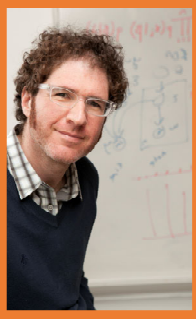
Plenary Speakers

Wednesday, January 8th

Room TBD
9:00-9:50 AM

"Continuous-time MCMC"
Paul Fearnhead
University of Lancaster

Thursday, January 9th



Room TBD
9:00-9:50 AM

"Scaling and generalizing approximate Bayesian inference"
David Blei
Columbia University

Friday, January 10th

Room TBD
8:30-9:20 AM

"From algorithms to statistical methods? The case of recursive learning in mixture models"
Sonia Petrone
Bocconi University

Room TBD
1:10-2:00 PM

"Computational approaches for large-scale time series analysis"
Emily Fox
University of Washington

Tuesday, January 7th, 2020

Short Courses Only

9:30-10:30am - Snacks and Registration

10:30am-1:30pm

"Introduction to Stan" : Robert Grant: Room TBD

Outline:

This half-day workshop will introduce you to the probabilistic programming language, Stan, and itsHamiltonian Monte Carlo algorithm. Many Bayesian models can be fitted to data more quickly, and with less sensitivity to priors and initial values, than Gibbs sampler software such as BUGS and JAGS. You will get some hands-on experience of coding for Stan, extracting results and checking for computational problems. This is a very interactive, hands-on workshop and we will use examples of Stan code throughout to give you practical experience.

Trainer:

Robert Grant is a medical statistician of 21 years' experience, and a professional trainer and coach for people working in data analysis. He developed and maintains the Stata interface for Stan and frequently teaches introductory courses on Bayesian statistics and data visualization. His personal website is robertgrantstats.co.uk and his company's is bayescamp.com

Pre-requisites:

Participants should know the basics of model fitting by MCMC simulation. There is no need for experience of Hamiltonian Monte Carlo or Stan but we will assume understanding of Bayesian analysis, model comparison and diagnosing MCMC problems such as non-convergence. Please bring a laptop with one of the Stan interfaces installed -- it doesn't matter which one as we will focus on the Stan code which is common to all.

Learning outcomes:

(1) Know how to get started with Stan via the various interfaces, including the common functionality of checking your model code for errors, translating it to C++, compiling it, sampling from the posterior, summarising the output and exporting chains. (2) Understand the basics of coding regression models up to multilevel models. (3) Be aware of tricks for more efficient parameterisation (4) Know how to obtain statistical and graphical diagnostic outputs, recognise problems and set about debugging. (5) Know how to add a new distribution as a Stan function, expose it to R/Python/Julia for debugging, and use it in the log-likelihood and posterior predictive checks.

Tuesday, January 7th, 2020

1:30-2:00PM - Snacks and Registration

2:00 PM-5:00 PM

"AutoStat® Workshop: A new software fro Bayesian Analysis" : Dr. Chris Strickland and Dr. Clair Alston-Knox: Room TBD

Overview:
AutoStat® is a fully automated, web based analytics application that allows analysts to enjoy automated model selection, specification and deployment. They can share projects and insights amongst colleagues and project teams. Analysts can undertake scenario analysis with ease and schedule routine tasks using the Pipeline. The proposed workshop will discuss a range of Bayesian models, with class exercises being completed using AutoStat®, which will be available to all participants as a free trial version. The Workshop will be hands-on, with models being explained in terms of at least one case study.

A brief overview to the use of the AutoStat® software will cover the following features:

- Data management, manipulation, filtering and creation of new variables.
- Visualisation options, both standard (for quick exploratory tools) and layered charts for publication purposes.
- Available models, prior specifications and algorithm options. These will include regression, univariate time series, space-time analysis, mixture models and multivariate models.
- The standard results will be illustrated, along with access to saved models to tailor your analysis.
- R integration for extended capability.
- The Document Builder for creating publications, reports and tutorials.
- Dashboard creation for increasing research impact and useability of results.
- The use of pipelines for scheduling tasks.

A key component of using AutoStat® for teaching statistical thinking is in alleviating the need for coding, which allows the instructors to focus on key concepts, questions and outcomes. In this course we will briefly touch on key features of AutoStat®, such as its parallel approach to Bayesian and classical statistics on the GUI, which encourages educators to teach both paradigms within the same course. We will illustrate the project sharing facilities, the calculator tool for "on the fly" demonstrations, tutorial builders and bespoke output creation.

Presenters: Dr Chris Strickland & Dr Clair Alston-Knox
Chris and Clair both work at the AutoStat® Institute (Melbourne, Australia). They have previously worked together in Professor Kerrie Mengersen's Bayesian Research Group (QUT, Australia).

Their combined work experience involves research positions in both academia and industry, having worked at NSW Agriculture, Bank of Queensland, Monash University, Queensland University of Technology, University of Queensland, Griffith University, University of NSW, Newcastle University, Predictive Analytics Group, Soil Conservation Service and NSW Sport and Recreation.

Tuesday, January 7th, 2020

2:00 PM-5:00 PM

"Developing, modifying, and sharing Bayesian algorithms(MCMC samplers, SMC, and More) using the NIMBLE Platform in R" : Chris Paciorek: Room TBD

Overview:

Do you want to share an algorithm you've developed with other researchers without having to build an entire platform? Do you want to use methods such as MCMC and tailor them for your application without having to implement everything from scratch?

NIMBLE is a platform built on top of R that allows methodologists to write algorithms (and modify existing algorithms) in R-like syntax with automatic compilation for fast run-times via C++ that is auto-generated by the system. NIMBLE gives you access to a variety of tools for ease of implementation: querying of model graphical structure (e.g., parent and child nodes in the model graph), a wide range of mathematical functionality including linear algebra through the Eigen package, calculation of probability density values for nodes in the model graph, simulation of node values, automatic differentiation for gradients, optimization, and storage objects for samples from the model.

This tutorial will introduce you to how to develop algorithms in NIMBLE, including new MCMC samplers and entire new algorithms. We will discuss how developers can build upon NIMBLE's existing algorithms (including a variety of MCMC, Bayesian nonparametric, and SMC methods) to avoid having to reimplement standard methods. Users of methods developed in NIMBLE write their model code in syntax almost identical to BUGS and JAGS but can then apply a variety of algorithms (various MCMC samplers, choosing between samplers, parameter blocking, user-defined samplers, various SMC algorithms, etc.) to the same model. The tutorial will demonstrate how algorithms that you write using NIMBLE are then easily available to users, who can try them out at low cost and compare them to other algorithms available in NIMBLE.

Learning outcomes:

The workshop will focus on live demos and hands-on coding. After the workshop, participants will understand (1) how to use NIMBLE to apply algorithms such as MCMC and SMC to fit hierarchical models, (2) how NIMBLE's built-in algorithms are implemented using nimbleFunctions, (3) how to use nimbleFunctions to extend NIMBLE's algorithms, and (4) how to develop algorithms in NIMBLE.

Pre-requisites:

Participants should have a basic understanding of Bayesian/hierarchical models and of one or more algorithms such as MCMC or SMC. Some experience with R is also expected. Please bring a laptop; we'll give instructions in advance for installing NIMBLE.

Instructor:

Chris Paciorek is one of the core developers of NIMBLE (code repository) and an adjunct professor of Statistics at UC Berkeley. He has presented a variety of workshops and courses on NIMBLE and more generally on statistical computing and Bayesian statistics.

Wednesday, January 8th, 2020

The Day at a Glance:

8:00-8:50 AM - Breakfast and Registration

8:50-9:00 AM - Introductions: Michael Daniels

9:00 -9:50 AM - Plenary Speaker: Paul Fernhead

9:50 -10:10 AM - Coffee break

10:10-11:40 AM
Session I1: Room TBD
"Theory & practice of HMC (and variants) for Bayesian hierarchical models"
- Tamara Broderick (MIT)
- George Deligiannidis (University of Oxford)
- Aaron Smith (University of Ottawa)

Session I2: Room TBD
"Scalable methods for high-dimensional problems"
- Akihiko Nishimura & Marc Suchard (UCLA)
- Anirban Bhattacharya (Texas A&M)
- Lassi Roininen (LUT University)

Session C13: Room TBD
"Sampling Techniques for High-Dimensional Bayesian Inverse Problems"
- Qiang Liu (University of Texas)
- Tan Bui-Thanh (University of Texas)
- Alex Thiery (National University of Singapore)

11:45 –12:35 PM
Special Speaker: Room TBD
"NSF Opportunities and Grantsmanship for Bayesians"
- Brani Vidakovic (NSF DMS Program Director)

11:40 AM-1:20 PM –Lunch break

Special Events

5:00-7:30 PM — **Poster Session & Snacks**

1:20-2:50 PM
Session I3: Room TBD
"MCMC and scalable Bayesian computations"
- Philippe Gagnon (University of Oxford)
- Florian Maire (University de Montreal)
- Giacomo Zanella (Bocconi University)

Session I8: Room TBD
"ABC"
- Ruth Baker (University of Oxford)
- David Frazier (Monash University)
- Umberto Picchini (Chalmers University of Tech & University of Gothenburg)

Session C3: Room TBD
"MCMC-based Bayesian inference on Hilbert spaces "
- Nawaf Bou-Rabee (Rutgers University)
- Nathan Glatt-Holtz (Tulane University)
- Daniel Sanz-Alonso (University of Chicago)

2:50-3:10 PM - Coffee break

3:10-4:40 PM
Session I4: Room TBD
"Scalable methods for posterior inference from big data"
- Subharup Guha (University of Florida)
- Zhenyu Zhang (UCLA)
- David Dahl (Brigham Young University)

Session C5: Room TBD
"Simulation in path space"
- Moritz Schauer (Leiden University)
- Frank van der Meulen (TU Delft)
- Andrew Duncan (Imperial College London)

Session C7: Room TBD
"Advances in MCMC for high dimensional and functional spaces"
- Galin Jones (University of Minnesota)
- Vivekananda Roy (Iowa State University)
- Radu Herbei (The Ohio State University)

Thursday, January 9th, 2020

The Day at a Glance:

8:00-9:00 AM - Breakfast and Registration

9:00 -9:50 AM - Plenary Speaker: David Blei

9:50 -10:10 AM - Coffee break

10:10-11:40 AM

Session I5: Room TBD
"Efficient computing strategies for high-dimensional problems"
- Gareth Roberts (University of Warwick)
- Veronika Rockova (University of Chicago)
- Umut Simsekli (Telecom ParisTec)

Session I7: Room TBD
"Computational advancements in entity resolution"
- Brenda Betancourt (University of Florida)
- Andee Kaplan (Duke University)
- Rebecca Steorts (Duke University)

Session C6: Room TBD
"Sequential Monte Carlo: Recent advances in theory and practice"
- Richard Everitt (University Reading)
- Liangliang Wangs (Simon Fraser University)
- Anthony Lee (University of Bristol)

Session C11: Room TBD
"Robust Markov chain Monte Carlo Methods"
- Kengo Kamatani (Osaka University)
- Emilia Pompe (University of Oxford)
- Bjorn Sprungk (Gottingen University)

11:40 AM-1:20 PM –Lunch break

Special Event (Paid Only)

5:30-7:30 PM — **Conference Dinner**

1:20-2:50 PM

Session I6: Room TBD
"MCMC methods in high dimesnion , theory and applications"
- Christophe Andrieu (University of Bristol)
- Gabriel Stoltz (Ecole des Ponts PartisTech)
- Umut Simsekli (Telecom ParisTech)

Session C1: Room TBD
"Novel mixture-based computational approaches to Bayesian learning"
- Michele Guindani (University of California-Irvine)
- Antonietta Mira (University della Svizzera Italiana & University of Insubria)
- Sirio Legramanti (Bocconi University)

Session C10: Room TBD
"Convergence of MCMC in theory and in practice"
- Christina Knudson (University of St. Thomas, MN)
- Rui Jin (University of Iowa)
- Aixin Tan (University of Iowa)

2:50-3:10 PM - Coffee break

3:10-4:40 PM

Session I9: Room TBD
"Continuous-time and reversible Monte Carlo methods"
- Yian Ma (University of California-Berkeley)
- Manon Michel (University Clermont-Auvergne)
- Daniel Paulin (University of Oxford)

Session I12: Room TBD
"Approximate Bayesian Nonparametrics"
- Peter Muller (University of Texas)
- Debdeep Pati (Texas A&M)
- Jeff Miller (Harvard University)

Session C4: Room TBD
"Advances in Multiple Importance Sampling"
- Art Owen (Stanford University)
- Victor Elvira (IMT Lille Douai)
- Felipe Medina Aguayo (University of Reading)

Friday, January 10th, 2020

The Day at a Glance:

8:00-8:30 AM - Breakfast and Registration

8:30 -9:20 AM - Plenary Speaker: Sonia Petrone

9:20 –9:35 AM - Coffee break

9:35-11:05 AM

Session I11: Room TBD

"Younger researchers' contributions to Bayesian computation"

- Tommaso Rigon (Bocconi University)
- Michael Jauch (Duke University)
- Nicholas Tawn (University of Warwick)

Session C9: Room TBD

"Posterior inference with misspecified models"

- Judith Rousseau (Oxford University)
- Ryan Martin (North Carolina State University)
- Jonathan Huggins (Harvard University)

Session C12: Room TBD

"Approximate Markov chain Monte Carlo Methods"

- Bamdad Hosseini (California Institute of Technology)
- James Johndrow (Stanford University)
- Daniel Rudolf (Gottingen University)

11:05 AM-11:20 AM –Coffee Break

11:20-12:50 PM

Session I10: Room TBD

"Markov chain convergence analysis and Wasserstein distance"

- Alain Durmus (ENS Paris-Saclay)
- Johnathan Mattingly (Duke University)
- Qian Qin (University of Minnesota)

Session C2: Room TBD

"Using Bayesian methods to uncover the latent structures in real datasets"

- Louis Raynal (University of Montpellier & Harvard University)
- Francesco Denti (University of Milan-Bicocca & University della Svizzera)
- Alex Rodriguez (International Center for Theoretical Physics)

Session C8: Room TBD

"Recent advances in Gaussian process computations and theory"

- Yun Yang (University of Illinois)
- Joseph Futoma (Harvard University)
- Michael Zhang (Princeton University)

12:50-1:10 PM - Coffee break

1:10 –2:00 PM - Plenary Speaker: Emily Fox