



UNIVERSITY OF
BIRMINGHAM

Masterclass Programme 2016–17

Subject experts in action at the
University of Birmingham!

‘I found the experience
interesting and it has given
me an insight into a potential
subject I may study.’

*Student, ‘Human Evolution’
Biosciences Masterclass*

Challenge what you know

www.birmingham.ac.uk/masterclasses



Business

Taxing Our Wealth – Do We Have It Right?

In this masterclass we will be exploring together issues of wealth equality in Britain today. How unequal is our society? Should we care? Does it matter? Can anything be done about it even if it does matter? In particular, we will focus on the role taxation plays in affecting wealth equality. We will explore questions such as: How does the UK tax system affect people's wealth in modern Britain? Do we have the right mixes of taxes in the UK to create a fair system of contributions from everyone – rich and poor? What changes are being suggested to improve our tax system? Are they sensible? Students should come along prepared to participate in the debate and offer opinions in what we hope will be an interesting and interactive session.

Date	Wednesday 16 November 2016
Time	1.00–3.00pm
Subject area	Accounting and Finance
Year group	Year 12/13

Engineering

Biomedical Engineering: Accident and Emergency Engineering

This workshop will give you a taste of what it is like to be a biomedical engineer, and design and make your own medical implant. A patient has broken the femur bone in one of their legs and been brought to A&E for help. Their X-rays show it is a nasty break and they are going to need surgery. The surgeon needs you, the engineer, to design and build a device which will hold the bone together while it heals. You will discover the science behind these amazing implants and how biomedical engineers help patients.

Date	Wednesday 23 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Engineering
Year group	Year 10/11

The Realities of Virtual Reality

The recent resurrection of interest in Virtual Reality (VR – and related topics of 'Augmented' and 'Mixed' Reality) cannot have gone unnoticed, with almost weekly announcements of new developments in head-mounted displays, advanced hand controllers and applications for smartphones and tablets. But has the domain of VR really progressed dramatically since its first appearance in the 1980s and 1990s? Is the notion of 'immersion' into computer-generated worlds really a reality? How far have we come in terms of senses other than vision – touch, smell and so on? Using examples from the HIT Team's extensive project portfolio – with applications in defence, health care and heritage, this masterclass will expose the truths and myths about VR, with opportunities for hands-on experiences with the latest technologies.

Date	Wednesday 9 November 2016
Time	1.00–3.00pm
Subject area	Electronic, Electrical and Systems Engineering
Year group	Year 12/13

Physics of a Car Crash

How do the police work out how fast a car was going when it started breaking? Or what speed a car was travelling at when it hit a pedestrian? In a head-on collision, what difference does it make if you are in the heavier car or the lighter car? How are cars designed to protect their occupants in a crash? What about pedestrians and cyclists? Find out about the physics of a car crash, the engineering behind designing safer cars and why speed really does make a difference between life and death.

Date	Wednesday 16 November 2016
Time	1.00–3.00pm
Subject area	Mechanical Engineering
Year group	Year 12/13

Sunny with a Mild Chance of Catastrophe

The impact of major space weather events is an active area of research and a topic of national interest. The potential damage of a solar superstorm to our economy, communications network and electricity grid is a real threat and must be taken seriously. Such storms can cause the loss of GPS (with many more consequences than just not being able to find the way to the supermarket), alter the orbits of satellites and could cripple the electricity grids around the world. This session will present an overview of the causes of space weather and the potential repercussions of a superstorm.

Date	Wednesday 9 November 2016
Time	1.00–3.00pm
Subject area	Physics/Engineering
Year group	Year 12/13



Humanities

Writing Other Lives

Creative Writing is not just about 'writing what you know'. It is also about exploring the lives of others, and imagining what it would be like to step into someone else's shoes. Through a series of reading and writing exercises, we will discover how fiction can break down barriers and ultimately lead to a greater sense of understanding and empathy.

Date	Wednesday 7 December 2016
Time	1.00–3.00pm
Subject area	Creative Writing
Year group	Year 12/13

How to Read a Shakespeare Play

This session will provide an opportunity for English Literature A level students to see how the ways of reading and responding to Shakespeare that they are encountering are taken forward and developed in university-level study. Led by the Department of English Literature, this session will offer students a taste of the different ways in which Shakespeare is researched, taught and explored at university; it will offer a taste of different teaching and learning methods, via a mini-lecture and small group work. The session might be tailored to reflect particular plays studied by those students attending.

Date	Wednesday 2 November 2016
Time	1.00–3.00pm
Subject area	English Literature
Year group	Year 12/13

Bad Writing and the Study of English

Why do we read English Literature? Why do we need a whole academic discipline devoted to it? What is the point of studying writing and criticism at university? These questions are getting bigger all the time. Disguised as questions about value and funding higher education, you have seen them over and over in newspapers and online. In this session, we'll take a look at some texts which make answering them especially challenging: bad texts. We'll read shockingly awful poetry and prose and then strive together to find the profit in it. You will cringe, wince and (hopefully!) enjoy yourself.

Date	Wednesday 9 November 2016, Wednesday 23 November 2016
Time	1.00–3.00pm
Subject area	English Literature
Year group	9 November –Year 12/13; 23 November – Year 9/10



Climate Change: Science, Impacts and Solutions

This class is designed to give a broad introduction to some key scientific ideas related to human-induced climate change, and a critical review of the effectiveness of global attempts to restrict enhanced global warming to below 2° Celsius.

Date	Wednesday 9 November 2016
Time	1.30–3.30pm
Subject area	Geography
Year group	Year 12/13

Crime and Punishment in the United Kingdom

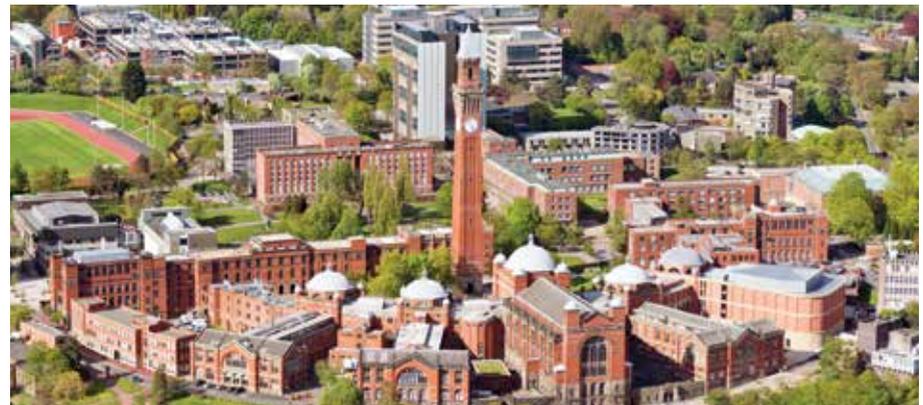
This session will explore the history of crime and punishment in the United Kingdom and will also look at current approaches. Students will examine the social and political factors that influence approaches to punishment, and will explain how and why they think people should be punished for committing criminal offences.

Date	Wednesday 9 November 2016
Time	1.00–3.00pm
Subject area	Law
Year group	Year 12/13

The Hard Problem of Consciousness: Can This Really be a Physical Property?

Students will examine basic arguments around the subject of consciousness in detail. Students will then be divided into groups – membership determined by their emerging sympathies on the issue – and will undertake supervised critical discussions intended to identify possible weaknesses in the arguments, and ways in which they might be improved.

Date	Wednesday 30 November 2016
Time	1.00–3.00pm
Subject area	Philosophy
Year group	Year 12/13



Languages

Try a New Language!

Why are languages useful for your future? In what ways could languages improve your employability or allow you to meet new people? What are the different ways to carry on with a language at university? Participants may be studying a modern language now, like French, German or Spanish, but Arabic, Chinese, Japanese, Italian, Portuguese or Russian are languages in demand and can be studied from scratch at university level. The masterclass allows students to try their hand at learning something new!

Date	Wednesday 9 November 2016
Time	1.00–3.00pm
Subject area	Languages
Year group	Year 10

Boost Up Your Languages!

Some students find the gap between GCSE and A level a bit difficult. This masterclass will boost up Year 12 students language skills! In French, German or Spanish, these sessions will help students to understand and practise more grammar points or to help them expand and memorise vocabulary.

Date	Wednesday 7 December 2016
Time	1.00–3.00pm
Subject area	Languages
Year group	Year 12 only

Languages and Cultures

Are you passionate about cinema, literature, arts or history and the modern language you are currently studying? Participants will have the opportunity to be introduced to topics linked to cinema, arts literature genres, authors, or history in the language they are studying. On the day, students will be split by language studied (French, German, Spanish and Russian and possibly Italian on request) and attend different interactive workshops where you will be able to practise your studied language in speaking and/or writing.

Date	Wednesday 30 November 2016
Time	1.00–3.00pm
Subject area	Languages
Year group	Year 12/13



Mathematics

Using Mathematics to Win Game Shows

Have you ever wondered what you would do if you were on *Deal or No Deal*, *The Million Pound Drop* or *The Weakest Link*? In this session we'll look at the mathematics and probability underlying the best strategies in a variety of games including these. The problems will build on the topics covered in probability and statistics components of the GCSE syllabus, and there will be a variety of problems to suit different abilities.

Date	Wednesday 2 November 2016, Wednesday 30 November 2016
Time	1.00–3.00pm
Subject area	Mathematics
Year group	Year 10/11

Using Maths to Survive the Zombie Apocalypse

Understanding how an infection such as swine flu spreads through a population, or how different populations interact with each other, is essential to maintain healthy and diverse populations. By describing these situations with maths, we can make predictions about what will happen when a particular treatment/containment strategy will be most effective. We will show students how to develop these mathematical models and look at ways to ensure the human race survives if (and when) the zombies attack!

Date	Wednesday 16 November 2016
Time	1.00–3.00pm
Subject area	Mathematics
Year group	Year 12/13

Science

Interested in the Biochemistry of Life?

Why should one be interested in the life sciences at all? They give you the unique opportunity to grab part of the mystery of how life works on a molecular level. Moreover, students will learn to see patterns and repeating laws in nature.

Date	Wednesday 2 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13



The Ethics of Organ Transplantation

Organ transplantation saves and improves thousands of lives in the UK each year, but there are still not enough organs to give a transplant to every person who needs one. This raises many difficult questions: Should we worry about consent for organ donation? Should we use lower quality organs if this means more people can receive transplants? How should we choose which patients to give transplants to? Should we give transplants to people who have caused their own illness? This session will explore these issues and will highlight the ethical issues that transplantation presents.

Date	Wednesday 2 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

Do We Need to Experiment on Animals?

Do you think that with all the scientific knowledge we now have, there is still a need to experiment on animals? Does information gained from animal research actually help us treat patients? Do scientists have the freedom to perform any experiment they think is interesting on an animal? This interactive masterclass will give students the opportunity to think about and discuss the issues involved in animal research. They will consider the ethics and law governing this area and will look at the medical and scientific developments, which have stemmed from work with animals.

Date	Wednesday 9 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

Healthy People Need a Healthy Planet – Climate Change and the Health of the Population

In this interactive workshop we will look at how people are changing the climate and how the climate is, in turn, impacting on people's lives. We will examine how this relationship differs across the globe and even within communities. We will use freely available interactive tools to examine these impacts within the students' own neighbourhoods. Finally, and, most importantly, we will look at how we can reduce the problem by becoming more sustainable members of our community and react to the problem by becoming more adaptable.

Date	Wednesday 16 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13



Drugs for Human Health: Where Do They Come From?

In the last 100 years, the chances of a person living to 100-years-old has increased by about 40 times. At least part of the reason for this extended lifespan is the increased availability of effective drugs to treat human diseases. This session will consider where drugs originate from and how we can convert them into relatively safe and effective medicines using the combined skills of biologists, chemists, computational mathematicians and healthcare workers.

Date	Wednesday 23 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

Life on Man: It's a Jungle out in There!

This interactive game show/workshop explores the diversity of life in the human microbiome and our intimate and mutually beneficial relationship with our nearest and dearest co-habitants, both outside and inside. We also touch on what happens when that relationship breaks down, when good microbes turn bad.

Date	Wednesday 23 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

Sunlight: Friend or Foe?

Public health advice tells us to cover up, stay out of the sun and wear high-factor sun cream but could this be detrimental to our health? While presenting the pros and cons of sunlight and the importance of lifestyle choices upon our health, this session, given by research scientists and clinicians, will enhance students' understanding of how cells function, how diseases develop, the methods researchers use to study them and the steps involved in making new drugs and treatment strategies. It will be of interest to science students and especially to those considering careers in research, medicine or public health.

Date	Wednesday 30 November 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

The Eye: Fact or Fiction?

Can you really lose a contact lens behind your eye ball? Is sitting close to the television screen really bad for your eyes? Do babies see the world in black and white? Is it dangerous to sneeze with your eyes open? We will answer these questions and more as we explore common beliefs and myths about the human eye. This workshop will teach students about the eye and visual system by separating 'fact' from 'fiction': Learn about one of the most fascinating and important organs in the human body, and why you shouldn't always believe what you see on television!

Date	Wednesday 7 December 2016
Time	1.00–3.00pm
Subject area	Biomedical Science/Medicine/Pharmacy/Healthcare
Year group	Year 12/13

Understanding Climate Change, CO₂ and Forests: the Birmingham BiFoR Face Experiment

Climate change is elevating atmospheric CO₂, the gas that plants use to make sugars in photosynthesis. Since plants are potentially getting more resources this may seem a good thing, but we do not understand how UK forests will respond. The FACE (Free Air Carbon Enrichment) experiment that the University Institute of Forest Research (BiFoR) has set up will find the answers. A lecture will introduce the compact relationship between CO₂ levels, water use and xylem transport and how the FACE is addressing these issues, including live online access to field data. In a hands-on lab session we will then explore stomatal function, xylem transport, transpiration and tree rings.

Date	Wednesday 30 November 2016
Time	1.00–3.00pm
Subject area	Biosciences
Year group	Year 12/13

Human Evolution: Who Do You Think You Are?

Meet the ancestors: introducing evolutionary trees and the major features of human evolution over the last 5 million years. You have dug up a set of bones in an African desert, but which species are they? They may represent an important link in human evolution, but are they nearer to the human or chimp branches of the evolutionary tree?

Date	Wednesday 2 November 2016
Time	1.00–3.00pm
Subject area	Biosciences
Year group	Year 12/13

Spectroscopy

A session packed full of ideas and activities, during which students will learn about the key spectroscopic techniques used in chemistry and see the instruments in action. There will also be an opportunity to run your own spectra. Please note this session is for Year 13 students only.

Date	Wednesday 16 November 2016
Time	1.00–3.00pm
Subject area	Chemistry
Year group	Year 13 only

Programming Autonomous Robots

In this masterclass students will learn about the problems that face scientists trying to build autonomous robots; robots which can do things for themselves using sensors, computers and motors. Students will then put what they have learnt into practice, programming simple autonomous behaviours on Lego robots.

Date	Wednesday 16 November 2016, Wednesday 23 November 2016
Time	1.00–3.00pm
Subject area	Computer Science
Year group	Year 9

Particle Physics

This masterclass will aim to introduce students to the current view of particle physics and will cover what we think we are made of at a fundamental level. There will be some discussion of the evidence found so far to lead us to this view. There will also be some discussion of where the research is going now and in the future – what is happening at CERN and elsewhere? What are the big questions still to be answered?

Date	Wednesday 2 November 2016
Time	1.00–3.00pm
Subject area	Physics
Year group	Year 12/13

Rocket Science

The session will introduce the basic principles behind rocket launches – the forces involved in getting the rocket off the ground! Short videos will be used to show the recent history and possible future of space flight, as well as simple activities to illustrate the scale of the Universe. The students will build their own ‘film canister’ demos to illustrate the principle of launch, and go on to design and build their own card/paper rockets. They will then be able to launch them, using a compressed air rocket launcher, and learn how to maximise the range. Student helpers will be involved.

Date	Wednesday 23 November 2016
Time	1.00–3.00pm
Subject area	Physics
Year group	Year 8

Physics: Hot and Cold

The session will introduce students to the idea of temperature – our experience of extremes of temperature, what temperature means, and how is it different to heat. We will discuss what happens to materials when they get very hot or very cold, with lots of demonstrations using liquid nitrogen. Superconductors will be introduced at a basic level. The students will each get an opportunity to solder together a circuit designed to warn if fridge temperature exceeds a certain level (40°C) and will be able to take the completed circuit away with them to test at home! Student helpers will be involved.

Date	Wednesday 7 December 2016
Time	1.00–3.00pm
Subject area	Physics
Year group	Year 10



My Brain Doesn't Work

This class will reflect on the causes and consequences of brain damage before considering what can be done to limit/repair the damage. This will be discussed with reference to movement disorders and some forms of criminal behaviour. The associated ethical issues will be aired. The students will be encouraged to discuss the implications of the material presented.

Date	Wednesday 2 November 2016
Time	1.00–3.00pm
Subject area	Psychology
Year group	Year 12/13

Why Do We Eat What We Eat?

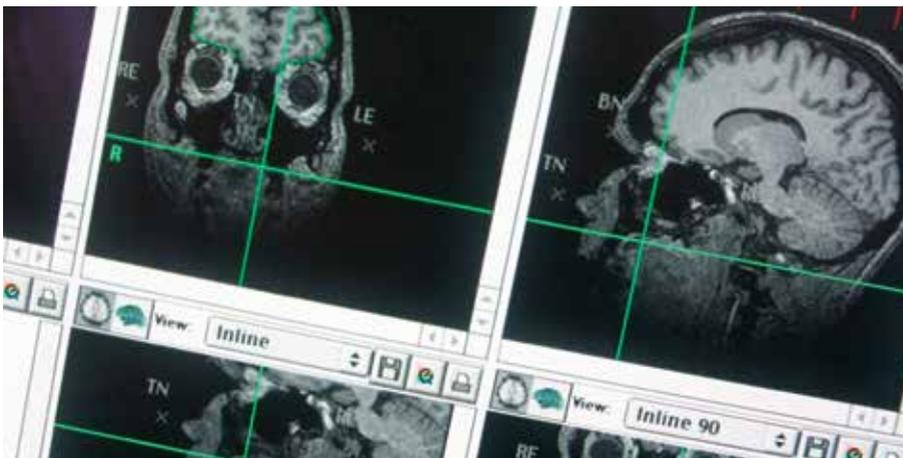
What makes us choose one food over another? Why do we stop eating when we do, and why do we eat when we are not hungry? This session will explore answers to these questions and discuss the experiments conducted by scientists who are interested in finding out why we eat what we eat.

Date	Wednesday 23 November 2016
Time	1.00–3.00pm
Subject area	Psychology
Year group	Year 12/13

Sport and Exercise: Just Study It!

This session will give an overview of the academic study of sport and exercise. The session will open with a general introduction to the area of teaching, detailing the subject area and its importance to the area of sport and exercise. The subject areas covered will include but not be restricted to: Sociology, Politics and Policy, Physiology, Psychology, Physiotherapy and Practical Studies.

Date	Wednesday 7 December 2016
Time	1.00–3.00pm
Subject area	Sport Science
Year group	Year 12/13

**Social Sciences****'What a Tangled Web We Weave, When We First Practise to Deceive.'****Children's Social and Cognitive Development and Theory of Mind**

Children learn to deceive others early in their development. They do this for a number of reasons. The session is not about the ethics or morality of lying, but of the psychological study of children's 'normal' development and how children come to understand our complex social world. Understanding what others know or do not know is an aspect of Theory of Mind (TOM), an important feature of children's social and cognitive development.

Date	Wednesday 30 November 2016
Time	1.00–3.00pm
Subject area	Education
Year group	Year 12/13

Phantom Menace or Violent Criminals – Are Young People Criminal or Poor?

The media is often full of images and stories of anti-social youth, gang culture and 'chavs'. Are these young people a social menace or the product of the society in which we live? This session will start by exploring popular media images of young people and explore youth criminality in relation to wider social problems. This interactive lecture explores the context and causes of youth crime and questions some of the approaches governments adopt to solve it. Should we rely on imprisonment? What can education do to prevent criminal behaviour? Is this a problem of poverty or individual behaviour? This inspiring session is led by Dr Lee Gregory (see below).

Date	Wednesday 7 December 2016
Time	1.00–3.00pm
Subject area	Social Policy/Criminology
Year group	Year 12/13



Dr Lee Gregory is a lecturer in Social Policy at the University of Birmingham. Lee was the first in his family to gain a degree, at Cardiff University in Social Policy and Sociology, and then went on to work in the Welsh Assembly before taking up teaching posts at the Universities of Bristol and then Birmingham. His first book was called 'Trading Time: Can Exchange Lead to Social Change?' and he is currently working on his second.

Learners attending the '**Phantom Menace or Violent Criminals – Are Young People Criminal or Poor?**' masterclass on **Wednesday 7 December 2016**, should expect an inspiring session from Lee who is excited to engage with learners from the local region.

Study skills

Study Skills: Research and Evaluation Skills

This session will help students understand how to critically think and evaluate the material they are using for essays. It will also provide them with the skills to find good quality materials. This is a great starting point for students undertaking the EPQ.

Date	Wednesday 30 November 2016
Time	1.00–3.00pm
Subject area	Study Skills
Year group	Year 12/13

Study Skills: Planning and Structuring an Assignment

This session will help students develop the key skills that are needed for successful planning and structuring of an assignment. This session is a good starting point for students who want to know more about academic writing or for those undertaking a longer essay, such as the EPQ, for the first time.

Date	Wednesday 7 December 2016
Time	1.00–3.00pm
Subject area	Study Skills
Year group	Year 12/13



Masterclass information

- Are you a teacher in a state school or college?
- Do you work with Year 8–13 learners?
- Are you looking for opportunities for your widening participation / pupil premium cohort to experience learning in a Russell Group institution?
- Do you want to ease your learners' transition between sixth form and university?
- Would you like your learners to learn how their current post-16 studies are developed at university, or discover new subjects they may be interested in studying?

If so, then University of Birmingham Masterclass programme is for you. Our masterclasses are designed to allow learners to experience what learning is like at a selective Russell Group university. Most masterclasses are two hours long and are normally held in the Autumn Term between 1.00–3.00pm on a Wednesday afternoon.

To find out more about our masterclass programme as well as submit a booking request, please visit our website:
www.birmingham.ac.uk/masterclasses

To complete a booking request via our online booking form, you will need the following information at point of booking:

- Teacher name
- Contact email address
- Job title
- Name and address of school/college
- Contact telephone number
- Number of spaces desired

Please only request spaces on a masterclass where a genuine interest has been expressed by a student. If a learner is requesting a space independently, they will need to provide the name and email address of a teacher who supports their booking request.

Schools and colleges should expect to hear by email whether their request has been successful.

- **Booking requests submitted by 23 September 2016**
Schools and colleges that have submitted applications by this date will be advised by 30 September 2016.
- **Booking requests submitted after 23 September 2016**
The Masterclass team will aim to process all booking requests submitted after this date within ten working days of their submission.

Terms and conditions

In sending us a booking request, you are automatically agreeing to the following terms and conditions:

- To brief all learners attending of their responsibility for their behaviour as well as the location of the masterclass
- To send us the names of students attending ASAP once booking is confirmed
- A minimum of 25 students is needed for a class to run (this may be from different schools)
- Priority will be given to those students currently under-represented in higher education
- All transport arrangements are the responsibility of the school/college and the University of Birmingham is unable to fund transport costs
- It is the responsibility of the school/college to ensure all necessary parental consent forms and permissions are obtained for the visit
- A booking request is not a guarantee of places

If you have a query regarding the Masterclass programme, please contact us:

Email: masterclass@contacts.bham.ac.uk
Tel: 0121 414 8489/0121 414 8332



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