apts.ac.uk

Academy for PhD Training in Statistics

Week 2: University of Oxford

20th–24th March 2017

Welcome to Oxford!

Workshop registration: Registration for the APTS week will take place between 11.00 a.m. and 12.30 pm on Monday 20th March 2017 in the Ground floor social area, Department of Statistics. A map showing showing key locations for the week can be found on page 3 of this booklet.

You will receive your name badge from the registration desk. Please wear your badge at all times. This will help with security and also help you identify fellow participants.

Check-in / Luggage: Check-in for residential delegates is from 2.00 pm. at the Lodge, Balliol College on Monday 20th March, however, Balliol have advised that you may be able to check-in slightly earlier i.e. just before or after lunch but we will not know this until the day of arrival. If not, a secure room will be made available to store your luggage at the Department of Statistics. Check-out is by 10 a.m. on Friday 24th March. A room will be available at the Department of Statistics to store your luggage until lunchtime.

IT: You are encouraged, if possible, to bring a laptop with R installed for taking part in the Statistical Computing practical sessions. See note on page 9 for further details. There will also be a computer lab with 48 desktop computers available for the practical sessions.

Wi-fi: We strongly advise that you set up Eduroam beforehand using `https://cat.eduroam.org/`. Alternatively, OWL accounts (a central wireless service for both University Members and Visitors) will be available at registration but please note you will need more than one OWL account if you plan to use multiple devices simultaneously.

There will also be wifi provision for residential students staying at Balliol College. Wifi is available in the bedrooms via the OWL network and you will be given your code when you check-in.

Your room: Residential participants have rooms booked at Balliol College, Broad Street, Oxford OX1 3BJ. **Unfortunately there is no parking available at the College (if you have special requirements then please contact the local organizer)** however the Pear Tree and Water Eaton Park and rides are very convenient as the buses stop near the College: `http://www.oxford.gov.uk/PageRender/decTS/Park_and_Ride_occw.htm` . The College is a 20 minute walk from the railway station (taxis are available outsideOxford train station) and a 15 minute walk from the bus and coach station at Gloucester Green.

All residential delegates have been booked single room accommodation at Balliol College for 4 nights from Monday 20th March until Thursday 23rd March inclusive. Check-in is from 2.00 pm on Monday 20th March at the Lodge, although Balliol hope to be able to offer an earlier check-in around lunchtime. This will be confirmed when registering at the Department of Statistics. Check-out is by 10.00 a.m. on Friday 24th March.

The Porter will give you a bedroom key and a code number to open the door to your staircase.

All rooms have washbasins. Linen and bedding is provided and tea and coffee making facilities are in all the rooms.

Breakfast will be served in the Grand Hall, Broad Street, between 8.00 am and 9.00 am. You will have the option of a full English breakfast.

Balliol operates a non-smoking policy in all buildings and enclosed areas including outside entrances to buildings. Smoking is permitted in the Quads please use the outside receptacles provided.

Meals: All meals, with the exception of the Academy Dinner, will take place in the main Dining Hall of Balliol College. Breakfast will be served from 08.00–09.00, lunch from 12.30–1.30 and dinner from 1800–1900. The Academy Dinner will be held at Exeter College at 1900.
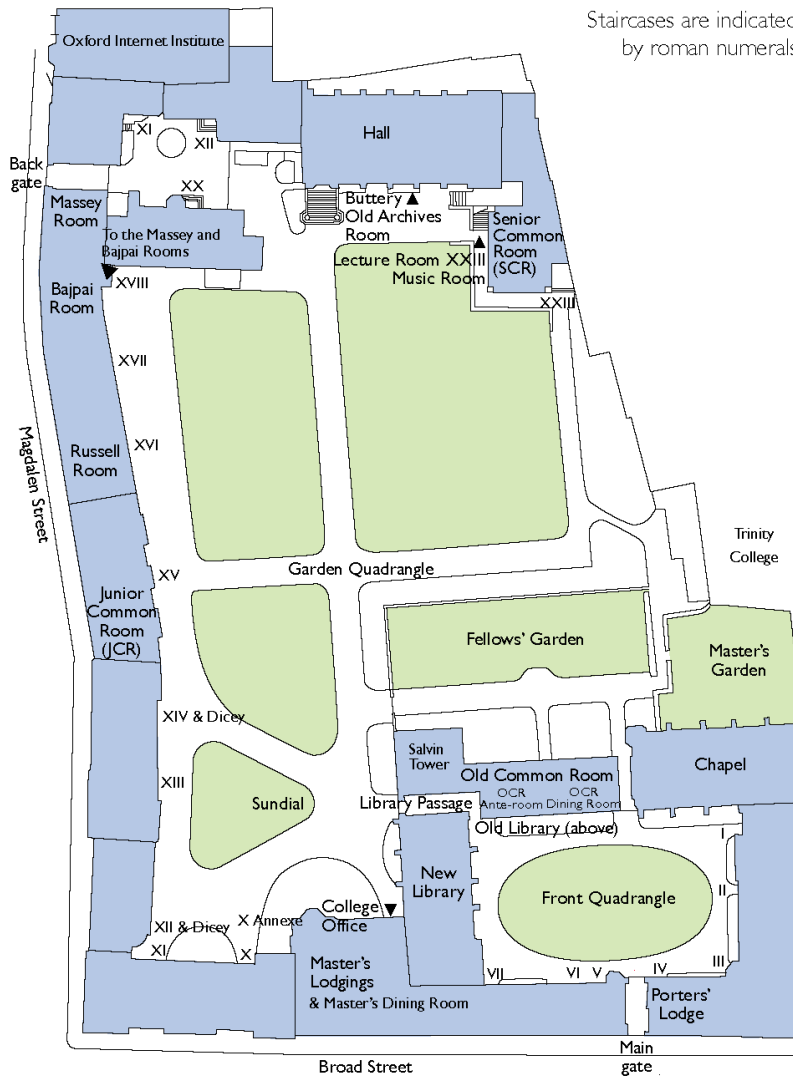
*Have a great week!*

Useful Maps

BALLIOL COLLEGE
Oxford OX1 3BJ

Staircases are indicated by roman numerals

Oxford Internet Institute

XI

XII

Hall

Back gate

XX

Massey Room

Buttery ▲
Old Archives Room

Senior Common Room (SCR)

To the Massey and Bajpai Rooms

XVIII

Lecture Room XXII
Music Room

Bajpai Room

XXIII

XVII

XVI

Russell Room

Trinity College

XV

Garden Quadrangle

Junior Common Room (JCR)

Fellows' Garden

Master's Garden

XIV & Dicey

Salvin Tower

Old Common Room

Chapel

XIII

OCR
Ante-room

OCR
Dining Room

Library Passage

Old Library (above)

Sundial

New Library

Front Quadrangle

I

XII & Dicey

X Annexe

College Office

II

XI

X

Master's Lodgings
& Master's Dining Room

VII

VI

V

IV

III

Porters' Lodge

Main gate

Broad Street

For disabled access, please see www.balliol.ox.ac.uk/disability

For a map of Oxford, other colleges and the University buildings, please see www.ox.ac.uk/visitors/map
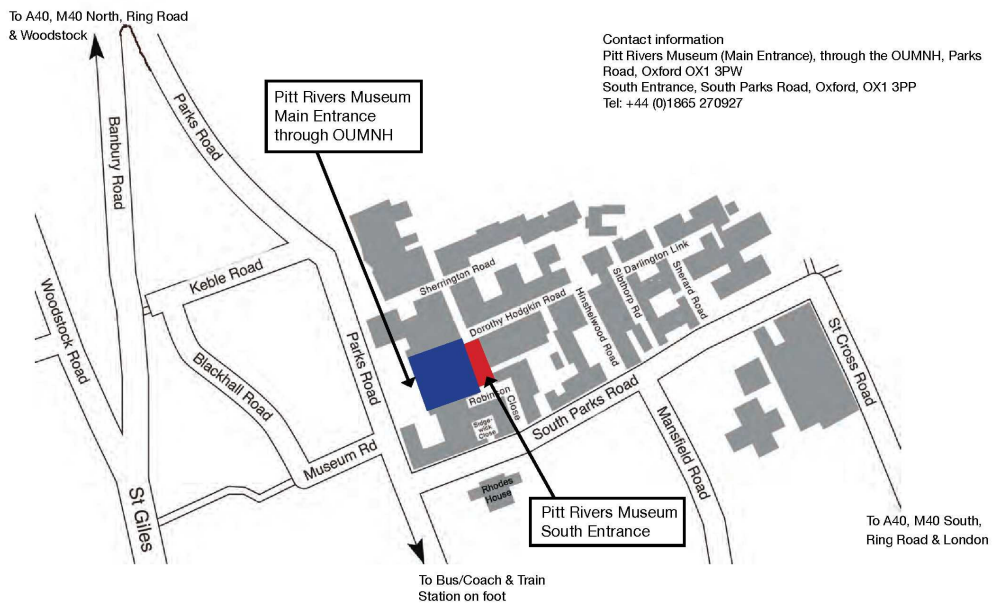
N

Magdalen Street

Map showing locations of key sites during APTS week
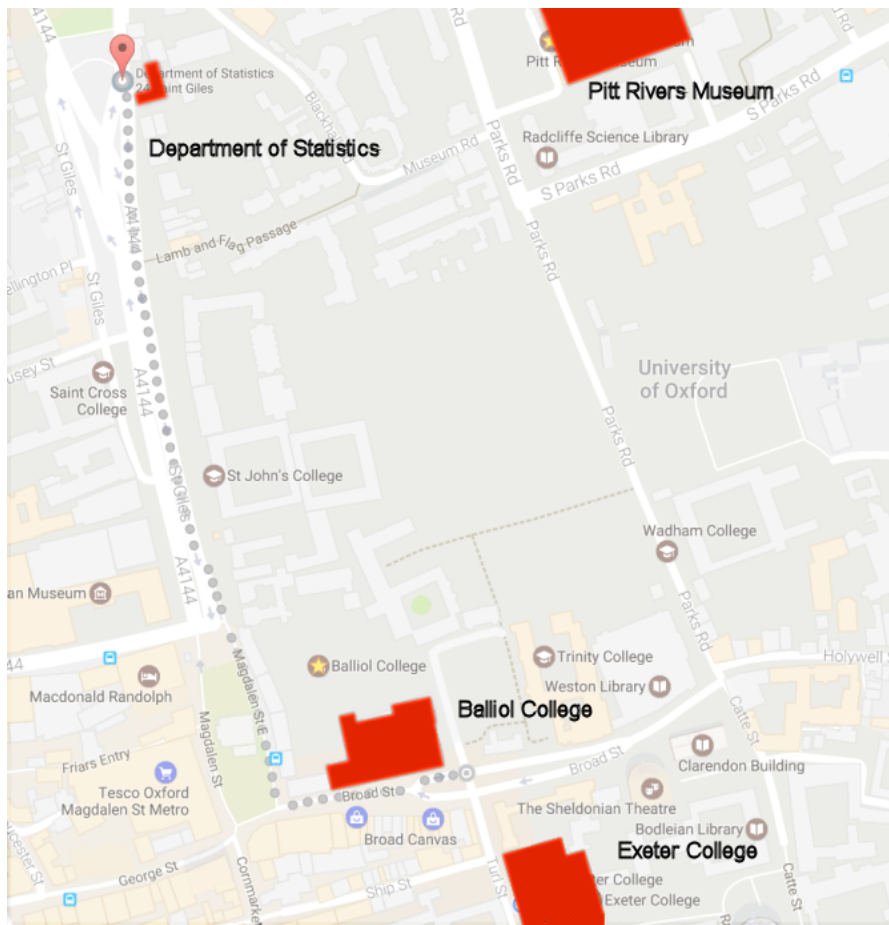
How to find the Pitt Rivers Museum
The Bus/Coach station at Gloucester Green is 15mins walk, the Train station is 25mins walk, taxis are available at both
Further travel information can be found at: http://www.ox.ac.uk/visitors_friends/maps_and_directions/index.html
There is no parking available on site but disabled parking spaces can be booked in advance by contacting the Museum

Pitt Rivers
M U S E U M
Anthropology and World Archaeology

Contact information
Pitt Rivers Museum (Main Entrance), through the OUMNH, Parks Road, Oxford OX1 3PW
South Entrance, South Parks Road, Oxford, OX1 3PP
Tel: +44 (0)1865 270927

APTS timetable

	Monday 20th Mar	Tuesday 21st Mar	Wednesday 22nd Mar	Thursday 23rd Mar	Friday 24th Mar
09.00 – 10.30		**Applied Stochastic Processes**	**Applied Stochastic Processes**	**Applied Stochastic Processes**	**Applied Stochastic Processes**
10.30 – 11.00		Tea and Coffee			
11.00 – 12.30	Registration	**Statistical Modelling**	**Statistical Modelling**	**Statistical Modelling**	**Statistical Modelling**
12.30 – 13.30	Lunch				End
14.00 – 15.15	Welcome **Applied Stochastic Processes (14.00–15.45)**	**Applied Stochastic Processes**	Free Afternoon	**Applied Stochastic Processes**	
15.15 – 15.45	Tea and Coffee (15.45–16.15)	Tea and Coffee		Tea and Coffee	
15.45 – 17.15	**Statistical Modelling (16.15–17.45)**	**Statistical Modelling (Practical session)**		**Statistical Modelling (Practical session)**	
18.00 – 19.00	Dinner				
Evening	RSS Reception (19.45 – 21.00)	Social Event at Pitt River Museum (19.30 – 21.00)	Free evening	Academy dinner sponsored by ATASS Sports (19.00 –)	

Local information

Location of lectures: All APTS lectures will take place in the Large Lecture Theatre (LG.01) at the Department of Statistics (`http://www.stats.ox.ac.uk/contact_us/how_to_get_to_the_department`), 24–29 St Giles', Oxford OX1 3LB. The practical sessions will take place in the Large Lecture Theatre (LG.01), IT Teaching Suite (LG.02) and Small Lecture room (LG.03) at the Department of Statistics.

Tea and coffee breaks: Refreshments will be served in the ground floor social area at the Department of Statistics.

Evening events: The Royal Statistical Society will once again, very generously, host a reception on Monday 20th March at which refreshments will be served. This will take place at 7.45 pm in the ground floor social area, Department of Statistics. There will be a short talk given by a representative from the RSS.

Tuesday evening will feature a unique evening at the Pitt Rivers Museum starting at 7.30 pm. This is one of the worlds great museums of anthropology and world archaeology. Mingle and chat over drinks whilst you wander between cases displaying an almost overwhelming array of intriguing artefacts from all corners of the world and many periods of human history. We will also have three guides for the evening, who are very knowledgeable about the displays and who will run 20 minute tours throughout the evening.

As we have exclusive use of the museum, access to the museum will be at the south entrance, South Parks Road, OX1 3PP.

The Academy Dinner, will take place at Exeter College at 7.00pm on Thursday 23rd March. Dress code: Smart casual. Exeter College, Turl Street, Oxford OX1 3DP is just a two minute walk from Balliol College. Many thanks to ATASS who are sponsoring this event.

Sports facilities: Oxford University Sport offer a day pass structure for non-members for the Pulse / Powerlifting gyms. They also have a number of fitness classes available for non-members. For further details see `http://www.sport.ox.ac.uk/membership/membership/community/` and `http://www.sport.ox.ac.uk/membership/classes/`. The Sports centre is located on Iffley Road, OX4 1EQ approx. 25 minutes walk from Balliol College.

Things to do in Oxford: Oxford is a beautiful and historic city with many local attractions. Some suggestions on activities of interest are given below:

University of Oxford Colleges Oxford University is the oldest University in the English speaking word. Countless famous figures and great minds have studied here and you may wish to explore some of the colleges that they were a part of. There are 38 independent colleges, many of whom open their doors to visitors at least a few hours every day. Many are free to visit, but some charge a small fee. Further details can be found at the link below: `www.ox.ac.uk/visitors/visiting-oxford/visiting-the-colleges?wssl=1`.

Museums, Libraries and places of interest Oxford has a wealth of museums such as the Ashmolean Museum and the Oxford University Museum of Natural History, places of interest such as the Sheldonian Theatre as well as many tranquil areas to get away from the hustle and bustle, such as Christ Church Meadow and University Parks. For further details please see the link below: `www.ox.ac.uk/visitors/visiting-oxford/visiting-museums-libraries-places?wssl=1`.

TV & Film Locations Oxford is a great favourite of the film industry and has been featured as the backdrop for many TV series and films such as Inspector Morse and Harry Potter. Further details can be found at: `http://experienceoxfordshire.org/see-and-do/tv-and-film-location.aspx`.

Other places of interest There are many neighbouring tourist attractions that are easily accessible from Oxford such as Blenheim Palace and Bicester Village. For further details please see: `http://experienceoxfordshire.org/see-and-do/top-10.aspx`.

Emergency details

In Office Hours

Medical Assistance: Please speak to Reception at the Department of Statistics if you need any medical assistance.

Messages: The telephone number for colleagues or family to leave an urgent message for you during office hours is +44 (0)1865 272860 or +44 (0)1865 281536.

Fire Procedures: The fire alarm is tested weekly, usually on Friday mornings around 9.00 am. There is no need to evacuate the building then. If the fire alarm is sounded at any other time, you must evacuate the building. If you discover a fire, set the fire alarm off using the nearest red fire call point.

In the event of the fire alarm sounding, evacuate the building safely and quickly. Do not use the lift. The assembly point is outside the Department of Physics, just across Keble Road.

Full details of safety procedures will be provided at registration.

Out of Office Hours

Medical Assistance: Contact the Duty Porter at the Lodge or telephone +44 (0)1865 277777. If no reply is received, the porter may be on a security patrol. Ring for an ambulance on 999 or 112 asking them to come to the main college entrance on Broad Street. Having made the call, go to the main entrance yourself reporting the emergency to the Porter on duty and wait for the ambulance to arrive.

Messages: The Lodge, Broad Street, is open 24 hours and the Duty Porter will be glad to assist with all your queries. The Lodge can be contacted on +44 (0)1865 277777 or `porter@balliol.ox.ac.uk`

Fire Procedures: Upon check-in at Balliol College, you will be given an information sheet giving details of emergency procedures.

Module details

Applied Stochastic Processes

Module leaders: S. B. Connor & A. Turner

Aims: This module will introduce students to two important notions in stochastic processes reversibility and martingales identifying the basic ideas, outlining the main results and giving a flavour of some of the important ways in which these notions are used in statistics.

Learning outcomes: A student successfully completing this module will be able to:

- describe and calculate with the notion of a reversible Markov chain, both in discrete and continuous time;

- describe the basic properties of discrete-parameter martingales and check whether the martingale property holds;

- recall and apply significant concepts from martingale theory (indicative list: optional stopping, martingale convergence);

- explain how to use Foster-Lyapunov criteria to establish recurrence and speed of convergence to equilibrium for Markov chains.

Prerequisites: Preparation for this module should include a review of the basic theory and concepts of Markov chains as examples of simple stochastic processes (transition and rate matrices, irreducibility and aperiodicity, equilibrium equations and results on convergence to equilibrium), and with the definition and basic properties of the Poisson process (as an example of a simple counting process).

Topics:

- Reversibility of Markov chains in both discrete and continuous time, computation of equilibrium distributions for such chains, application to important examples.

- Discrete time martingales, examples, application, super-martingales, sub-martingales.

- Stopping times, statements and applications of optional stopping theorem, martingale convergence theorem.

- Recurrence and rates of convergence for Markov chains, application to important examples.

- Statements and applications of Foster-Lyapunov criteria, viewed using the language of martingales.

- Statistical applications and relevance (highlighted where appropriate throughout).

Assessment: One of

- Read an appropriately chosen paper (either specified or from a specified list), and identify some of the main stochastic process models and results referred to in the paper, describe their significance and use in the paper, and relate them to the material covered in the module.

- Complete appropriate exercises that are simple developments or extensions of aspects of the results in the module (that may be related in some way to models and results arising in the paper).

Statistical Modelling

MODULE LEADER: ANTONY OVERSTALL

Aim: The main aim of this module is to introduce important general aspects of statistical modelling, including Bayesian modelling, and to introduce some fundamental aspects of data collection. A broad range of specific, commonly-used types of model will also be encountered.

Learning outcomes: After taking this module, students should — for topics listed below which are included in the module — understand the issues (why this is important), the terminology, the statistical principles associated with this aspect of modelling, and sufficient theory to deal with simple examples; and they will have gained some practical hands-on experience in more complex examples.

Prerequisites: Preparation for this module should (re-)establish familiarity with linear and generalized linear models, and with likelihood and Bayesian inference. Students who are familiar with (for example) chapters 4, 8, 10 and 11 of Davison (2003) "Statistical Models" will be very well prepared (and will already know something of the areas to be covered in the module).

Topics:

- Principles and practice of model selection;

- Random-effects/hierarchical/mixed models;

- The role of conditional independence in modelling;

- Data collection and an introduction to design of experiments.

Assessment: Exercises set by the module leader, which will include some practical data analysis and statistical modelling.

Notes