



## WEEK 2: UNIVERSITY OF NOTTINGHAM

15th April 2024 – 19th April 2024

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# Welcome to Nottingham!

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**Workshop registration:** registration for the APTS week will take place between 11:00 and 12:30 on Monday 15th April 2024 in the foyer area (near the dining hall) of Rutland Hall of residence, University Park Campus. Your room key can be collected from welcome point central (identified on the attached map).

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 Rutland Hall on Monday 15th April and on Friday 19th 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 Rutland Hall of residence, University Park Campus (Next to the east midlands conference centre and Orchard Hotel on the campus map).

**Car Parking:** Delegates who are staying in the Hall can obtain a parking permit from welcome point central 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. 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 Rutland Hall.

**Checking in/out your room:** Keys for your room can be collected from Welcome Point Central. The hall management team will be on duty from 08:00 until 18:00, and the porter will be on duty from 18:00 until 08:00. There is a free phone number to ring if you require a later check in. For participants who arrive in the 11:00 – 12:30 window on the Monday, please register before picking up your key.

**Meals:** Breakfast and Dinner will be in the dining room, Rutland Hall. Breakfast will be from 8:00 to 9:00, and dinner from 18:30 to 19:30 on Monday – Wednesday, and the Conference Dinner from 19:00 onwards on Thursday. Lunch will be in the served in the Foyer of the ESLC building, next to the APTS lectures, Tuesday – Thursday, and at Rutland Hall on Monday, from 13:00 to 14:00.

**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).

# University Park Campus Map

## CAMPUS VENUES

### Conference delegate buildings

28	Nottingham Lakeside Arts Centre
36	Pharmacy Building
51	Coates Building
34	Coates Road Sports Village
58	David Ross Sports Village
54	East Midlands Conference Centre
24	Engineering & Science Learning Centre
9	George Green Library
10	Hallward Library
55	Highfield House
56	Keighton Auditorium
7	Law & Social Sciences
5	Lenton Grove
46	Medical School
33	Music Building
59	Nottingham Conferences Cottage

49/50	Nottingham Lakeside Arts Centre
26	Pharmacy Building
27	Physics Building
22	Pope Building
15	Portland Building
29	Psychology Building
16	Sir Clive Granger Building
62	Teaching and Learning Building
8	The Hemsley Building
11	Trent Building
47	Vaughan Parry Williams Pavilion

### WELCOME POINT NORTH

**Other facilities**  
 Cafés 7/8/9/11/15/16/36/49/50  
 & Cavendish Café 15  
 Bank/Shops/Food Court 15/19  
 Chemist 15/19  
 Library 9/24

### NORTH ENTRANCE

Satnav code: NG7 2RD

### WELCOME POINT CENTRAL

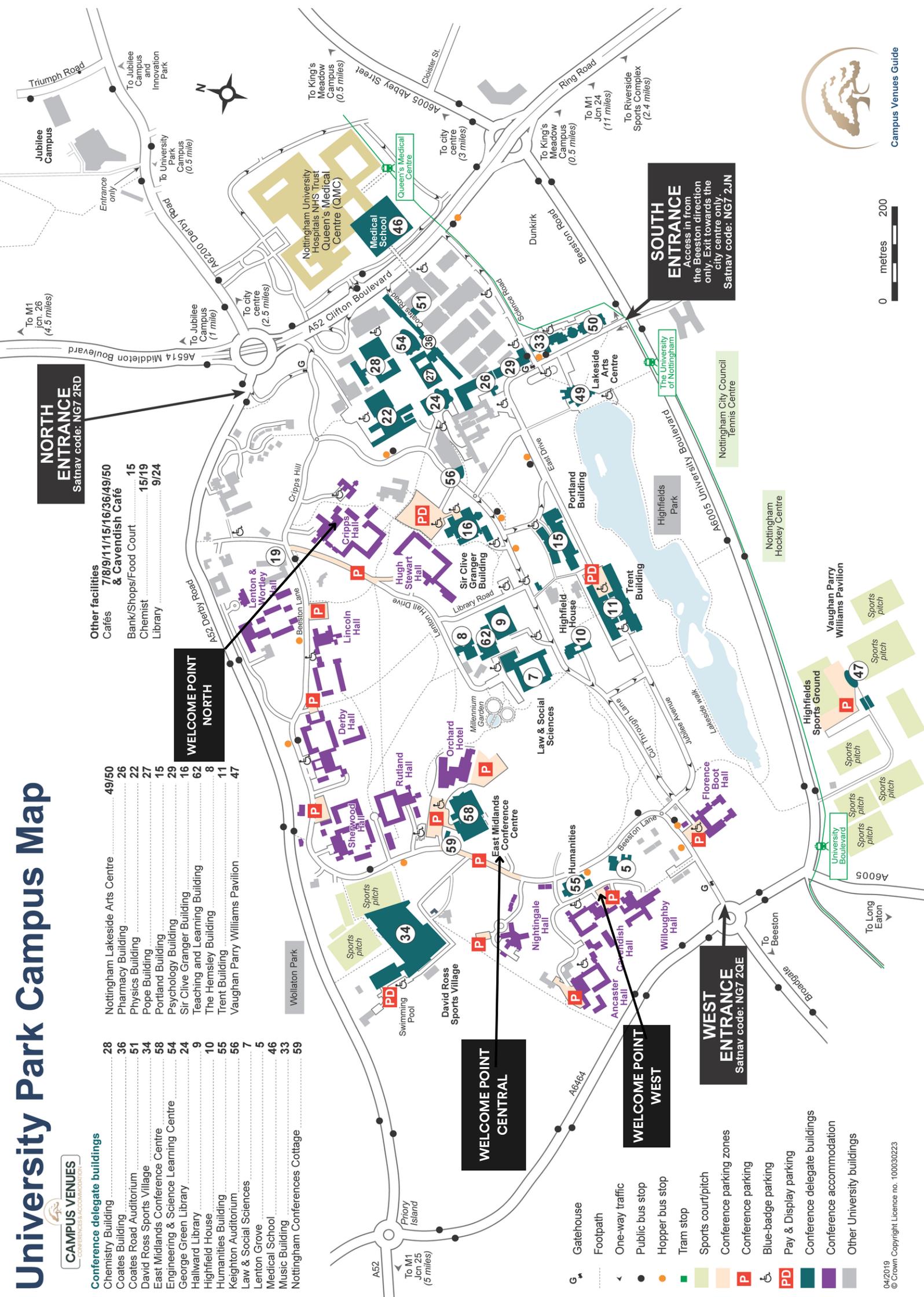
### WELCOME POINT WEST

### WEST ENTRANCE

Satnav code: NG7 2QE

### SOUTH ENTRANCE

Access in from the Beeston direction only. Exit towards the city centre only. Satnav code: NG7 2JN



- G Gatehouse
- Footpath
- One-way traffic
- Public bus stop
- Hopper bus stop
- Tram stop
- Sports court/pitch
- Conference parking zones
- Conference parking
- Blue-badge parking
- Pay & Display parking
- Conference delegate buildings
- Conference accommodation
- Other University buildings



## APTS Timetable

	Monday 15th April	Tuesday 16th April	Wednesday 17th April	Thursday 18th April	Friday 19th April	
08:00 - 09:00		Breakfast				
09:30 - 11:00		Applied Stochastic Processes	Applied Stochastic Processes	Applied Stochastic Processes	Applied Stochastic Processes	
11:00 - 11:30		Tea & Coffee				
11:30 - 13:00	Registration	Statistical Modelling	Statistical Modelling	Statistical Modelling	Statistical Modelling	
13:00 - 14:00		Lunch				
14:15 - 15:45	Statistical Modelling	Statistical Modelling (LAB)		Statistical Modelling (LAB)		
15:45 - 16:15		Tea & Coffee	Free Afternoon		Tea & Coffee	
16:15 - 17:45	Applied Stochastic Processes	Applied Stochastic Processes		Applied Stochastic Processes		
18:30 - 19:30		Dinner				
Evening	Free evening	Free evening	Free evening	Academy Dinner (19:00 - )		

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## Timetable Notes

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**Location of lectures:** All APTS lectures will take place in the Engineering and Science Learning Centre (ESLC) building, University Park campus (building 54 on the campus map). The lectures will be held in room A09. Rooms C01 and C13 can be used as breakout spaces.

**Location of labs:** Computer Labs will be held in the Coates building, University Park campus (building 36 on the campus map), room C19 (Tuesday and Thursday, 14:15 to 15:45).

**Tea and Coffee:** Tea and coffee will be served in the foyer area of ESLC building.

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## Local Information

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**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.

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## Emergency details

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**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.

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# Module details

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## Statistical Modelling

MODULE LEADER: IOANNIS KOSMIDIS

Aim: To introduce important aspects of statistical modelling, including model selection, various extensions to generalised linear models, and non-linear models.

Learning outcomes: After taking this module, students should be able to:

- provide a theoretical justification for the use of various criteria for model selection, and apply these techniques in practice.
- describe some reasons why Generalised Linear Models may fail to fit real data well, and apply techniques to diagnose such failures.
- describe some commonly-used extensions to Generalised Linear Models, and conduct frequentist and Bayesian inference for these models.

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.
- Extensions of the Generalised Linear Model, including models for overdispersion and mixed-effects models.
- Non-linear models.

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

Further reading:

- Davison (2003). Statistical Models.
- Gelman and Hill (2007). Data Analysis Using Regression and Multilevel/Hierarchical Models.

# Applied Stochastic Processes

MODULE LEADERS: NICHOLAS GEORGIU & CHAK HEI

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:

- Complete appropriate exercises that are simple developments or extensions of aspects of the results in the module.

