



Academic Subject Exploration with Current & Former Oxbridge Academics

For Students Aged 14-18

-
- Medicine
 - Law
 - Economics
 - Mathematics
 - Psychology

 **ARCH**
E D U C A T I O N



Medicine

Depression and an Introduction to Pharmacology

Depression is a leading cause of disability worldwide, with many people around us suffering from it. To approach the study of depression thoroughly, it is important to explore the biological basis of such disorder as much as its psychological aspects. Studying depression allows us to understand the emotional and fear circuits in the brain and the basic neurochemistry of nerve cell communication. This will in turn shed light on the various ways of controlling depression, both the application of drugs and non-drug treatments. The growing significance of psychopharmacology will be explored by studying how drugs can impact neurotransmission at different levels – through direct effect on neurotransmitter, or as an agonist or antagonist on receptors. This lecture will first introduce students to the biology of depression, followed by an examination of how drug molecules interact with our own molecules in our body to alter neurophysiology, delving into the different types of molecules targeted by drugs.



Professor Zoltán Sarnyai MD PhD MA (Cantab)

*Former Fellow of Pembroke College, University of Cambridge;
Former University Lecturer in the Department of Pharmacology,
University of Cambridge*

Professor Sarnyai, currently Head of the Laboratory of Psychiatric Neuroscience at James Cook University, Australia, is a medically trained PhD neuroscientist researching on the neurobiological mechanisms of stress and psychiatric disorders. Professor Sarnyai was previously University Lecturer in the Department of Pharmacology, University of Cambridge and a Fellow of Pembroke College, Cambridge. He has close to a hundred publications and was awarded the Curt Richter Prize by the International Society of Psychoneuroendocrinology; the DuPont-Warren Award by the Department of Psychiatry, Harvard Medical School; and the Brain Research Foundation (formerly NARSAD) Young Investigator Award.

Law

Criminal Law, International Law and War Crimes

As individuals, we are bound not only by the criminal law of the country in which we live, but also by certain rules in international law regardless of which country we live. These two sessions look at how crime is regulated in the UK and in international law. The first session examines how the law of England and Wales deals with crimes that are committed with more than one person playing a part. It had long been established that a person may be found guilty as a participant in a crime committed by another person by virtue of the principles of joint enterprise. In other words, it is unnecessary to prove the accomplice's intention to commit the crime in question. Such had been the common law position in both Hong Kong and England & Wales for over 3 decades, until recently the U.K. Supreme Court decided to abolish the joint enterprise doctrine in England & Wales. This has sent shock waves around England and Wales as well as other common law jurisdictions that still operate joint enterprise principles, raising the hopes of hundreds of prisoners here and elsewhere who had been convicted under joint enterprise.

The second session then moves from the national criminal law system to the international law system, considering what international law is and how it regulates the most violent human conduct, war. Whilst there are many problems with international law, which we will explore, it will also be shown that in recent years there has been a push to find ways of prosecuting countries and individuals for war crimes, including the use of international courts such as the International Criminal Court in The Hague.



Dr. Lawrence Hill-Cawthorne PhD

*Completed DPhil in Public International Law at Merton College,
University of Oxford*

Dr. Lawrence Hill-Cawthorne completed his DPhil in Public International Law at Merton College, University of Oxford prior to joining the University of Reading in 2013 as an Associate Professor in Law, teaching LLB Constitutional Law, Administrative Law, Trusts Law and International Law, and LLM International Humanitarian Law and International Dispute Settlement. Lawrence has extensive experience with university admissions, and has been serving as School Director of Recruitment and Admissions at the Law School, University of Reading since 2015.



Mathematics

Estimation Problems and Mathematical Modelling

How many tennis balls will fit inside a London bus? How much ice cream is consumed per year in the US? And how long can you shower and still make it more environmentally friendly than taking a bath? In a world where we are continuously bombarded with qualitative and quantitative information and disinformation, estimation is a key facilitator enabling us to tackle complex situations, whether real-life or hypothetical and increase confidence in the decisions we make. The first session introduces students to the fundamentals of Fermi estimation and how it can be applied in various contexts to obtain approximate answers for the above questions. As many problems are far too complicated for us to immediately come up with answers, let alone precise and accurate solutions. The application of Fermi estimation enables anyone with basic math and science skills to estimate virtually anything quickly using realistic assumptions and logical thinking, hence allowing us to judge the viability of any plans or projects before we embark on them.

Extending our work from the first session, the second session will introduce students to some basic modelling concepts which allow estimates to be extended into the future in the form of predictions. We will also discuss the importance of assumptions and the limitations of such models when interpreting the results.



Dr. Tom Crawford MMath (Oxon) PhD (Cantab)
Current Tutor in Mathematics at St Edmund Hall, University of Oxford

Dr. Tom Crawford is a Mathematics tutor at St. Edmund Hall at the University of Oxford, as well as the person behind the award-winning Tom Rocks Maths. He obtained his degree in Mathematics at Oxford before completing his PhD in Applied Mathematics at the University of Cambridge. He can regularly be found discussing all things Maths on his YouTube channel and on the BBC, where he previously worked for a year as a science journalist.

Economics

Economics of Developing Countries

The world is currently facing multiple challenges, from the pandemic to climate crisis to political conflicts. As developed countries are struggling to keep their economies functioning, this will inevitably have significant knock-on impacts on developing countries. For instance, several governments of developed countries have already reduced the amount of foreign aid to developing countries.

This lecture will give students an overview of the policy-related issues faced by developing countries today, ranging from poverty and inequality, to governance and institutions through to natural resources and development, from both theoretical and practical perspectives. Central to all aforementioned issues is the question – Why are some countries much poorer than others and what can be done about it? – which international organisations such as the UN, governments, policy makers and academics alike aim to address. We will also discuss how the discipline has incorporated insights from Behavioural Economics in recent years to help understand the psychological underpinnings of poverty.

Suitable for students who have a keen interest in contemporary development issues, this series is designed to be multidisciplinary and non-mathematical. This is a very topical subject and students would benefit from having attended these lectures and small-group discussions before applying to Oxbridge. No previous theoretical knowledge of microeconomics or macroeconomics is required although having it would be helpful.



Dr. Donna Harris PhD (Cantab)
Former Academics in Development Economics, University of Oxford;
Postdoctoral Researcher at CSAE, University of Oxford*

Donna holds PhD and MPhil in Economics from University of Cambridge, MSc in Economic History from the London School of Economics and Political Science, and a BA in Economics from Chulalongkorn University in Thailand. She has been awarded research grants from the British Academy and a joint Post-Doctoral Fellowship from the Economic and Social Research Council (ESRC) and the Medical Research Council (MRC), UK.



*All Academics have research experience at University of Oxford or/ and University of Cambridge. You may view their bio/ work on our website (<https://bit.ly/30kql1z>).

Psychology

Neurobiology of Memory

As one of the most fundamental cognitive processes, memory makes us who we are. It is indispensable in many domains of our everyday life; without it, independent living can become very difficult if not impossible. Loss of memory thus not only means being robbed of our past, but it is also associated with one's inability to perceive the world, navigate the environment and contemplate the future. As memories are a reconstruction of our experiences in the environment, not all our memories are true. They can contain information that were not present or missing certain information we experienced. It is no surprise that complaints about memory failure are among the most common in clinical and hospital settings. Until we develop a more precise and comprehensive understanding of how memory works, however, effective rehabilitation for memory-impaired patients will be limited.

The first session looks at the fundamental types of memory and the neurobiology of memory, analysing the extent to which memory is localised in our brain. These are followed by an empirical assessment of some real-life case studies to consider whether our memories are always true. Acknowledging the prevalence of Alzheimer's disease, the session will end by examining how memory is affected by this disorder and what we can learn from there.

How to Treat Major Depressive Disorder

With a lifetime prevalence of 16% and a female-to-male ratio of about 5:2, depression is a common but debilitating illness that leads to a persistent feeling of sadness as well as high personal, social and economic costs. As a recurrent disease, 75% of patients experience more than one episode of major depression within 10 years. Healthcare provision of more immediate relief to depressed patients therefore centres upon a comprehensive understanding of the biological and psychological causes of the disorder alongside ongoing pursuit of technological advances and treatments.

The second session dovetails with Professor Sarnyai's session on the biology of depression. It was designed with the aim to enlighten students to concepts of normality and abnormality before an in-depth exploration of major depressive disorder (MDD), from its typical signs and symptoms through to causes of and treatments for the disorder.



Dr. Carmen Pinon PhD

Current Senior Lecturer in Neuroscience and Physiology, University of Oxford

Dr. Carmen Pinon is a senior lecturer at Oxford and has occupied similar positions at different universities in the UK. She has 20 years of experience lecturing and tutoring Neuroscience and Physiology for Medics, Biomedics and Psychology students. She is a Neuroscientist and her areas of interest include the visual system, connectivity and development of the brain, publishing high quality Medical Journals.

*All Academics have research experience at University of Oxford or/ and University of Cambridge. You may view their bio/ work on our website (<https://bit.ly/30kql1z>).



Program Structure

	No. of Hours	Scope of Coverage
Day 1 & 2	2 hours (a total of 4 hours)	Small Group Academic Discussion Academics* will deliver an insightful small-group teaching on the captioned topics. Under the *Academics' guidance, students will then be invited to consider and discuss about the topics from various perspectives. Supporting materials will be provided to students.
Day 3	2 hours	Small Group Evaluation in Interview Setting Students will gain an insight to Oxbridge interviews and interview skills first-hand from Academics* before they engage in an authentic Oxbridge interview practice for feedback and exchange of ideas!

*All Academics have research experience at University of Oxford or/ and University of Cambridge. You may view their bio/ work on our website (<https://bit.ly/30kql1z>).

Program Details

Date & Time:	Medicine Series: Apr 7-9 (Wed-Fri) 2:00 - 4:00pm HKT Economics Series: Apr 7-9 (Wed-Fri) 4:30 - 6:30pm HKT Law Series: Apr 7-9 (Wed-Fri) 7:00 - 9:00pm HKT Psychology Series: Apr 8-10 (Thu-Sat) 6:00 - 8:00pm HKT Mathematics Series: Apr 8-10 (Thu-Sat) 8:00 - 10:00pm HKT
Target Student:	For students aged 14-18
Fee:	HK\$4,800 per course (2-6 students per course)

ENQUIRIES & APPLICATION

If you have any enquiries or would like to apply for the program, please fill out the form [here](#). We will get back to you as soon as possible.

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Website



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