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JAMES RENNIE BEQUEST

REPORT ON ATTENDANCE OF A WORKSHOP ON MULTIVARIATE MORPHOMETRICS

On the 12th of March, 2001 the James Rennie Bequest kindly granted me £150 towards attending a special course on Advanced Biostatistics at the University of Amsterdam. This grant covered the cost of travel to and from the course and accommodation whilst in Amsterdam, for which I am extremely grateful. Contribution of this money towards my trip made attendance at this extremely useful and relevant course possible.

The focus of this course was on Multivariate Morphometrics with emphasis on developments in the field of multivariate statistics and their relevance to studies of biological size and shape. The scope of this topic was such that the course covered theoretical statistics but combined this with opportunities to apply this theory using computers. Held in the University of Amsterdams' *Amstel Instituut Studio Classroom*, the course gave access to facilities of outstanding quality. Multimedia presentations were common with displays alternating from power-point, to white board, to enlarged computer screens. The design of the room included 16 large flat screen computers to share between 25 students making hands on experience with computer programming and statistical packages possible. The technology of the classroom made learning easy and extremely enjoyable.

The course was run over a period of four days. Lectures and demonstrations were given by three distinguished scientists in this field: Dr Richard Strauss, Dr Eric Dyreson, and Dr Antonia Monteiro. Day One covered topics concerning the

modelling of individual forms. This included descriptions and demonstrations of methods of abstracting forms such as radial functions and tangent angle functions. One method which was of particular interest to me was Fourier decomposition of forms which enables comparisons of outlines between forms with minimal assumptions of homology. Day One ended with a discussion on the use and assumptions of homology in interspecies comparisons.

Days Two and Three covered a multitude of multivariate statistical tests which can be used to test hypotheses about sets of populations or forms. Starting with familiar analyses such as Principle Components Analysis, Discriminant Function Analysis, and Factor analysis the course quickly moved on to cover more complicated procedures such as Canonical Variates Analysis, 'Size-free' Discriminant Functions, and Multivariate ANOVA. By far the highlight of these two days was learning how to attach significance values to these tests when data is nonparametric. The importance of the bootstrapping technique was emphasised throughout these procedures.

Day Four was, for me, the highlight of the course as a bridge between analysis of phylogenetic data and morphometric data was formed. This is of particular relevance to my own PhD where I plan to use phylogenetic and morphometric data to understand the process of speciation. Statistical methods of visualising shape change such as thin-plate-spline and procrustes methods were introduced in the morning. During the afternoon methods of mapping phylogenies into 'morphospace' were demonstrated. This was particularly interesting to me as it is an excellent method of combining phylogenetic and morphological data sets visually.

Throughout the course we were introduced to numerous computer packages for collecting, analysing and presenting our morphometric data. Such packages included programs such as Object-image 1.62, TpsDIG, MATLAB, SAS, and 'Rhetenor' for Mesquite many of which I plan to use here at the University of Edinburgh. I found these introductions extremely useful as they enabled me to see what software other morphometricians are currently using.

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Attending this workshop enabled me to establish links with people in my field and with some highly skilled experts. I made use of the informal class atmosphere which encouraged questions and discussion on topics of difficulty or debate. I have returned to Edinburgh with a great deal of enthusiasm to apply my newly learnt skills. I plan to remain in touch with this network of people on a social and professional basis.

I would strongly recommend this course to anyone studying morphometrics and evolution of morphology. In conclusion, I would like to emphasise how useful I found this course and how grateful I am for the support given by the Committee of the James Rennie Bequest. I had a fantastic time and would love to attend next year!

Kind Regards,

Felicity Jones

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