Imperial College London

Data Science Entrepreneurship Summer School

18 July to 14 August 2019 at Imperial College London, UK.

This four-week summer school is designed for students studying any degrees of their undergraduate or postgraduate studies at a well-recognised university in China, with an interest in data science. This summer school is structured in a way that students will be introduced to the business of data science and develop an understand of the technical side of data science. It will also provide an enhanced learning experience for students to further develop their transferrable skills, hear some of the global challenges with relevant tour and company visit.

Students will:

- Learn the current state of the art in Data Science;
- Develop an understanding of the exploratory data analysis and visualisation;
- Understand the concepts and real-world applications;
- Meet and hear from academic experts in this area;
- Develop valuable professional skills in business model innovation, communication and presentation;
- Work as a team on a data science business project;
- Visit the state of the art 360 data observatory and see demonstrations of latest data science research;
- Visit London's Silicon Roundabout Tech City and the City of London;
- Join the day trips to the University of Oxford and the University of Cambridge;
- Hear how Imperial is tackling some of the global challenge issues.
- Meet Imperial entrepreneurs to hear their start-up journey and visit to a company.
- Practice and improve their English language.

In addition, students will have an opportunity to make new friends, get to know student ambassadors from Imperial College London through social activities and discuss opportunities for future study and experience what it is like to study in a world class university.

Programme Structure:

The programme spread over 4 weeks covering lectures, workshops, tutorials, project work and visits.

Students will be allocated into groups and a project will be assigned to each group at the start of the summer school towards a project presentation on the Friday in the second week of the programme. There will also be cultural and social activities organised by Imperial student ambassadors.
The entire programme will be taught in English.

For more detailed information, please check the session descriptions and the programme schedule.

Certification:

Students will receive an Imperial College London certificate of attendance on successful completion of the summer school and a prize will be awarded to the best project team.

Entry requirements:

All students are expected to be studying an undergraduate degree or have been awarded a degree at a well-recognised university in China. Students with basic knowledge of coding skills and a good command of English will be advantageous.

Cost:

The cost of the Data Science Summer School programme is £5700. This includes:

- All tuition
- Course materials
- Masterclasses
- Use of campus facilities
- Accommodation
- Social activities, including travel to and from activities
- Certificate of participation on completion of the Summer School, awarded by Imperial

The following are not included in the Summer School fee:

- Domestic or international travel to or from London at the start and end of the programme
- Any travel, cancellations to trips to/from the Summer School
- Any associated costs e.g. visa application costs
- Spending money
- Laundry
- Food or snacks

Teaching Faculty

The summer school will be led by Prof. Yike Guo and taught by a multi-disciplinary teaching faculty from the Data Science Institute and other departments.

Professor Yike Guo
Director of the Data Science Institute
Professor of Computing Science
Imperial College London

Yike Guo, is a Professor of Computing Science in the Department of Computing at Imperial College London. He is the founding Director of the Data Science Institute at Imperial College. He is a Fellow of the Royal Academy of Engineering (FREng), Member of Academia Europaea (MAE), Fellow of British Computer Society and a Trustee of The Royal Institution of Great Britain.

Professor Guo received a first-class honours degree in Computing Science from Tsinghua University, China, in 1985 and received his PhD in Computational Logic from Imperial College in 1993 under the supervision of Professor John Darlington. He founded InforSense, a software company specialized in big data analysis for life science and

medicine, and served as CEO for several years before the company's merger with IDBS, a global advanced R&D software provider, in 2009. He was then the Chief Innovation Officer of the IDBS until 2018. He also served as the Chief Technical Officer of the tranSMART foundation, a global alliance in building open source big data platform for translational medicine research.

He has been working on technology and platforms for scientific data analysis since the mid-1990s, where his research focuses on data mining, machine learning and large-scale data management. He has contributed to numerous major research projects including: the UK EPSRC platform project, Discovery Net; the Wellcome Trust-funded Biological Atlas of Insulin Resistance (BAIR); and the European Commission U-BIOPRED project. He was the Principal Investigator of the European Innovative Medicines Initiative (IMI) eTRIKS project, a €23M project building a cloud-based informatics platform, in which tranSMART is a core component for clinico-genomic medical research, and co-Investigator of Digital City Exchange, a £5.9M research programme exploring ways to digitally link utilities and services within smart cities.

Professor Guo has published over 250 articles, papers and reports. Projects he has contributed to have been internationally recognised, including winning the “Most Innovative Data Intensive Application Award” at the Supercomputing 2002 conference for Discovery Net, the Bio-IT World "Best Practices Award" for U-BIOPRED in 2014 and the "Best Open Source Software Award" from ACM SIGMM in 2017.

Photos above: Data Science Institute 360 degree observatory and Professor Yike Guo hosting a visit for President Xi Jingping in October 2015.

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Session descriptions:

Pre-sessionals:

The Pre-sessionals are geared towards providing the necessary academic language and social skills to succeed in the English-speaking learning environment. The workshops and events focus on written and spoken academic communication prepares you to perform at a high level from the very beginning of the intensive learning experience at Imperial College London.

It provides an opportunity to meet and connect with your peers and local people, boost your confidence and social skills, therefore enable you to integrate into the British university life quickly and effectively.

In particular, the Pre-sessionals will help you:

- Speak academic English in presentations, seminars and tutorials
- Improve your pronunciation
- Learn effectively from lectures
- Develop critical thinking
- Understand the culture of the University and the United Kingdom
- Make life-long friends and build valuable networks

Week 1:

Introduction - Data Science

This session aims to introduce the current state of the art in data science providing an overview of the challenges and potentials in data science.

This session will cover:

- Data & Data Science – history and future
- Statistical Foundation of Data Science
- Exploratory Data Analysis and Visualization
- Machine Learning for Data Science
- Big Data Management and Cloud Computing
- Systems and Network Engineering
- Data Privacy and Ethics

Group Project Briefing and Planning

The aim of this session is to introduce the students to the group project on setting up a data science company. The group project will enable the students to apply the knowledge learned in the lectures and create innovative approaches to develop a business case for a data science company. We will introduce the overview and guideline of the group projects, assessment criteria and expectations. We will also use this session for the students to form project groups.

This session will cover:

- Group project overview;
- Guideline of the group projects;
- Assessment criteria and expectations;
- Forming multi-disciplinary project groups.

The World of AI

The aim of this session is to provide a comprehensive overview of AI technology and applications. This

will serve as the base of the programme for building data product innovation and entrepreneurship.

This session will cover:

- AI development history
- State of the art AI technology
- Typical AI products

Big Data Management and Cloud Computing

The aim of this session is to provide students with an understanding of the concept of managing big data.

This session will cover:

- Computer systems for Data Sciences
- Distributed system
- Cloud Computing

Silicon Roundabout and Tech City – London Walking Tour

The UK's Digital industry is booming. It's epicentre – an unassuming roundabout in East London. Known as Silicon Roundabout or Tech City, this area of London is home to the world's third biggest start-up tech cluster and is currently snapping at the heels of New York City and San Francisco's tech scene. Last year Silicon Roundabout launched over 15,500 new businesses – nearly five times as many launched in Canary Wharf. It is also where some of the biggest tech companies in the world have put down roots, including heavy hitters Google and Amazon, alongside Zoopla, Asos, Moo, Spotify, Songkick.com, Mind Candy and more. But how did this tech start-up metropolis come about? Award-winning Insider London's walking tour offers an eye-opening educational insight into how Shoreditch spawned a tech monster to rival San Fran's Silicon Valley. Students will see where tomorrow's trends are created, where killer concepts are born, where tube carriages double as office space and the only place in the world where you can buy an alcoholic smoothie.

Machine Learning for Data Science

The aim of this session is to provide students with an understanding of the concepts in Machine Learning.

This session will cover:

- Supervised Machine Learning
- Unsupervised Machine Learning
- Reinforcement Learning

Business Model Innovation & Marketing

This expert-led module facilitates students' understanding of how businesses differentiate and compete in global markets. Students learn to define and build business models and how to market ideas to establish competitive advantage.

Topics considered:

- Building and improving business models that drive growth and innovation
- Evaluating ideas to determine which to pursue
- Creating strategies to differentiate and market products/brands
- Leveraging market insights to strengthen competitive position
- Identifying the most appropriate marketing mix, considering: product, price and global position

Effective Communication for Presentation

This workshop will take you on a journey through fundamental principles of communication and presentation. Through interactive exercises, plenary and interaction you will learn more about your strengths and natural abilities, and how to perform at your higher level. The session will allow you to work experientially within a group setting and will give you exercises, ideas, tips and practises for inclusion in your presentations on the last day.

Week 2:

Exploratory Data Analysis, Data Assimilation and Visualization

The aim of this session is to provide students with an understanding of the exploratory data analysis and visualisation

This session will cover:

- Background of exploratory data analysis
- Real applications in data assimilation
- Visualisation at all stages of the data lifecycle

Data Science Products

The aim of this session is to provide a landscape of data products especially. The course will illustrate the design & production process of the data product, its value proposition and business model.

This session will cover:

- Principle of data products
- Issues and strategy of designing a data product
- Defining value proposition of data products
- Case studies
- Business model design

Data Science Entrepreneurship

The aim of this session is to provide business knowledge in building a data product company and become a data science entrepreneurship. The session will set up a doundation for the student to explore the commercialization of the data science innovation.

This session will cover:

- How to set up a company
- How to build up a technical team
- How to write a business plan.
- How to communicate with venture capital
- How to grow a business
- What are the success criteria of a data science business

Thames River Cruise

A social activity for students to enjoy famous sights of London along the river Thames. The cruise will depart from Embankment or Tower Hill and finishes at Greenwich where students will have the opportunity to explore the Greenwich meantime and observatory.

Data Privacy and Ethics

The aim of this session is to provide students with an understanding of the concept of privacy and ethics as they relate to data.

This session will cover:

- Ethical implications of using data
- Privacy implications

Project Presentation

Students in teams will present their project/business plans in front of a judging panel. Each project team will be given a score and a winning team will be selected to receive a prize.

Day Trip to Cambridge

Visit to Cambridge will give students some insight into its university history. Founded in 1209 and consisting of 31 constituent colleges, Cambridge University is consistently ranked among the Top 5 Universities in the World. Punting is also a must in Cambridge. The students will have a guided tour, and see the beautiful colleges, whilst enjoying a relaxing boat trip on the river Cam. There are also many museums in Cambridge, such as the Fitzwilliam Museum and the University Museum of Archaeology and Anthropology.

Week 3:

Design Thinking Workshop at The Design Museum – "Unpacking the Design Process"

This workshop provides an insight into a professional design process working across multidisciplinary platforms. Drawing on the Design Museums exhibitions and collections students unpack the process of design by understanding the brief, relevant research and analysis, problem solving, communication and evaluation. Students will have the opportunity to visit the museum as well.

Challenges of the Internet

The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite to serve several billion users worldwide. Whether for business or leisure, use of the internet is becoming part of our daily lives. To understand what impact this have, the session will cover:

- An introduction/overview of the internet and its power
- Current challenges of the internet and problems faced by companies.
- What businesses are doing to overcome these challenges?
- Current innovations in managing Internet Challenges (academic and business)

Innovations in Climate Change

Climate Change is one of the biggest challenges to development today. While climate change poses a number of risks to vulnerable communities and businesses around the world, many opportunities are unfolding for private companies to implement actions towards reducing risks to their business operations, as well as investing in adaptation action in vulnerable regions in a sustainable and profitable manner. The session will give students an understanding of what Climate Change is, its impact and the challenges businesses and academia face as they find innovations to tackle these problems.

Company Visit

Students will get to visit a start-up company to hear their success stories and gain an insight of an entrepreneur journey.

City of London Finance Tour

The City of London is a leading financial hub and home to some of the biggest banking and insurance institutions in the world. The walking tour of The City will take you on a fascinating journey to discover the origins of London's financial centre – from its humble beginnings in 17th century coffee houses to its ancient and unusual governance and voting system that's still in use today.

Starting at Panyer Alley, the expert guide will show you how the City of London developed into a global financial centre, taking in key buildings such as, the London Stock Exchange, Guildhall, the Bank of England, Lloyds of London and Rothschild's, before finishing at Willis, the world's oldest insurance broker.

Negotiation and Influencing Skills

The ability to negotiate solutions and influence people so that everyone involved agrees and commits to those solutions requires thought, analysis and practice. Good negotiation skills are a key aspect of personal effectiveness. Linked to persuasiveness, conflict handling, assertiveness and active listening skills, success in negotiation can be increased by learning and applying key behaviours.

This workshop emphasises the need for careful thought and planning before negotiations. Key topics are consideration of: the situation, who is involved, their motives and objectives, styles of communication, preparation: bargaining and planning, signs of conflict and dealing with conflict. Negotiation exercises allow participants to practise and identify key improvement opportunities.

Meet Imperial Entrepreneurs

The talk is to share an experience transferring from a student to an entrepreneur.

The entrepreneurs will share their story and emphasise the key stages of transferring: including preparing for business, generating an idea, finding partners, building teams, finding funds, attending competition, getting a visa, starting the first project and growing up.

Visit to Bletchley Park –The home of the Codebreakers

Bletchley Park is a place of exceptional historical importance. It remains highly relevant to our lives today and for the future. It is the home of British codebreaking and a birthplace of modern information technology. It played a major role in World War Two, producing secret intelligence which had a direct and profound influence on the outcome of the conflict.

Over the past twenty years Bletchley Park has become an internationally renowned heritage attraction, visited by people from around the world, which acknowledges the successes from the War and the people responsible for them. It celebrates their values: broad-minded patriotism; commitment; discipline; technological excellence. By presenting and explaining these achievements and these values, in the very place where they occurred, Bletchley Park brings together the dramatic history of the twentieth century with the challenges we face in the twenty first in our rapidly changing and technologically complex society.

Students will explore the different types of machines and codes that were using during World War Two and find out how enemy message get to Bletchley Park.

Day Trip to Oxford

Oxford is a university city situated about 60 miles from London, making a Oxford day trip an ideal way to get out of the bustling capital for a day or weekend to explore this compact historical city. Nicknamed the City of Dreaming Spires, Oxford is best known as the home of England's oldest university, the University of Oxford, which is still one of the most respected in the country.

Week 4:

Meet Imperial Alumni

This session offers the opportunity to meet with the Imperial Alumni and learn from their own experience.The alumni will share their life story as students or professionals in the dynamic city of London.

Social Sightseeing Events

Social activities for students to make connections, visit iconic places in London and get the most of their journey in Britain.

Data Science Summer School, 18 July to 14 August 2019 - programme

Pre-Sessionals

Thursday 18 July 2019	
16:00	Flight to London
	Welcome Dinner
Friday 19 July 2019	
09:30	**Orientation and Introduction to the Programme**
12:30	Welcome lunch
13:30	**Life in the UK: the University Life and the British Culture**
16:30 to Evening	Social Programme and Cultural events in London
Saturday 20 July 2019	
09:30	**Academic English**
12:30	Lunch
13:30	**Communication and Presentation Skills**
16:30 to Evening	Social Programme and Cultural events in London
Sunday 21 July 2019	
	Free time to explore London

Week 1:

Monday 22 July 2019	
08:15	Programme Registration
08:30	**Welcome, Housekeeping and Introduction to Imperial**
09:30	**Introduction to Data Science**
12:30	**Group Photo**
12:45	**Welcome lunch with student ambassadors followed by Campus Tour**
14:15	**Group Project Briefing and Planning**
16:30	End of day
Tuesday 23 July 2019	
09:30	**The world of Artificial Intelligence (first hand experience)**
12:30	Lunch
13:30	**The world of Artificial Intelligence (first hand experience II)**
16:30	End of day
Wednesday 24 July 2019	
09:30	**Big Data Management and Cloud Computing**
12:30	Lunch
13:30	**Social activity with student ambassadors**
	Silicon Roundabout and Tech City – London Walking Tour
16:30	End of day
Thursday 25 July 2019	
09:30	**Machine Learning for Data Science**
12:30	Lunch
13:30	**Group project pitch**
15:00	Teams work on group project
16:30	End of day

Friday 26 July 2019	
09:30	**Business Model Innovation Workshop**
12:30	Lunch
13:30	**Effective Communication for Presentation Workshop**
16:30	End of day

Saturday 27 July & Sunday 28 July 2019	
	Free time to explore Britain

Week 2:

Monday 29 July 2019	
09:30	**Exploratory Data Analysis, Data Assimilation and Visualization**
12:30	Lunch
13:30	**Visit to DSI 360 observatory for Groups 1, 2, 3 & 4**
14:30	**Visit to DSI 360 observatory for Groups 5, 6 & 7**
15:30	**Visit to DSI 360 observatory for Groups 8, 9 & 10**
	Teams not visiting will work on group project
16:30	End of day

Tuesday 30 July 2019	
09:30	**Data Science Products**
12:30	Lunch
13:30	Group project supervision
15:30	Teams work on group project
16:30	End of day

Wednesday 31 July 2019	
09:30	**Data Science Entrepreneurship**
12:30	Lunch
13:30	**Social sightseeing activity with student ambassadors**
	Thames River Cruise
16:30	End of day

Thursday 1 August 2019	
09:30	**Data Privacy and Ethics**
12:30	Lunch
13:30	**Opportunities for InternationalStudents**
14:30	Group project supervision & teams work on group project
16:30	End of day

Friday 2 August 2019	
09:00	**Students arrive to upload projectpresentations**
09:30	**Group 1**
09:50	**Group 2**
10:10	**Group 3**
10:30	**Group 4**
10:50	**Group 5**
11:10	**Group 6**
11:30	**Group 7**
11:50	**Group 8**
12:10	**Group 9**
12:30	**Group 10**
12:50	Presentation ends
13:00	Lunch

14:30	**Award ceremony**
15:15	**Activity with student ambassadors**
16:45	Activity ends
Saturday 3 August 2019	
	Day trip to Cambridge
Sunday 4 August 2019	
	Free time to explore Britain

Week 3:

Monday 5 August 2019	
Morning	Free time for group 4, 5 & 6
09:15	**Group 1,2 & 3 - Depart for the Design Museum**
10:00	**Group 1,2 & 3 - Unpacking the Design Process Workshop**
13:00	Session ends and free time to visit the Design Museum
13:00	Lunch
Afternoon	Free time for group 1, 2 & 3
13:15	**Group 4,5 & 6 - Depart for the Design Museum**
14:00	**Group 4,5 & 6 - Unpacking the Design Process Workshop**
17:00	Session ends and free time to visit the Design Museum
Tuesday 6 August 2019	
09:30	**Global challenge talk - Challenges of the internet**
12:30	Lunch
13:30	**Global challenge talk - Innovations in Climate Change**
16:30	Visit ends
Wednesday 7 August 2019	
10:00	**Depart from Imperial for company visit**
11:00	**Arrive Verb Brands Tour**
12:00	Lunch & travel to St. Pauls
14:00	**Finance walking tour of the City of London**
16:00	End of tour
Thursday 8 August 2019	
10:00	**Negotiation and Influencing Skills**
13:00	Lunch
14:00	**Meet Imperial entrepreneurs**
15:30	End of day
Friday 9 August 2019	
09:30	**Visit to Bletchley Park** **Explore the home of the codebreakers**
16:30	Visit ends
Saturday 10 August 2019	
	Day trip to Oxford
Sunday 11 August 2019	
	Free time to explore Britain

Week 4:

Monday 12 August 2019	
10:00	**Meet Imperial Alumni**
12:30	Lunch
13:30	**Social sightseeing activities**
16:30	End of day
Tuesday 13 August 2019	
08:15	**Social sightseeing activities**
16:30	End of day
Wednesday 14 August 2019	
09:00	**Depart from London**