:1) or above. Students should have an academic background in mathematics or statistics, although those from a life sciences background with strong analytical skills are also encouraged to apply. Students should have the ability to work independently, with effective written and oral communication skills. There is an English language requirement for all non-native English speakers.

Applicants should be UK/EU nationals.

Further information and the online application form is available at

http://www.maths.ed.ac.uk/pg/prosp.shtml

For enquiries regarding the PhD, please contact Dr Natalia Bochkina (<u>N.Bochkina@ed.ac.uk</u>) or Dr Claus Mayer (C.Mayer@abdn.ac.uk).

### How to apply

Applicants must complete and submit an online admissions application, via the admissions portal <u>http://www.ed.ac.uk/studying/postgraduate/degrees?id=516&cw\_xml=details.php</u> This must include the following:

- Academic References all admissions applications require two supporting references. If the applicant is relying on his/her referees to submit references directly to the College after he/she has submitted his/her admissions application, then the applicant must ensure that their chosen referees are made aware of the funding deadline.
- Academic Transcripts where applicable, academic transcripts (with a translation to English if the original is in a different language) must be submitted with the online admissions application.
- Your CV and a Personal Statement outlining your suitability, why you are interested in pursuing a PhD in this area, and any other information relevant to the application should be uploaded as an attachment. (In the Research Proposal section of the application form you may only comment "Please see attached documents").
- English Language Certificate if the applicant is not a native English speaker

• Please use the reference "Joint BioSS Statistics" in the 'Funding' section of the admissions application.

Only shortlisted applicants will be contacted.

# Closing Date: Monday 13<sup>th</sup> May, 2013 (09:00 GMT)

Interviews: Week commencing: 3<sup>th</sup> June 2013