

LTCC Advanced Statistics Course

Title: High Dimensional Bayesian Modelling

Course Description:

- Notion of random distribution function.
- The Dirichlet process: properties, posterior and large sample properties.
- Mixtures of Dirichlet processes.
- Stochastic processes; independent increment processes and survival models.
- Decision theory, based on the notion of maximization of expected utility.
- Regression modelling with $p \gg n$.
- Basis functions and wavelets
- Regularisation, variable selection and sparsity.
- Auxiliary variables and multinomial modelling.
- Bayes factors, BIC, FDR and Bayes multiple comparison.
- Illustrations from social science, medicine, genomics and proteomics.

Recommended reading: A.F.M. Smith and J. Bernardo (1994) *Bayesian Theory*. Wiley.

Prerequisites: Knowledge of stochastic processes; probability theory; Bayesian statistics.

Format: 8 lectures of 1 hour each over one day (mid-day to mid-day).

Lecturers: Professors Philip Brown and Stephen Walker (University of Kent).