

**EPSRC Symposium**

## **Challenges in Scientific Computing**

**Workshop on Markov chain Monte Carlo and related methods**

**16-20 April 2009**

**Organisers:** Professor Gareth Roberts (University of Warwick), Dr. Elke Thonnes (University of Warwick), Professor Andrew Stuart (University of Warwick)

**Symposium Organiser:** Andrew Stuart (University of Warwick)

### **Introduction**

For over 50 years, MCMC has been one of the most important computational techniques for simulation and Monte Carlo in high dimensional problems, impacting problems across the scientific spectrum. However its relevance as an area is still expanding rapidly, fuelled by computational power, the availability of complex high-dimensional data and the need to model large complicated systems. Modern application areas are demanding ever more from MCMC methods and this also increases the demands for research into methodology and theory. In recent years, the field has been significantly broadened and enriched by the introduction of closely related computational methods often involving sequential and/or adaptive methods.

### **Aims**

The main aim of the workshop was to bring together diverse communities working on the theory methodology and applications of MCMC to share experiences and expertise. It was envisaged that the majority of participants would be from backgrounds in Statistics, Probability, Applied Mathematics, Engineering, and Computer Science.

### **Scientific content**

The workshop took the form of a five day meeting. A total of 46 plenary presentations were given. Most lectures lasted half an hour, though three keynote addresses, of ninety minutes, were given by Christian Robert (Paris), Dan Crisan

(Imperial) and Havard Rue (Trondheim). Particularly prominent themes were sequential Monte Carlo methods, Adaptive MCMC, Scaling problems in MCMC, Bayesian Inverse problems, Bayesian inference for stochastic processes, data assimilation, perfect simulation, data augmentation methodology and fundamental stability and estimation theory for Markov chains arising in MCMC. Application areas included signal processing, epidemiology, mining engineering, financial econometrics, fluid mechanics and image analysis.

## **Participation**

There were over 90 registered participants with many more people from Mathematics and Statistics attending informally on occasion. Participants came from UK, France, Germany, Poland, Italy, USA, China, Canada, Ireland, Denmark, Spain, Norway, and Roumania. The meeting was co-sponsored by the Centre for Research in Statistical Methodology at Warwick and this facilitated the funding of PhD students to attend the meeting.

## **Dissemination**

The presentations that took place are published on the website of the conference:  
[http://www2.warwick.ac.uk/fac/sci/math/research/events/2008\\_2009/symposium/wks3/talks/](http://www2.warwick.ac.uk/fac/sci/math/research/events/2008_2009/symposium/wks3/talks/)  
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