apts.ac.uk

Academy for PhD Training in Statistics

Week 2: University of Nottingham

11th April 2016 – 15th April 2016

EPSRC

Engineering and Physical Sciences Research Council

Welcome to Nottingham!

Workshop registration: Registration for the APTS week will take place between 11.15am and 12.45pm on Monday 11th April 2016 in the conservatory (near the dining hall) of Lenton and Wortley Hall, University Park Campus. Your room key can be collected from the Porter's cabin at the main entrance to the Hall.

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

Luggage: You will be able to leave luggage safely at Lenton and Wortley Hall on Monday 11th April and on Friday 15th April.

IT: Delegates are advised to bring a laptop with them in order to complete the R computer lab. A small number of computers will be provided for those without laptops. Internet access can be obtained via the eduroam wifi network. Please make sure you are able to access eduroam at your home institution. Alternatively, you can register to use the UoN-guest wifi network.

Accommodation location: All residential delegates will be staying at Lenton and Wortley Hall, University Park Campus (next to building 52 on the campus map)

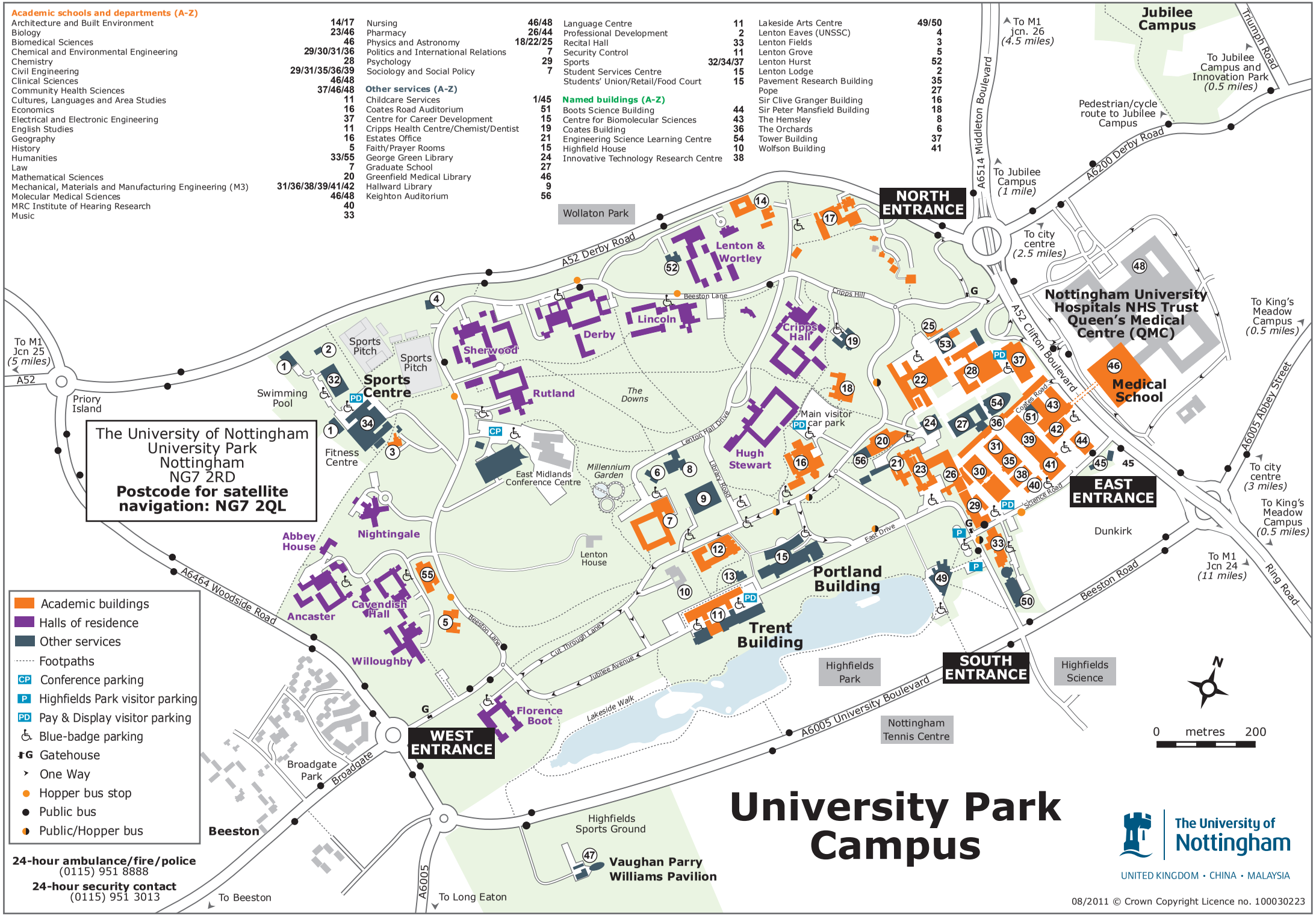
Car Parking: Delegates who are staying in the Hall can obtain a parking permit from the Hall office when they collect their room key. This, when completed with details such as name, conference and hall of residence should be displayed in the car for Security to see, and then parking is free. There are spaces close to the the Hall.

Your room: Accommodation is in single rooms with shared bathroom facilities. All bed linen, bath towels and a toiletry pack will be provided. There are also tea and coffee making facilities in the bedrooms. There are wifi hot-spots in Lenton and Wortley Hall.

Checking in/out your room: Keys for your room can be collected from the Porter's cabin at the main entrance to Lenton and Wortley Hall. The Porter will be on duty until midnight. After that time, there is a free-phone number to ring for Security to come and provide your key. For participants who arrive in the 11.15 am – 12.45 pm window on the Monday, please register before picking up your key.

Meals: All meals will be in Lenton and Wortley Hall dining room. Breakfast will be from 8 am to 9 am, lunch from 1 pm to 2 pm, and dinner from 6.30 pm to 7.30 pm on Monday – Wednesday, and the Conference Dinner from 7 pm onwards on Thursday.

Shop/cafes/banks: The student union shop, several cafes and cash machines can be found in the Portland Building (number 15 on the campus map).


Academic schools and departments (A-Z)
Architecture and Built Environment 14/17
Biology 23/46
Biomedical Sciences 46
Chemical and Environmental Engineering 29/30/31/36
Chemistry 28
Civil Engineering 29/31/35/36/39
Clinical Sciences 46/48
Community Health Sciences 37/46/48
Cultures, Languages and Area Studies 11
Economics 16
Electrical and Electronic Engineering 37
English Studies 11
Geography 16
History 5
Humanities 33/55
Law 7
Mathematical Sciences 20
Mechanical, Materials and Manufacturing Engineering (M3) 31/36/38/39/41/42
Molecular Medical Sciences 46/48
MRC Institute of Hearing Research 40
Music 33
Nursing 46/48
Pharmacy 26/44
Physics and Astronomy 18/22/25
Politics and International Relations 7
Psychology 29
Sociology and Social Policy 7
Other services (A-Z)
Childcare Services 1/45
Coates Road Auditorium 51
Centre for Career Development 15
Cripps Health Centre/Chemist/Dentist 19
Estates Office 21
Faith/Prayer Rooms 15
George Green Library 24
Graduate School 27
Greenfield Medical Library 46
Hallward Library 9
Keighton Auditorium 56
Language Centre 11
Professional Development 2
Recital Hall 33
Security Control 11
Sports 32/34/37
Student Services Centre 15
Students' Union/Retail/Food Court 15
Named buildings (A-Z)
Boots Science Building 44
Centre for Biomolecular Sciences 43
Coates Building 36
Engineering Science Learning Centre 54
Highfield House 10
Innovative Technology Research Centre 38
Lakeside Arts Centre 49/50
Lenton Eaves (UNSSC) 4
Lenton Fields 3
Lenton Grove 5
Lenton Hurst 52
Lenton Lodge 2
Pavement Research Building 35
Pope 27
Sir Clive Granger Building 16
Sir Peter Mansfield Building 18
The Hemsley 8
The Orchards 6
Tower Building 37
Wolfson Building 41
The University of Nottingham
University Park
Nottingham
NG7 2RD
Postcode for satellite navigation: NG7 2QL
Academic buildings
Halls of residence
Other services
Footpaths
CP Conference parking
P Highfields Park visitor parking
PD Pay & Display visitor parking
Blue-badge parking
G Gatehouse
One Way
Hopper bus stop
Public bus
Public/Hopper bus
24-hour ambulance/fire/police
(0115) 951 8888
24-hour security contact
(0115) 951 3013
To M1 Jcn 25 (5 miles)
A52
Priory Island
A52 Derby Road
To M1 jcn. 26 (4.5 miles)
A6514 Middleton Boulevard
Jubilee Campus
Triumph Road
To Jubilee Campus and Innovation Park (0.5 miles)
Pedestrian/cycle route to Jubilee Campus
A6200 Derby Road
To Jubilee Campus (1 mile)
NORTH ENTRANCE
To city centre (2.5 miles)
Wollaton Park
Nottingham University Hospitals NHS Trust Queen's Medical Centre (QMC)
Medical School
A52 Clifton Boulevard
To King's Meadow Campus (0.5 miles)
A6005 Abbey Street
To city centre (3 miles)
EAST ENTRANCE
To King's Meadow Campus (0.5 miles)
Dunkirk
To M1 Jcn 24 (11 miles)
Ring Road
Beeston Road
Lenton &
Wortley
Lincoln
Derby
Sherwood
Rutland
Cripps Hall
Hugh Stewart
Sports Centre
Swimming Pool
Fitness Centre
Sports Pitch
Sports Pitch
The Downs
Beeston Lane
Cripps Hill
Lenton Hall Drive
Library Road
Coates Road
Science Road
East Drive
Main visitor car park
East Midlands Conference Centre
Millennium Garden
Lenton House
Portland Building
Trent Building
Abbey House
Nightingale
Ancaster
Cavendish Hall
Willoughby
Florence Boot
Lakeside Walk
Jubilee Avenue
Cul-de-sac
Through Lane
A6464 Woodside Road
WEST ENTRANCE
SOUTH ENTRANCE
A6005 University Boulevard
Highfields Park
Highfields Science
Nottingham Tennis Centre
Highfields Sports Ground
Vaughan Parry Williams Pavilion
Broadgate Park
Broadgate
Beeston
A6005
To Beeston
To Long Eaton
N
0 metres 200
University Park Campus
The University of Nottingham
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APTS timetable

	Monday 11th Apr	Tuesday 12th Apr	Wednesday 13th Apr	Thursday 14th Apr	Friday 15th Apr
09.15 – 10.45		**Statistical Asymptotics**	**Statistical Asymptotics**	**Statistical Asymptotics**	**Statistical Modelling**
10.45 – 11.15		Tea and Coffee			
11.15 – 12.45	Registration	**Statistical Modelling**	**Statistical Modelling**	**Statistical Modelling**	**Statistical Asymptotics**
13.00 – 14.00	Lunch				
14.00 – 14.15	Welcome				
14.15 – 15.15	**Statistical Asymptotics (14.15 – 15.45)**	**Statistical Asymptotics**	**Statistical Asymptotics**	**Statistical Asymptotics**	
15.15 – 16.00	Tea and Coffee				
16.00 – 17.00	**Statistical Modelling (16.15 – 17.45)**	**Statistical Modelling (Computer lab)**	**Statistical Modelling (Computer lab)**	**Statistical Modelling (Computer lab)**	
18.30 – 19.30	Dinner				
Evening	RSS Reception (19.45 – 21.00)	Free evening	Free evening	Academy dinner (19.00 –)	

Timetable Notes

Location of lectures: All APTS lectures and workshops will take place in the Pope building, University Park campus (building 27 on the campus map). The lectures will be held in room C16 and the three Computer Labs will be held in room A15 (Tuesday, Wednesday and Thursday, 4 pm to 5 pm).

Tea and Coffee: Tea and coffee will be served in room A14 in the Pope building.

Evening events: The RSS reception on the Monday evening (7.45 pm to 9 pm) will take place in Lenton and Wortley Hall. The Lenton and Wortley Hall bar will be open from 8 pm to 10.30 pm each evening.

Local Information

Sports facilities: Residential conference guests are permitted free access to the fitness centre and swimming pool during the APTS week; see the University Park campus map for where they are located. Guests should take their room key with them to the reception area of the fitness centre/swimming pool and they can use the facilities free of charge. It is also possible for guests to use the Astro turf, squash courts or tennis courts there is a charge for these facilities. Further enquiries can be made at the fitness centre.

Things to do within walking distance:

Wollaton Park and Wollaton Hall. Wollaton Park is just the other side of Derby Road from Lenton and Wortley Hall. It is a good location for a walk or a run.

Highfields Park. On the southern edge of campus, walk around the university lake or stop at the cafe and gallery at the Lakeside Arts Centre (building 49 on the map).

Things to do in Nottingham: You can get to Nottingham city centre using the bus (get on the number 36 along Derby Road behind Lenton and Wortley Hall) or tram (get on at the university stop on the south side of the campus). Nottingham has a wide selection of shops, bars, cafes, restaurants, clubs, cinemas, theatres etc. Nottingham attractions include:

Nottingham Castle. A museum about Nottingham, with caves to explore.

Galleries of Justice. Hear about crime and punishment from the Sheriff of Nottingham.

Nottingham Contemporary. Free modern art gallery.

Green's Windmill. Former home of mathematician George Green.

Ye Olde Trip to Jerusalem. Claims to be England's oldest inn.

National Ice Centre. Get your skates on.

National Video Game Arcade. Get your game face on.

Emergency details

Medical Assistance: Please contact a local member of staff who will alert the appropriate services.

Fire Procedures: If the fire alarm sounds for more than five seconds and there has been no warning of a prolonged test, you must leave the building by the nearest emergency exit. All exits are well signed. Do not stop to collect personal belongings. Make your way to the nearest evacuation point, standing well clear of the building. Do not re-enter the building until told to do so by the Fire Services or the University security staff.

Module details

Statistical Modelling

Module leader: Antony Overstall and Dave Woods

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.

Statistical Asymptotics

Module leader: Andrew Wood

Aims: This module has the twin aims of introducing students to asymptotic theory and developing their practical skills in using asymptotic approximations.

Learning outcomes: After taking this module, students will have a basic understanding of the asymptotic properties of parametric likelihoods and posterior distributions, and the knowledge and skills to derive and implement first-order Laplace and saddlepoint density approximations in simple examples.

Prerequisites: Preparation for this module should establish:

- basic knowledge of likelihood methods, exponential families and Bayesian inference, to the level developed in a typical third-year undergraduate inference course;
- knowledge of limit theorems in the univariate IID case (laws of large numbers and CLT);
- familiarity with different modes of convergence (convergence in distribution, in probability, almost sure and Lp);
- familiarity with Taylor expansions in the multivariable case;
- familiarity with $o(\cdot)$, $O(\cdot)$, $o_P(\cdot)$ and $O_P(\cdot)$ notation.

Topics:

- Multivariate central limit theorem, (a gentle introduction to) the continuous mapping theorem, the delta method;
- Stochastic asymptotic expansion;
- Likelihood asymptotics (including asymptotic properties of MLEs);
- Asymptotic normality of posterior distributions (parametric case);
- Laplace's approximation (univariate and multivariate);
- Introduction to Edgeworth expansions and saddlepoint density approximations (via tilting);
- Saddlepoint approximations to tail probabilities.

Assessment: A mini-project which ideally has both a theoretical component (e.g., discussion of conditions for asymptotic normality in a particular set-up, or derivation of a suitable approximation in particular examples) and a computational component (e.g., numerical implementation of a Laplace or saddlepoint approximation).

Notes