

# apts.ac.uk

Academy for PhD Training in Statistics

Week 3: Durham University  
3 – 7 July 2017



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## Welcome to Durham!

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### CONFERENCE VENUE

The conference will take place in the Palatine Centre on the University Science site, a short walk from Collingwood College. Please see site map overleaf.

**Please note that most of Durham is on a slope.** Let us know at registration if you have mobility difficulties, and we will try to accommodate these. There is no parking available on the University Science site.

### APTS REGISTRATION

Registration will take place in the Chemistry Café on Monday 3rd July from 11am. You will receive your badge from the registration desk. Please wear your badge at all times. This will help with security and also help participants to identify one another. Please note that there are no facilities to store luggage on the Science Site.

### IT

Login details for wi-fi will be included in your information pack at the APTS registration. ***You are strongly encouraged, if possible, to bring a laptop with R installed for taking part in the Computer Intensive Statistics practical sessions.*** We also strongly advise that you set up Eduroam beforehand using <https://cat.eduroam.org/>.

### LECTURE THEATRES AND LABS

All lectures will take place in lecture room CG85 (between Maths and Chemistry). The following 'breakout' rooms are suitable for lab work and are also available at any time during the week, including breaks and free time: PCL050, PCL053, PCL054, PCL056, PCL057, PCL058, PCL216.

### TEA, COFFEE, and LUNCH BREAKS

Refreshments will be served in the Scarborough Café next to the lecture room.

### EVENING EVENTS

The Royal Statistical Society will once again, very generously, host a reception on Monday 3<sup>rd</sup> July at which refreshments will be served. This will take place at 7.30pm in the Collingwood College Penthouse. There will be a short talk given by a representative from the RSS.

The Academy Dinner will take place at 7pm on Thursday 6<sup>th</sup> July in the Collingwood Dining Hall. Dress code: Smart/casual.

Please note that Collingwood bar will be closed for refurbishment. However, APTS participants have the use of nearby Grey College bar.



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## Emergency details

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### **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 signposted. 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.

### **EMERGENCY AND MEDICAL ASSISTANCE NUMBERS**

Collingwood – Reception 0191 334 5000 (8am – 4pm) after these hours Porters – 07821 617578

Palatine – Reception 0191 334 6100

First Aiders – Jeremy Pidgeon – 0191 334 6318, Kathryn Buckle – 0191 334 6424

Chemistry – Security – 0191 334 2222

### **MEDICAL ASSISTANCE**

Please contact a local member of staff who will alert the appropriate services. Please note if you need to dial 999 from a mobile, please also call security on 0191 3342222 to inform them your location as the campus is complex and escorts by the security team are required for emergency service vehicles arriving onto campus to prevent any delays reaching you.

# Information for participants staying at Collingwood College



If you have booked University accommodation, for the APTS Conference, you will be accommodated at **Collingwood College**.

Collingwood College is one of the most modern of all Durham University's colleges and offers all the essential amenities for any event, from international conferences for hundreds of delegates to group trips exploring the riches of the area.

## **BEDROOM FACILITIES**

The College has 200 en-suite bedrooms and 307 standard bedrooms. APTS Participants have been booked in en-suite rooms.

All bedrooms have the following facilities:

- Tea and coffee making facilities refreshed daily
- Free internet connection Wi-Fi available in the bedrooms
- Hollow fibre filled pillows
- Bathrooms with shaver socket outlets
- Toiletry pack containing Shower gel/Shampoo, Soap, Body Lotion and a vanity kit, one per person per stay
- One hand towel and one bath towel per person
- Hairdryers, irons and ironing boards available from Reception
- Lift access in en-suite rooms but not in standard rooms

## **CHECK IN**

Rooms are guaranteed to be ready by 2pm on Monday 3<sup>rd</sup> July 2017. The reception will be open from 9am-5pm each day. Outside these times, a porter will be available to show you to your room. Please use the internal telephone near to reception to call the porter if he is away from his post.

## **CHECK OUT**

Check out is before 10am on Friday 7<sup>th</sup> July 2017.

## **BREAKFAST**

For participants resident in Collingwood College, breakfast will be served in the college's dining hall from 8am-9am. Early breakfasts can be arranged on request.



# Guest information

## SMOKING

Smoking is prohibited in all enclosed public places in the UK. A designated outdoor smoking area is provided at each College.

## BUSINESS AND INTERNET FACILITIES

Free wireless internet access is available in college and all University buildings. Login details will be provided at registration. Fax and photocopying facilities are available at the College, subject to a small charge.

## ELECTRICAL APPLIANCES

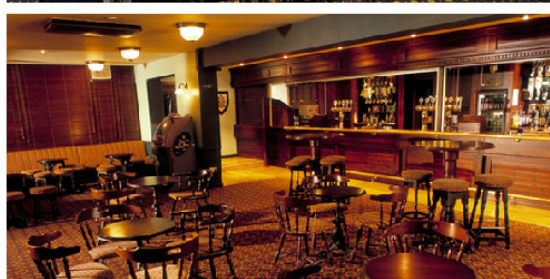
Plugs and sockets in the UK have voltage between 220-240V. Please bring appropriate adaptors for your mobile phone recharger and other appliances.

## EMERGENCY

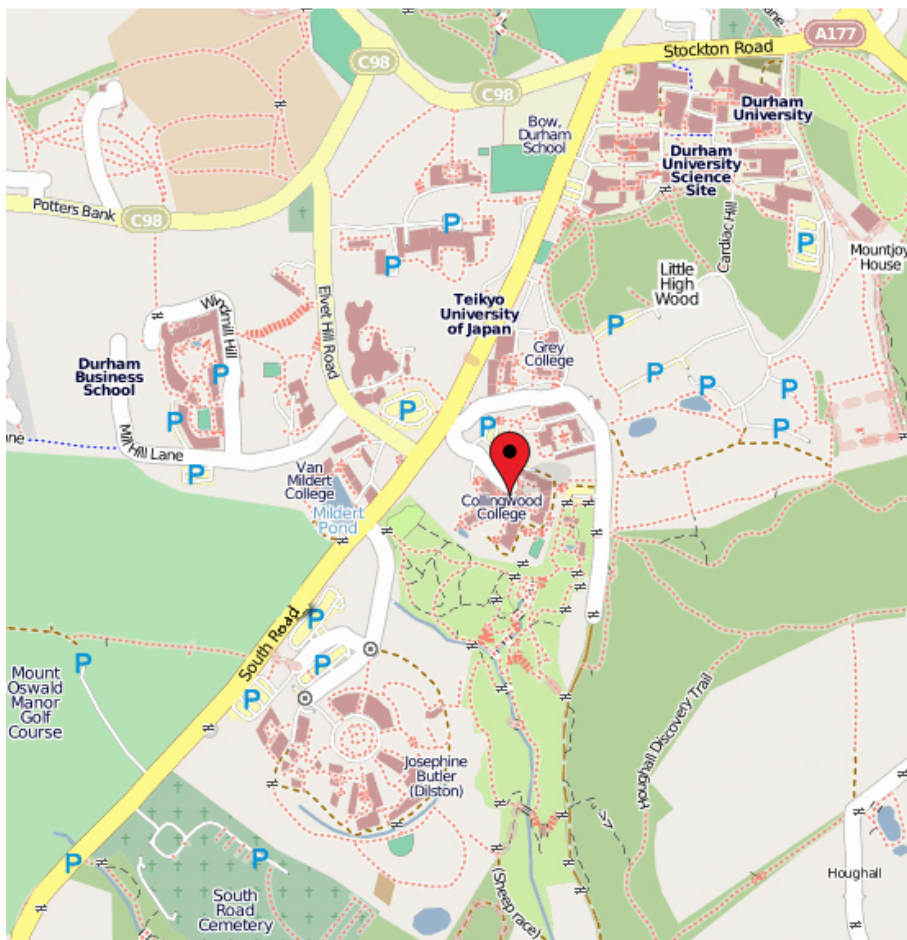
In case of an emergency, to report any suspicious behaviour, accidents, if you require any medical attention or any other assistance please contact Reception.

## PARKING

Car parking is available at the college, but limited and strictly on a first come first serve basis. No spaces can be reserved. Car details will need to be registered on arrival at College Reception.



## Directions to college



Collingwood College  
South Road  
Durham University  
DH1 3LT  
Tel: +44 (0) 191 334 5000

Set in tranquil woodland, Collingwood is close to the city centre, Durham Botanic Garden and the Oriental Museum.

### Public Transport Directions

Durham Railway station is 2 miles away. From the city bus station – a short walk from the railway station – take the Arriva No 6 Bishop Auckland service which runs every 15 minutes past the Colleges on South Road.

### Road Directions

Take the A690 from the A1 (M), turn left across Elvet Bridge over the traffic lights. Follow the road to New Inn crossroads, go straight over. Collingwood is the third turning on the left-hand side.

For further information on how to get to Durham, please refer to the Travel section at the end of this brochure.

## APTS Timetable

	Monday	Tuesday	Wednesday	Thursday	Friday
09:30-11:00	Registration (11:00-12:45) Chemistry Café	<b>High-Dimensional Statistics</b>	<b>High-Dimensional Statistics</b>	<b>High-Dimensional Statistics</b>	<b>High-Dimensional Statistics</b>
11:00-11:30		Coffee (Scarborough Café)			
11:30-13:00		<b>Computer Intensive Statistics</b>	<b>Computer Intensive Statistics</b>	<b>Computer Intensive Statistics</b>	<b>Computer Intensive Statistics</b>
13:00-14:00	Lunch (13:00-13:45)  Scarborough Café	Lunch (Scarborough Café)			
	Welcome & <b>High-Dimensional Statistics</b> (14:00-15:45)	<b>High-Dimensional Statistics</b>	Free afternoon	<b>High-Dimensional Statistics</b>	(End)
14:15-15:45					
15:45-16:15	Coffee (Scarborough Café)			Coffee (Scarborough Café)	
16:15-17:45	<b>Computer Intensive Statistics</b>	<b>Computer Intensive Statistics</b> (lab*)		<b>Computer Intensive Statistics</b> (lab*)	
18:30-19:30	Dinner (Collingwood Dining Hall)				
Evening	RSS Reception (19:30-21:00)  Collingwood Penthouse	Free Evening / Grey College Bar	Free Evening / Grey College Bar	Academy Dinner (19:00-21:00)  Collingwood Dining Hall	

**\*Please bring your own laptop for the computer sessions.**



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## Computer Intensive Statistics

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**Module leader:** Dr Adam M. Johansen (Warwick)

**Aims:** This module will introduce various computationally-intensive methods and their background theory, including material on simulation-based approaches such as Markov-chain Monte Carlo (MCMC) and the bootstrap, and on strategies for handling large datasets. The different methods will be illustrated by applications.

**Learning outcomes:** After taking this module, students will have a working appreciation of MCMC, the bootstrap and other simulation-based methods and of their limitations, and have some experience of implementing them for simple examples. Students will also have gained an appreciation of the difficulties of handling very large datasets and of some approaches to overcoming them.

**Prerequisites:** Preparation for this module should include a review of the following topics:

- familiarity with basic types of convergence of random variables: in probability, almost sure and in distribution;
- relevant basic material on statistical modelling (for which the earlier APTS module 'Statistical Modelling' would be advantageous);
- basic Markov chains (as for the 'Applied Stochastic Processes' module);
- basic knowledge of programming in a high-level language such as R will be assumed, and R will be used for case studies and exercises.

**Topics:**

- Overview of simulation-based inference; Monte Carlo testing.
- Basic theory of bootstrap methods; practical considerations; limitations.
- Basic theory of MCMC; types of MCMC samplers; assessment of convergence/mixing; other practical considerations; case studies.

**Assessment:** Exercises set by the module leader, which will include some practical simulation.

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## High-Dimensional Statistics

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**Module leader:** Dr Rajen Shah (Cambridge)

**Aims:** Remarkable developments in computing power and other technology now allow datasets of immense size and complexity to be collected routinely. One common feature of many of these modern datasets is that the number of variables measured can be very large, and even exceed the number of observations. In these challenging high-dimensional settings, classical statistical methods often perform very poorly or do not work at all. In this course we will look at some of the current methods for handling such data and try to understand when and why they work well.

**Learning outcomes:** After taking this module, students should be able to use analogues of many of the tools from classical statistics to analyse high-dimensional datasets. They should also be more well-placed to study and make a contribution to the growing literature on high-dimensional statistics.

**Prerequisites:** Preparation for this module should establish:

- Standard matrix algebra (not beyond that covered in the Statistical Computing module);
- Basic knowledge of real analysis and norms;
- Undergraduate level probability (no measure theory required) and statistics (e.g. maximum likelihood, the normal linear model, hypothesis tests and  $p$ -values);
- Thorough understanding of the normal linear model;
- Some basic elements of optimisation and convex analysis that will be covered in the preliminary material.

**Topics:**

- Ridge regression;
- The Lasso and extensions;
- Graphical modelling including neighbourhood selection and the graphical Lasso;
- Multiple testing including the false discovery rate and the Benjamini-Hochberg procedure.

**Assessment:** Exercises with both a theoretical and a computational component.

## Travel information: How to get to Durham



### BY AIR

#### NEWCASTLE AIRPORT

Newcastle airport is approximately 20 miles north of Durham. There are connecting flights from a number of European hubs including London Heathrow & Gatwick, Amsterdam, Paris and Brussels, and the airport is also served by a number of budget airlines. See [www.newcastleairport.com](http://www.newcastleairport.com) for full details.

The Metro is available from the airport to Newcastle Central Station. The journey takes approximately 20 minutes, and Metro trains run every 7 minutes.

**If you are arriving in the evening we recommend taking a taxi from the airport to avoid the risk of missing the last trains south (see taxi section).**

#### DURHAM TEES VALLEY

Durham Tees Valley is approximately 25 miles south of Durham. Although it has fewer flights than Newcastle, there are connecting flights with Amsterdam and other cities, and it is served by budget airlines. See [www.durhamteesvalleyairport.com](http://www.durhamteesvalleyairport.com) for further details.

To reach Durham, the Tees Valley Sky Express (737) bus service runs between the airport and Darlington train station and is free for air travellers. The timetable can be viewed at [www.skyexpress.co.uk](http://www.skyexpress.co.uk).

## BY TRAIN



60 InterCity trains from most major centres in the country call at Durham daily including 14 trains from London. The National Express high speed service takes under 3 hours from London King's Cross on the main East Coast line. First Transpennine Express offers frequent links to Manchester, Sheffield and Leeds, while Cross Country links Durham with Scotland, the Midlands and the South West.

For train times and fare information call National Rail Enquiries on 08457 48 49 50 or +44(0)20 7278 5240 from overseas (note international rates apply), or visit [www.nationalrail.co.uk](http://www.nationalrail.co.uk). The following website is also useful for checking train times [www.thetrainline.com](http://www.thetrainline.com)

## BY CAR



Durham city centre is only two miles from the A1 (M). Leave the motorway at Junction 62 on the A690 Durham - Sunderland road and follow signs to Durham City Centre. Durham City is served by three Park and Ride sites on the key routes into the city. These are situated at Belmont, Sniperley and Howlands. A direct bus service runs every 10 minutes to the city centre from each site. The sites offer free parking for users of the Park and Ride bus service and unlimited daily travel into the city centre and back for just £2.00 per person. Park and Ride users can also use the Cathedral Bus for free.

## BY TAXI



Taxis are available from Newcastle and Durham Tees valley airports.

Airport Taxis is the official taxi service for Newcastle International Airport. To make a booking, or for further information, contact:

Tel: +44 (0) 191 214 6969

Web: [www.airport-taxis.co.uk](http://www.airport-taxis.co.uk)

In Durham, taxis are available from the train station, on the opposite northbound side, accessible by a subway. The taxi journey to the Colleges takes 5–10 minutes.

### Useful Durham Taxi Numbers:

Paddy's Taxis	0191 3866662
Pratts Taxis	0191 3864040
Durham Taxis	07961 818464
Pollys Taxis	07774634765
Dunelm Taxis	0191 3831122
Macs Taxis	0191 3841329

## Tourist Information

Few venues in the world can rival the splendour, prestige and heritage of the City of Durham. Located on a dramatic peninsula overlooking the River Wear, Durham's unique Norman Cathedral and Castle not only dominate the skyline, they are also a designated World Heritage Site.

Durham is a small and compact city, and everything is within easy walking distance. Just minutes from the bustling centre, you can enjoy the tranquillity of leafy riverside footpaths along the banks of the River Wear, or the changing seasonal displays at the Botanic Garden. Palace Green Library, the Oriental Museum and World Heritage Site Visitor Centre hold fascinating collections of international significance, as well as offering key insights into local history.

Within a short distance of Durham, visitors can experience dynamic cities, an unforgettable stretch of coastline, and a wealth of historic and natural wonders. Moreover, the sights and sounds of Newcastle and Gates-head are only 15 minutes' train journey north of Durham.

For more information of how to make your visit unforgettable, please visit:

<https://www.dur.ac.uk/attractions/>

<http://www.thisisdurham.com/>





# Durham Campus Map

