

apts.ac.uk
Academy for PhD Training in Statistics

WEEK 4: UNIVERSITY OF GLASGOW
20th – 24th August 2018

Welcome to Glasgow!

Workshop registration: Registration on Monday 20th August will take place at the University of Glasgow, in the main foyer of the Mathematics & Statistics Building, between 11.30am and 12.30pm.

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.

IT: You will be issued with a log in and password from the registration desk. Please keep a note of this for use throughout the week within the Labs in the Maths & Stats Building and for Wi-Fi access within Room 109 and Student Common Area.

There will also be internet access in your accommodation; please ask at your accommodation to be given a cable for internet access in your room and/or for the appropriate login/password for Wi-Fi access in your room and the communal areas within your accommodation.

Messages: The telephone number for colleagues or family to leave an urgent message for you during office hours is **0141 330 2940**.

Accommodation information

Cairncross House Residence, 20 Kelvinhaugh Place, Glasgow, G3 8NH

Travel/location: Your accommodation is based at the above address. Please click on the attached link for travel directions to the Cairncross House Residences:

<https://www.gla.ac.uk/undergraduate/accommodation/residenceprofiles/cairncrosshouse/traveldirectionstocairncrosshouse/>

There is free car parking at the Cairncross House Residences.

Accommodation:

- Rooms are single or twin with linens and towels provided
- Internet access provided in each room - please ask at reception for a cable
- Wi-Fi provided in all rooms and communal areas – please ask reception for login/password
- Laundry facilities are available
- Please note all areas of the Residences are non-smoking.

Single/Twin rooms have been booked for 4 nights – Monday 20th August until Thursday 23rd August (unless you have informed us otherwise).

The Cairncross House Residences are manned 24 hrs a day; you can check-in and access your room between 9am and 5pm. Outwith these hours there are LSA (Living Support Assistants) who will provide you with keys to your room.

Bedrooms are available from 2pm onwards and rooms should be vacated by 10am on the day of departure.

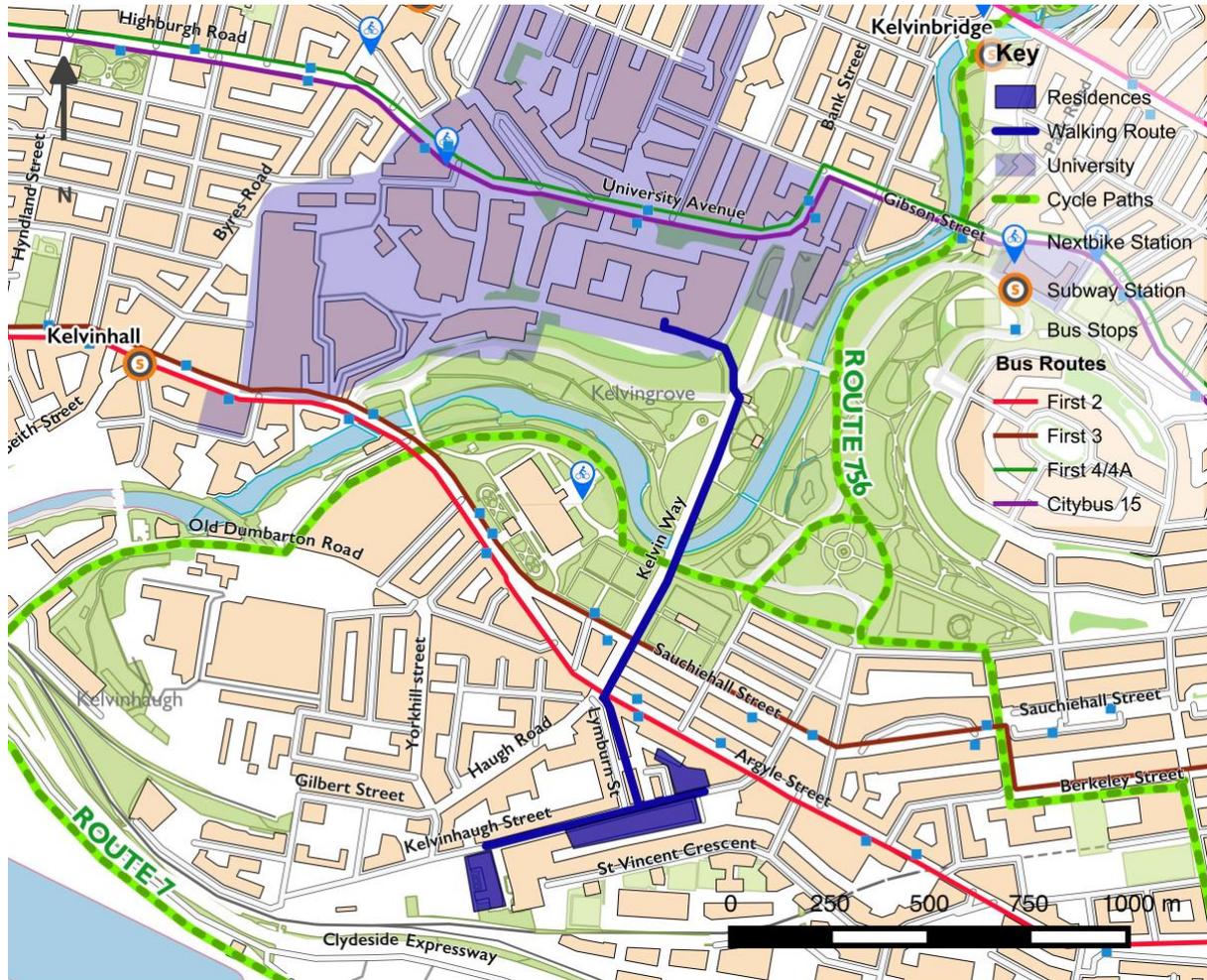
There are no facilities at this accommodation for luggage storage; however, we will provide a room in the Mathematics & Statistics Building (Room 110), University of Glasgow on Monday 20th and Friday 24th August to store your luggage. Further details will be given at Registration.

Breakfast each day will be provided at the Glasgow University Union from 8.00am to 9.00am, Tuesday - Friday.

Email access: The Residences provide data points in each room for internet access and Wi-Fi is available in all rooms and communal areas. Please ask at check-in for cables and/or Wi-Fi login/password.

Travel to APTS venue

The University of Glasgow is a short journey from your accommodation at the Cairncross House Residences.



Cairncross House Residences are approximately fifteen minutes' walk from the main University campus and a twenty-minute bus ride from the city centre.

The most easily accessible route from your accommodation to the Mathematics Building (at University Place, G12 8SQ) is via Kelvin Way, University Avenue and then University Place.

Medical and emergency information

Medical Assistance: The University Health Centre is open Monday-Friday 09.00 – 17.00.

Emergency Services and Fire Procedures: For help in an emergency dial **4444** from any internal telephone and your call will be directed appropriately. Visitors are asked to familiarise themselves with the University's fire procedures which are displayed in each bedroom.

On discovering a fire in other buildings:

Raise the alarm by breaking the glass in the nearest Break Glass Point.

On hearing the continuous ringing of the fire bells:

Stop what you are doing.

Leave by the nearest Fire Exit.

Walk calmly, do not run.

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.

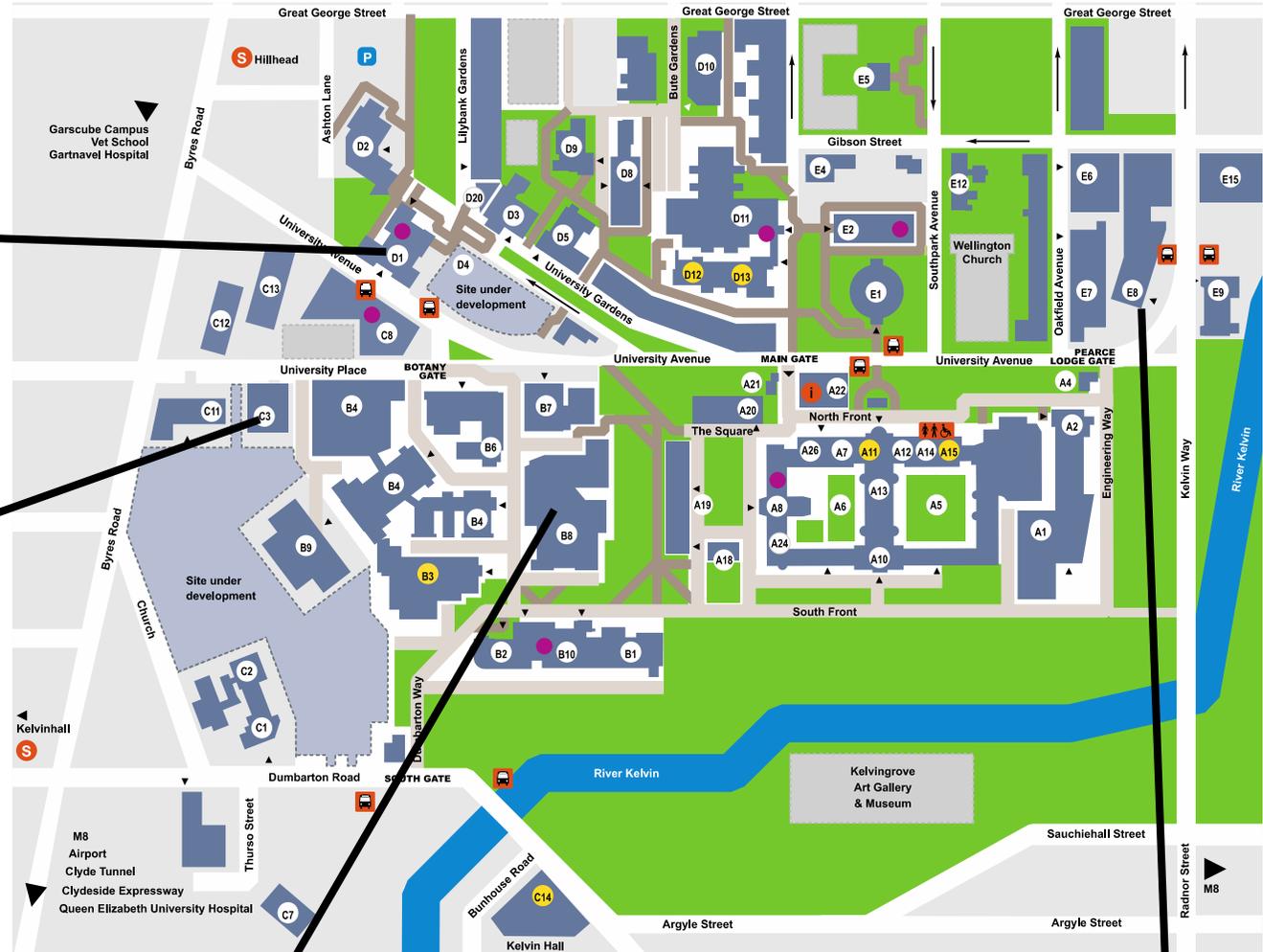
Campus Map

D1 Boyd Orr Building
(Labs)

C3 Maths & Stats Building
(Registration)
(Lunches)
(Tea & Coffees)

B8 Kelvin Building
(Lectures)

E8 Glasgow University Union
(Breakfast & Dinners)



Design of experiments and studies

Module leader: D Woods

Aims: To introduce the fundamental principles of statistically designed experiments, and other modes of data collection, and highlight their important role in the scientific method. A variety of classical and modern methods will be overviewed, connections between them emphasised. and ongoing research challenges introduced.

Learning outcomes: An understanding of the major different mechanisms for data collection, their similarities and differences. For designed experiments, an appreciation of the impact of the choice of design on the precision and accuracy of the subsequent statistical modelling and inference. An awareness of the challenges presented to data collection methodologies from modern scientific experiments and studies. Familiarity with some of the practical issues in implementing statistically designed experiments.

Prerequisites: Linear and nonlinear/generalised linear modelling. Sampling distributions of parameter estimators, including basic asymptotic results. An understanding of the fundamentals of Bayesian inference. Basic statistical computing, including simple optimisation methods. All these topics, and more, are covered by the APTS Statistical Inference, Statistical Computing and Statistical Modelling modules.

Topics:

1. Modes of data collection, experiments and causality, the impact of design on modelling
2. Factorial experiments
3. Bayesian design, and design for nonlinear models
4. Design of computer and simulation experiments
5. Data collection in spatial studies and via sample surveys, and connections to design of experiments

Assessment: Exercises, that will include finding and assessing designs for practically relevant examples.

Flexible regression

Module leader: C Miller and T Neocleous

Aims: The term 'flexible regression' refers to a wide range of methods which provide flexibility in the nature of the relationship being modelled. The course will start with univariate smoothing and progress through standard forms of nonparametric regression to state-of-the art modelling tools which can be applied in a wide variety of settings. The course will cover the main ideas from a conceptual perspective as well as investigating aspects of the underlying theory and computation. There will also be some exploration of practical use of the methods in real applications.

Learning outcomes: By the end of the module, students will: be able to describe and explain the techniques of nonparametric regression including smoothing and quantile regression approaches; be able to describe the issues of bias and variance associated with model fitting and selection; be able to state and describe a range of mechanisms which can be used to smooth data; be able to explain how these techniques can be incorporated into wider modelling tools; be able to use these methods in a wide range of applications.

Prerequisites: Linear models and generalised linear models (preliminary APTS material and Statistical Modelling); R programming (preliminary APTS material and Statistical Computing); matrix computations (Statistical Computing); confidence intervals and hypothesis tests (Statistical Inference).

Topics:

- spline, basis and kernel approaches to nonparametric regression;
- quantile regression;
- computational issues and an insight into asymptotic properties;
- generalised additive models (including quantile regression extensions);
- alternative approaches, including e.g. functional data analysis and Gaussian processes;
- case studies.

Assessment: A set of exercises assigned by the module leaders, including a data-analysis exercise involving practical use of some of the methods covered.

APTS Timetable

| | Monday 20th August | Tuesday 21st August | Wednesday 22nd August | Thursday 23rd August | Friday 24th August |
|---------------|--|--|---|---------------------------------------|---------------------------------|
| 08:15 – 9:15 | | Breakfast – GUU | | | |
| 09:30 – 11:00 | | Flexible regression | Flexible regression | Design of experiments & studies | Design of experiments & studies |
| 11:00 – 11:30 | | Tea & Coffee Break – M&S Building | | | |
| 11:30 – 13:00 | Registration: Maths building (Foyer) | Flexible regression (Lab) | Design of experiments & studies | Design of experiments & studies (Lab) | Flexible regression |
| 13:00 – 14:00 | Lunch – M&S Building | | | | |
| 14:00 – 15:30 | Flexible regression | Design of experiments & studies | Free afternoon | Flexible regression | |
| 15:30 – 16:00 | Tea & Coffee Break – M&S Building | | | Tea & Coffee – M&S | |
| 16:00 – 17:30 | Design of experiments & studies | Design of experiments & studies (Lab) | | Flexible regression (Lab) | |
| 17:30 – 18:30 | RSS Drinks Reception – M&S | Free Time | | Free Time | |
| 18:30 – 19:30 | Dinner – GUU | Dinner – GUU | Free evening – to arrange own dinner | Dinner – GUU | |
| Evening | | Quiz | | Ceilidh (20:00 – 23:00) | |

GUU – Glasgow University Union

M&S Building – Maths & Stats Building

Timetable notes

- **Lectures** will take place in Lecture Theatre Room 312, Kelvin Building.
- **Computer labs** will take place in Room 417/420, Boyd Orr Building.
- **Tea and coffee breaks** will be served in Room 109 and Student Common Area, Ground Floor, Mathematics & Statistics Building.
- **Lunches** will be served in Room 109 and Student Common Area, Ground Floor, Mathematics & Statistics Building.
- **Breakfasts & Dinners** will be served in the Glasgow University Union.
- **RSS Drinks Reception:** The Royal Statistical Society is kindly sponsoring a drinks reception on the early evening of Monday 20th August. This will take place in Room 109 and Student Common Area, Ground Floor, Mathematics & Statistics Building.
- **APTS Ceilidh:** This will take place in the Glasgow University Union after dinner on Thursday 23rd August.