

Academic Enrichment Courses

*St Mary's School, Cambridge,
9-15 April 2018*



**INDEPENDENT
THINKERS EDUCATION**



**St Mary's School
CAMBRIDGE**

Independent Thinkers Education, in conjunction with St Mary's School, Cambridge, is offering an academic enrichment programme, delivered over a week during the Easter 2018 holidays, to help prepare students for the intellectual challenges of university and beyond.

The programme, aimed at students aged 15-18, will challenge the brightest students to extend themselves beyond A level, IB, and Pre-U; and help them to develop the intellectual, and written and oral presentation skills, required by the world's best universities, and for success in the most demanding careers.

Students will choose two 'electives' from a wide range of subjects, as well as attending 'core' course sessions on university admissions; successfully making the transition from school to university; and presentation skills for the arts, social sciences, and humanities, or for STEM subjects. The programme will be taught through a mixture of tutorials, workshops, and guest lectures.

The Course

Throughout the week-long course, students will have the opportunity to digest what they learn, to practise the skills and competencies they are acquiring, and to receive individual feedback on their work from their course tutors. They will also work in small groups researching an academic or current affairs topic of their choosing, and will present their findings orally to their tutors and peers at the end of the course.

Our materials and courses have been developed in consultation with experienced Sixth Form teachers, and tutors with extensive experience of teaching at Oxbridge and other leading universities (see the advisory board on our website).

Sample Timetable

Day 1	
9.30am-11.45am	Elective Course 1 (with 15 minutes' break)
11.45am-12.45pm	Core Course 1
12.45pm-1.30pm	Lunch
1.30pm-4.00pm	Elective Course 2 (with 30 minutes' break)
4.00pm-5.30pm	Guest Lecture

1. Law Course I: Law in the City of London

Tutor: Laura Hodgson

This course is comprised of a series of interactive workshops which introduce students to the work of a solicitor in the City of London. Sessions will cover the following topics: working in the London legal market; the training contract – what it is, how it works, applications, and how to get on as a trainee; commercial awareness; negotiation – an exercise with groups negotiating a 'deal'; presentation skills – the basic dos and don'ts of presenting in a legal context.

2. Law Course II: Legal Debating Skills

Tutor: Michael Clark

This course covers the foundational skills in legal debating, known as mooting. Students will be taught the basics of legal textual analysis, reasoning, and how to structure and present a courtroom argument, based on examples of actual legal cases (no prior knowledge of or exposure to the law is required). The skills taught will be of wide application in terms of the analysis of language, the use of logical argument and persuasion, and public speaking. Each participant will have an opportunity to present their own legal submissions, playing the role of a court advocate, with personal feedback. This is an ideal course for students considering a future career in the law, but also provides valuable skills for other disciplines.

3. Comparative Literature: From *Les Liaisons Dangereuses* to *Dangerous Tweets*

Tutor: Alicia Spencer-Hall

This course equips students with the skills necessary to analyse a broad range of media at an advanced level. The focus of our investigations is an engaging – and explosive – tale of court intrigue and romantic drama: the eighteenth-century French novel *Dangerous Liaisons* (*Les Liaisons Dangereuses*) by Pierre Choderlos de Laclos. Alongside studying this seminal work of French literature in its own right (in both the original French and an English translation), students will interrogate the tale's many adaptations. Our sources will include: a 2013 e-book that re-writes the plot in tweets, *Dangerous Tweets*; the Oscar-winning period film from 1988; and the 1990s teen movie, *Cruel Intentions*, which moves the action to contemporary New York. The course will thus permit students to develop their knowledge of key methods of inquiry into literature, film, and digital media. In every class, students will be encouraged to practice their skills, and think critically about our objects of study. By so doing, students will develop the fundamental competencies necessary for success in humanities studies at the highest levels.

SECTION 2: COURSE DETAILS

4. PPE Course I: Introduction to Philosophy

Tutor: Mathew Coakley

This course samples some of the key topics that are typically covered by undergraduate philosophy and PPE degrees at the very top universities, including central questions of identity, of how to act ethically, of what it is to have justified beliefs, and of how collectively we might make just decisions in politics. The focus is on developing the sort of critical thinking and problem-solving skills that enable students both to obtain the highest marks and, in the broadest sense, to get the very most out of a philosophy degree.

5. PPE Course II: Politics, Theory, and International Relations

Tutor: Mathew Coakley

This is a course about how we should make choices in politics and what just institutions and policies might be like. We will look at different ways of evaluating how states are run, and also at how to understand some contemporary changes in international relations. Topics will be drawn from the core offerings of the top political science and international relations programmes. Students will get the opportunity to explore central questions in politics, and to develop the skills that will be of use in social science degrees more generally.

6. Advanced Topics in Physics

Tutor: Stephanie Walton

During the course, students will expand and deepen their physics and maths knowledge among like-minded learners whilst developing invaluable reasoning skills. Course sessions will include physics and maths by example; tackling physics Olympiads with confidence; bridging the gap between A level/IB and university; and interview skills for the physical sciences.

7. Advanced Topics in Mathematics and Computer Science

Tutors: Bono Xu and David Carey

This course will introduce students to topics and methods in mathematics beyond the school curriculum, and encourage them to develop previously unfamiliar problem-solving skills. It will stretch the ablest mathematicians beyond A level/IB and introduce them to university level work in mathematics. The course will also introduce students to some of the most innovative and exciting applications of mathematics in the context of computer science.

SECTION 2: COURSE DETAILS

8. Psychology: Remembering, Forgetting, and Amnesia

Tutor: Louise Carey

This course will cover the topic of memory and memory disorders in psychology, with a focus on the types and causes of amnesia. After initially focusing on normally functioning memory, and models of remembering and forgetting in healthy people, we will look at how memory can go wrong by considering various examples of amnesia. We will explore how the information retained and forgotten by patients suffering from amnesia provides evidence for distinct types of memory localised in different regions of the brain. Later sessions will explore the phenomenon of childhood amnesia, and evaluate the theories psychologists have put forward to explain why we are unable to remember our infancy in detail. The workshops will also incorporate more philosophical discussions of the implications of memory research for our understanding of selfhood, personality, and the mind.

9. Neuroscience, Neurobiology, and Medicine

Tutor: Ibrahim Humoud

This course will provide students with an introduction to some of the most exciting and cutting-edge work in neuroscience and biology, and its applications in the context of clinical medicine. The course will cover the following topics and areas: neuroanatomy, neurophysiology and cellular neuroscience; diseases of the central nervous system and neurodegeneration; novel methods in neuroscience and neurology; and recent advances in targeting neurological diseases.

10. Entrepreneurship: The Entrepreneurial Mindset and How to Adopt It

Tutor: Chris Coleridge

This course will give participants an understanding of how the process of entrepreneurship works, and the behaviours entrepreneurs demonstrate. Concepts to be covered, derived from studying expert entrepreneurs, include:

- the centrality of the customer's perspective;
- attaching one's venture to pain points;
- proceeding, where possible, through experiments and small bets;
- assembling teams and developing partnerships.

How does the entrepreneur think and make decisions? What are the guiding principles which, when adopted by entrepreneurs, aid effectiveness? What is the role of mission and vision? Must entrepreneurs be leaders? How do entrepreneurs embrace and live with the paradoxes of managing under uncertainty, and of promoting their vision to others while remaining objective? How do entrepreneurs use design thinking and rapid prototyping to create, clarify, and communicate their value propositions and ventures? What does a 'good' opportunity for an entrepreneur to pursue look like *ex ante*? Through a variety of philosophical, psychological, and practitioner perspectives, this module aids understanding of the entrepreneurial mindset and how to adopt it.

SECTION 2: COURSE DETAILS

11. Advanced Chemistry

Tutor: Camden Ford

This course is divided into three parts: (i) Quantum Dots & Fluorescence; (ii) Organic LEDs & Spin Coating; and (iii) Silver Nanoparticles & Antibacterial Properties.

(i) Quantum Dots & Fluorescence

Students will explore the physics and chemistry of CdSe quantum dots, their applications, synthesis, and characterisation. The course will start with an introductory lecture on quantum phenomena, followed by two lab sessions, giving the students a chance to synthesise their own quantum dots through a colloidal synthesis technique and then characterise the results using UV spectroscopy.

(ii) Organic LEDs & Spin Coating

Students will be taught the structure and physics of LEDs, including the developing field of organic LEDs and cutting-edge synthesis routes. The course will include an initial lecture on the physics and applications of LEDs, followed by an opportunity for the students to create an organic LED of their own using a spin coating machine. There will also be the opportunity for course participants to build their own spin coater using a simple computer fan and board.

(iii) Silver Nanoparticles & Antibacterial Properties

Students will learn about the inhibiting and antibacterial properties that silver nanoparticles have, and the biological and chemical processes behind these capacities. They will have the opportunity to create their own colloidal silver, apply this to a piece of clothing, and observe the effect their solutions have on bacterial growth compared to untreated clothes, or pre-treated clothes.

All three topics will look at the interdisciplinary nature of science (focusing on chemistry, but touching on the overlap between physics, chemistry, and biology), providing students with an insight into how undergraduate science degrees involve work at the intersections of traditional disciplinary boundaries.

12. Engineering

Tutor: Camden Ford

This course is divided into two parts: (i) Alloys & Engineering; and (ii) Siege Equipment & Projectile Motion.

(i) Alloys & Engineering

Students will learn about metallic alloys, their physical properties, and their various compositions. Within this context, we will explore how to read and interpret phase diagrams of common alloys. Participants will then get the chance to create their own alloys from a range of metals. Finally, they will test and document the alloys' physical properties to understand and demonstrate for themselves how changing the composition of an alloy can have a significant impact on these properties.

SECTION 2: COURSE DETAILS

12. Engineering *continued*

(ii) Siege Equipment & Projectile Motion

Students will have the opportunity to build and test a small-scale model of a trebuchet. They will be encouraged to adapt their original design to maximise projectile speed and distance and to calculate projectile kinetic energy.

13. Classical Civilisation, Classics, and Ancient History: From Ancient to Modern

Tutor: Jonathan Griffiths

This course introduces students to five themes central to the civilisations and cultures of Ancient Greece and Rome. Each session of the course will be devoted to a single broad theme that was important in classical antiquity: theatre, drama, and the arts; games, sport, and sporting prowess; democracy; philosophy; and science. Participants will read and discuss in English translation extracts from a broad range of classical sources (plays, speeches, political theory, philosophy, and scientific treatises), as well as visiting the Fitzwilliam Museum, Cambridge, to experience first-hand ancient Greek and Roman art, inscriptions, and material culture. Besides rich and informed discussion of each of the five themes in their ancient contexts, the course invites students to consider the extent to which our own culture, thought, and institutions remain indebted to classical antecedents. For example, students will consider the importance of individual choice in the ancient and modern democratic processes, and examine current debates about doping within professional sport through the lens of classical ideals concerning physical perfection and athleticism. Thus, this open-minded course will not only provide a broad conspectus of some major parts of ancient Greek and Roman society, but also challenge students to reflect on their lasting impact on society in the West today.

14. International Relations: International Security, Conflict, and Terrorism

Tutor: Lizz Pearson

This course provides an introduction to contemporary global conflict studies and undergraduate political science. Students will discuss key concepts in security studies, with an emphasis on understanding political violence in the context of international conflict. The course begins with an exploration of definitions of 'security' and 'terrorism', and how these frame societal and government responses to organised violence. It then considers the historical evolution of political violence, looking at case studies from each of Rapoport's 'four waves' of terrorism: anarchist, anticolonial, New Left, and religious. Finally, the sessions explore the contemporary UK, 'home-grown radicalisation,' and the impacts of government counter-radicalisation policies. Gender is a particular focus throughout the course, with students encouraged to consider the different ways in which men and women are politically active, and ways in which violence affects them.

SECTION 3: OUR TUTORS

Our courses are taught by leading academics and professionals, and teachers at some of the UK's best independent schools. All our tutors have outstanding records of personal achievement, and extensive teaching and mentoring experience; as such, they act as inspiring role models and mentors for the students attending the courses.



Laura Hodgson is a lawyer at Norton Rose Fulbright's London office. Laura has over 10 years' experience in insurance and has written widely about insurance regulation. Laura works for a variety of insurance and reinsurance clients on regulatory issues (including advice on the authorisation and application of UK and EU requirements), and the application of contract law on policy drafting.



Michael Clark first gained experience in public speaking, debating, and mooting (legal debating) at secondary school, where he won the finals of the Australian Schools Mooting Competition for two consecutive years, as well as receiving the prize for the best advocate in the Competition nationally. He studied classics and law at Sydney University, followed by Oxford University (where he completed the BCL), and finally City University and the Inns of Court School of Law, winning various public speaking, mooting, and debating competitions whilst there. After graduation, he was asked back to coach students on the GDL course at City University in mooting, and also began judging university mooting competitions. Following university, Michael commenced pupillage at the Chambers of Lord Grabiner QC, One Essex Court in London, the leading English barristers' chambers specialising in commercial litigation. He took up an offer for tenancy at the chambers in 2008, and has worked there ever since, gaining extensive experience in advocacy in the High Court and Court of Appeal.



Alicia Spencer-Hall began her studies at the University of Cambridge as an undergraduate reading French and German in 2004. During her time as an undergraduate, Alicia honed her skills in literary and linguistic analyses, with a specific focus on medieval literature. Continuing her studies at Cambridge, she achieved a high distinction for her MPhil work on these topics in 2009. This work formed the inspiration for her PhD project, a parallel study of medieval and modern visual culture, undertaken in the French Department at University College London (2010-2014). After spending a year at Queen Mary University of London revising her thesis into a book (2015-2016), Alicia is now based at University College London as a Junior Research Fellow in the Institute of Advanced Studies. Alicia has taught undergraduate courses at several universities, on topics including French literature, French grammar, academic writing skills, critical theory, and medieval history. Alicia is committed to developing both learners' knowledge and soft skills, thereby enabling students to achieve their best.

SECTION 3: OUR TUTORS



Mathew Coakley is a Teaching Fellow and Senior Tutor for PPE at the University of Warwick, having previously taught at the London School of Economics and Political Science. His focus is contemporary political theory and ethics. His BA (first class) was gained at King's College Cambridge studying Social and Political Sciences. He also has an MA (with Distinction) in War Studies from King's College London, and was awarded his PhD in Politics from New York University. His book, *Motivation Ethics*, was recently published by Bloomsbury.



Stephanie Walton graduated from Oxford University with a first in Physics, and from Imperial College, London with a PhD in Nanomagnetism. She has worked as Scientist in Residence at The Lady Eleanor Holles School, and now teaches physics at Highgate School in London. She is an expert in Oxbridge admissions for the physical sciences and for Engineering.



Bono Xu graduated from King's College, Cambridge with a first in Physical Natural Sciences. He recently completed his PhD, also at Cambridge, in High Energy Physics. Bono works as a researcher for a technology company in Cambridge on machine learning and artificial intelligence. He has worked as a researcher at the University of Cambridge's Computer Science Department, and at the Hefei National Laboratory for Physical Science in China. Bono has many years' experience teaching maths and physics to students aged 15-18, and he has taught the same subjects to Cambridge undergraduates.



David Carey has recently completed his Masters degree at Oxford in Maths and Philosophy, achieving first class honours. While at Oxford he was awarded two college exhibitions. He has eighteen months' teaching experience, concentrated on working with students aged 15-18.



Louise Carey studied English Language and Literature at Oxford, before being awarded her MSc in Psychology with Distinction from Oxford Brookes University. She has five years' teaching experience, and has worked with students at all levels, from GCSE and A Level students to undergraduates and mature learners. She has published two novels, and currently works as a tutor, writer, and editor.



Ibrahim Humoud trained and qualified as a doctor in Germany, graduating in the top 5% of his year in the state medical examination. He worked as a Senior House Officer in Switzerland, before undertaking his MSc degree in Neuroscience at UCL. He is currently studying for his PhD in Clinical Neuroscience at the University of Cambridge, where he is a Cambridge Trust scholar and the recipient of a Vice-Chancellor's Award.

SECTION 3: OUR TUTORS



Chris Coleridge was an entrepreneur as a young man in the 1990s, and, after exiting his business, pursued an MBA, an experience which inspired him to enter academia. He is Director of the Cambridge Judge Launchpad in Cambridge Judge Business School's Entrepreneurship Centre. He has an MBA from London Business School, an MSc in Organisational and Social Psychology from the London School of Economics, and a PhD in Management, also from the LSE. Recent consulting and education work on innovation management, pricing strategy, and strategy execution, includes work for a wide range of SMEs and for larger organisations such as Omnicom, AstraZeneca, JLL, Sberbank, Lloyds Banking Group, Santander, the Sanger Institute, Porsche, the UK Ministry of Defence, BAE Systems, the UAE Prime Minister's Office, the London Stock Exchange, and IBM. He is a board advisor to startups in the construction, healthcare, and digital learning sectors. Prior to coming to Cambridge, Dr Coleridge was a Senior Teaching Fellow and Senior Research Associate at University College London, where in 2015 he won the Best Lecturer award in the School of Management.



Camden Ford has been teaching students chemistry, engineering, maths, and physics for over seven years. He currently teaches courses in polymers and composites for undergraduate Materials Scientists at Oxford University, having previously achieved his undergraduate and MSc degrees on the same programme. He has run practice interviews and tutorials for prospective Oxford students, and regularly contributes to summer outreach and enrichment programmes for prospective scientists and engineers.



Jonathan Griffiths received his MA and MSt (Distinction) in Classics from the University of Oxford, after which he became a research student and tutor at the University of Heidelberg, Germany. He is currently pursuing a PhD degree in the History and Philosophy of Science at University College, London. Jonathan has a wide range of teaching experience from GCSE to undergraduate level in South Wales, Oxford, London, Cambridge, Germany, and Sichuan, China.



Lizz Pearson is an ESRC-funded PhD candidate in War Studies at King's College, London, researching gender and cumulative extremism, and an Associate Fellow at RUSI (the Royal United Services Institute), the London-based defence think tank. She has an MA in International Conflict Studies, also from KCL, for which she was awarded the Simon O'Dwyer Russell Prize for the highest marks achieved on the course. As an undergraduate, she read German and Philosophy at Wadham College, Oxford. Lizz has a background in radio journalism and worked for more than fifteen years in reporting and production for the BBC, on programmes including BBC Radio Four's 'Woman's Hour', 'Making History', and 'You and Yours'. Lizz lectures and teaches international security at KCL; she has also taught at New York University, and at QMUL.

SECTION 4: KEY INFORMATION

Our location

Situated in the heart of Cambridge, just ten minutes' walk from Cambridge train station, St Mary's School is the perfect location for our courses.



The fee for attending the course on a residential basis is £1900; the fee for attending as a day student is £1100. Representing excellent value for money, these fees include all course sessions, course materials, meals and refreshments, and, where applicable, excursions and boarding accommodation.

TESTIMONIALS FROM PREVIOUS COURSES:

'I'd like to thank the organizers for the very helpful tuition they provided for my son. He found the course both challenging and enriching in content. Highly recommended!'

Mother of a student who attended the October 2017 Economics at Cambridge course.

'The pre-reading for the interview was really relevant and thought provoking and I found discussing this very beneficial.'

Student from Roedean School who attended the October 2017 Advanced Comprehension and Essay Writing course.

'I felt more confident and having a day focused solely on the test gave me a clear idea of what to expect.'

Student who attended the October 2017 TSA Preparation course.

'I definitely recommend the course to students who are considering applying for Medicine, as it not only provides you with helpful tips from doctors and Oxbridge graduates on tackling each section of the BMAT, but also provides guidance on how to prepare for the admissions test from the beginning of the school year.'

Student from The Tiffin Girls' School who attended the October 2017 BMAT Preparation course.

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