THE CAMBRIDGE STATISTICS DISCUSSION GROUP

Thursday 4th May 2006 7:15 for 7:45

Hopkinson Room,
University of Cambridge Computer Laboratory,
Pembroke Street, Cambridge

Parameter estimation and prediction for the course of a single epidemic

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Abstract: Predictions in epidemiology are mainly made on the basis of mean behaviour of an ensemble of replicates. However, in practice we are often interested in predicting a course of a disease in a particular population. Close inspection of many examples of replicate disease progress curves shows that once a trajectory is chosen, variability is low. In contrast, the between-replicate variability is often very high, resulting in high degrees of unpredictability based on average behaviour. Future course prediction of an epidemic is based on partial observations of this population and complete past observations of similar populations. A hierarchical Bayesian approach is a natural choice for a replicate-based prediction method, enabling us to combine partial information about a particular realisation with a behaviour of other realisations. Adam explores this idea for a set of contrasting population dynamics of a plant pathogen. He shows that even a very limited set of data can be used to narrow down predictions for development of a single epidemic, even if variability between individual epidemics is very large. This has profound implications for data collection and analysis as well as for designing control strategies. The relevance of results in a broader ecological context, particularly to invasion and persistence of species, is examined.

Speaker: Adam did his postgraduate study at the Institute of Physics in Krakow fitting deterministic and stochastic models to physical processes and, subsequently in Germany, to ecological systems. Since coming to Cambridge he has worked in various university departments modelling behaviour of measles, soil-born diseases and cereal pathogens. He is currently lecturing in Mathematical Biology at the Department of Plant Sciences looking at plant and microbial systems biology.

Directions: Enter the New Museums site through the arch from Pembroke Street. Turn to the left in front of the building with the brown iron staircase and pass through the passage way by the tree. Enter the lobby which is straight in front of you and find the back entrance to the Computing Service on your left. When inside follow the signs to the Hopkinson Room. It is not possible to park on the New Museums site in the evening. The back entrance to the Computing Service will be locked at **7:45.** Arrivals after **7:45** can gain admittance by contacting the secretary on 07761769436.

Provisional Next Meeting:
3rd October – Nick Galwey (GSK).
Supper: Some members eat regularly in the University Centre before each meeting at **6pm**. Feel free to join them.
Subscriptions: of 4 pounds are now due for attending the 2005-2006 session.
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