



UNITED KINGDOM

MACHINE LEARNING AND DATA SCIENCE WORKSHOP

2020/1/19–2020/2/15



BECOME A DEEP LEARNER IN UK!

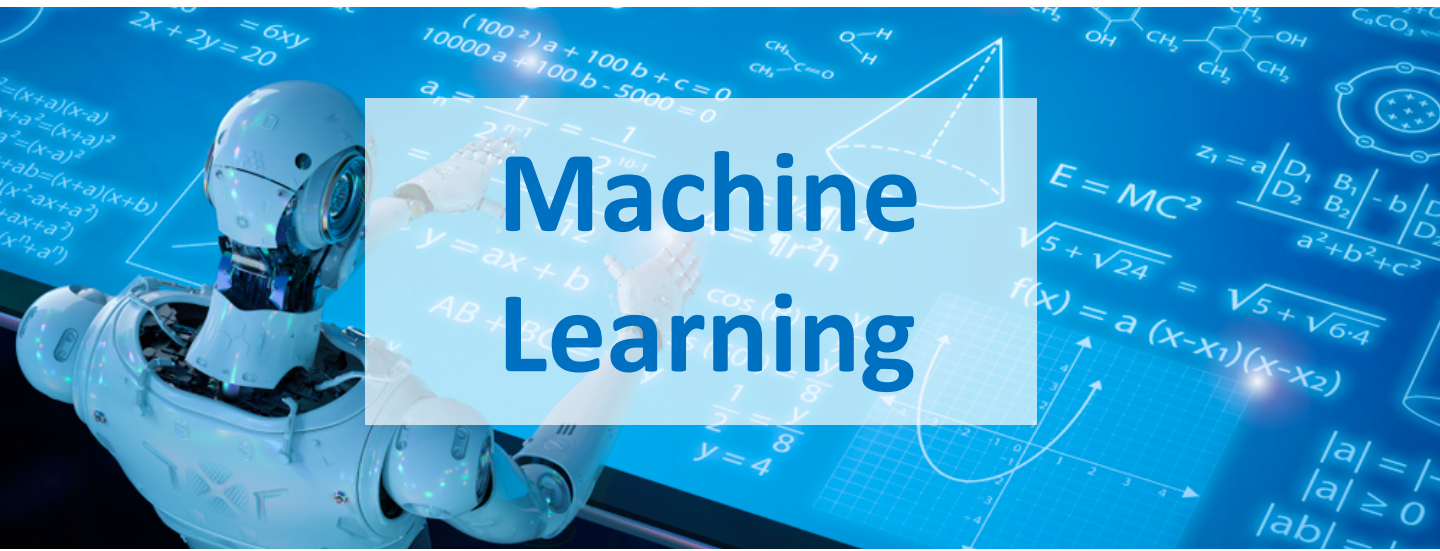
JOIN US AT UK FOR AN ENRICHING AND UNFORGETTABLE WINTER

The last decade has seen a dramatic rise in computer power, in data and scientific breakthroughs, as in deep learning and neural networks. Together, these advances have led to the emergence of data science and the resurgence of artificial intelligence – ‘machines that think’, as imagined in Alan Turing’s landmark research paper published in 1950.

Turing is widely considered to be the father of theoretical computer science and artificial intelligence. And United Kingdom is recognized as the birthplace of Modern Computer Science. There are many world-renowned institutes or companies for its AI, Machine Learning and Data Science expertise, such as the Imperial College London, Alan Turing Institute, ARM, Deep Mind, etc.

This course is designed for students studying any degrees of their undergraduate or postgraduate studies at a well-recognized university, with an interest in computer science. By attending this course, you can explore UK and its computer science in deep, you will also have the opportunity to develop and apply your Machine Learning and Data Science skills if you are a “deep learner” in this course.

01 | Programme Backgrounds



Machine learning is the scientific study of algorithms that computer systems use to perform specific tasks without using explicit instructions, relying on patterns and inference instead. It is seen as being closely related to Artificial Intelligence and has a number of applications in products and services used in daily life.



Data Science is an interdisciplinary field about processes and systems to extract knowledge or insights from data in various forms, either structured or unstructured, which is a continuation of some of the data analysis fields such as statistics, data mining, and predictive analytics, similar to Knowledge Discovery in Databases (KDD).



02 | Programme Highlights

Academic Courses and Lectures	<p>The Students can attend one main course given by Professor of Artificial Intelligence in Imperial College London. Course supervision by PhD student in IC will also be provided during the course. Student will also attend several lectures about Data Science, Artificial Intelligence and its application in different fields given by professional scientists.</p> <ul style="list-style-type: none"> - Deep Learning Course, and supervision - PhD Application Lecture - Lectures about Data Science and AI - Imperial College London professor signed <i>Certificate of Attendance</i> - More than 70 hours Contact Hours during the programme
UK institutions and Enterprise Visit and Lectures	<p>Students will visit institutions listed below, and have the opportunity to attend the lecture given by academic fellow of the institute, and founder, partner, director or lead scientist of the Enterprise:</p> <ul style="list-style-type: none"> - Alan Turing Institute - ARM - Bletchley Park - Streetdrone - Thomson Reuters
Transferable Skills	<p>Students are supposed to gain transferable skills through this programme:</p> <ul style="list-style-type: none"> - Communicate effectively through oral presentations, computer presentations and written reports; - Program in the major computer programming paradigms; - Learn management skills such as coordination, project design and evaluation and decision processes; - Transfer techniques and solutions from one area to another; - Learn independently with open-mindedness and critical enquiry; - Learn effectively for the purpose of continuing professional development; - Gain teamwork skills and friendships.
Programme Excursions	<p>Students will have the wonderful opportunity to visit G5 universities campus, travel to some of the most amazing tourist attractions and historical landmarks in the United Kingdom:</p> <ul style="list-style-type: none"> - The British Museum - Covent Garden - Science Museum - Thames River Cruises - Royal Observatory Greenwich - Sky Garden

03 | Programme Instructors



Prof Björn W. Schuller

Björn Schuller is Professor of Artificial Intelligence & Head of GLAM – Group on Language, Audio & Music, Imperial College London; Professor & head of the Chair of Embedded Intelligence for Healthcare and Wellbeing, University of Augsburg. He has more than 700 publications with more than 23000 citations, h-index 71. The focus of his research is on machine learning, automatic speech recognition and affective computing. He is also a Chief Scientific Officer (CSO) and co-founder of audEERING, describes himself as an audiophile and belongs to those who perceive the world via their ears. With his work he is aiming at teaching machines to listen.

Guest Experts (to be confirmed)



Dr Mark Briers

Honorary Senior Lecturer,
Imperial College London ;
Strategic Programme Director,
Alan Turing Institute



Dr Pingfan Song

Research Associate,
Imperial College London



Prof Jochen Leidner

Research Director,
Thomson Reuters



Mark Preston

Founder,
Streetdrone



Dr Jialin Dou

Education Manager,
ARM

and



Other Experts

You'll also hear from a number of renowned industry professionals, global experts and PhD candidate during the programme, who will share their insights and opinions through the lecture.

04 | Agenda

WEEK 1	Day 1 19 Jan	Day 2 20 Jan	Day 3 21 Jan	Day 4 22 Jan	Day 5 23 Jan,	Day 6 24 Jan	Day 7-8 25-26 Jan
9-12 am	Arrival	Open Ceremony & Ice Breaking	Course I-1	Lecture II	Course I-2	Lecture III	Free Weekend
2-5 pm		Lecture I IC Application	The British Museum	Covent Garden	Science Museum	Thames River Cruises	
EVE	LDN	LDN	LDN	LDN	LDN	LDN	LDN

WEEK 2	Day 9 27 Jan	Day 10 28 Jan	Day 11 29 Jan	Day 12 30 Jan	Day 13 31 Jan	Day 14-15 1-2 Feb
9-12 am	Course I-3	Lecture IV Streetdrone	Course I-4	Course I-5	Course I-6	Free Weekend
2-5 pm	UCL Campus	LSE Campus	Course Supervision	Lecture V Thomson Reuters	Teamwork on group project	
EVE	LDN	LDN	LDN	LDN	LDN	LDN

WEEK 3	Day 16 3 Feb	Day 17 4 Feb	Day 18 5 Feb	Day 19 6 Feb	Day 20 7 Feb	Day 21-22 8-9 Feb
9-12 am	Course I-7	Course I-8	Bletchley Park	Prepare for the Examination	Course I Examination	Free Weekend
2-5 pm	Royal Observatory Greenwich	Course Supervision			Teamwork on Group Project	
EVE	LDN	LDN	LDN	LDN	LDN	LDN

WEEK 4	Day 23 10 Feb	Day 24 11 Feb	Day 25 12 Feb	Day 26 13 Feb	Day 27 14 Feb	Day 28 15 Feb
9-12 am	Lecture VI Alan Turing Institute	Cambridge Campus	Oxford Campus	Presentation	Departure for China	Arrived in China
2-5 pm	Sky Garden	Lecture VII ARM	Mini-Cooper Oxford Factory	Free Activity & Farewell Dinner		
EVE	LDN	LDN	LDN	LDN		

05 | Agenda Descriptions

Course I: Deep Learning

Module Leader: Prof. Björn Schuller (this may be changed to other module leader due to their schedule)

Module Aims

The course covers the fundamental concepts and advanced methodologies of deep learning and relates those to real-world problems in a variety of domains. The aim is to provide an overview of different approaches, both classical and emerging. This course teaches the necessary skills that enable students to work and conduct research in the field of deep learning, covering both basic and classical techniques, as well as the most recent developing and cutting edge results.

Module syllabus

- Basic concepts in machine learning, supervised vs unsupervised learning, generalization, overfitting.
- Perceptrons, deep vs shallow models.
- Basic concepts in optimization, stochastic gradient descent, backpropagation.
- Convolutional neural networks (CNN) and underlying mathematical principles. Different CNN architectures (e.g. LeNet, AlexNet, VGG, Inception, ResNet). Applications in image analysis.
- Recurrent neural networks (RNN), long-short term memory (LSTM), gated recurrent units (GRU). Applications in speech analysis, machine translation.
- Mathematical principles of generative networks. Variational autoencoders (VAE), Generative adversarial networks (GAN). Applications to image generation.
- Graph neural networks: spectral and spatial domain methods, message passing. Example of applications in computational social sciences, high-energy physics, and medicine.
- Written Examination.

Lecture I–VII

Lecture I	Experience on PhD Application and School Life in Imperial College London: Procedure, Scholarships and School life.
Lecture II	Overview of Data Science and a practitioner's guide to Big Data
Lecture III	AI & Data Science in Healthcare
Lecture IV	Streetdrone: AI and Sensors in Self-driving Cars
Lecture V	Thomson Reuters: AI & Data Science in Finance
Lecture VI	Alan Turing Institute: to be confirmed
Lecture VII	ARM: Internet of Things (IoT) solutions (e.g. Retail Solution: Arm Treasure Data Customer Data Platform)

05 | Agenda Descriptions

G5 Universities, Companies or Institutes

University of Cambridge	The University of Cambridge, an integral part of the history and character of the city, is divided into 31 colleges where affiliated students and academics live, eat and work. With its origins dating back to 1209, the university belongs to the world's oldest. Recognized as one of the best in the world, many of the world's greatest scientist, authors, and political figures are alumni of the university. Alan Turing had been an undergraduate Mathematics student at King's college, gaining his degree with first-class honours in 1934. A year later, on the strength of his mathematical dissertation, he was elected a Fellow of the College.
University of Oxford	The University of Oxford is a collegiate research university in Oxford, England, the oldest university in the English-speaking world. We will have the guided campus tour by student in Oxford, who will share their experience of Master or PhD application, scholarships as well as school life.
IC	Imperial College London (IC) is a world-class university with a mission to benefit society through excellence in science, engineering, medicine and business. During the programme, we will attend courses and lectures given by IC's academic scientists.
UCL	University College London (UCL) is London's leading multidisciplinary university currently ranked 10th in the 2019 QS World University Rankings. In UCL, we will have the guided campus tour by student in UCL, who will share their experience of Master or PhD application, scholarships as well as school life.
LSE	London School of Economics and Political Science (LSE) is one of the foremost social science universities in the world. In LSE, we will have the guided campus tour by student in LSE, who will share their experience of Master or PhD application, scholarships as well as school life .
Alan Turing Institute	The Alan Turing Institute is the national institute for data science and artificial intelligence, with headquarters at the British Library. The Institute is named in honour of Alan Turing (23 June 1912 – 7 June 1954), whose pioneering work in theoretical and applied mathematics, engineering and computing are considered to be the key disciplines comprising the fields of data science and artificial intelligence.
Thomson Reuters	Thomson Reuters is the world's leading provider of news and information-based tools to professionals. Their Eikon platform is the financial analysis desktop and mobile solution that connects you to relevant, trusted content, Reuters news, markets, liquidity pools, and colleagues. In Reuters, their technician will show us the application of AI and Data Science in the field of finance, taking Eikon as the example.
ARM	ARM, headquartered in Cambridge. The world's leading technology provider of silicon IP and custom SoCs at the heart of billions of devices. Student will hear from more about the ARM, about it products and its solution to IoT from the manager.
Mini Plant Oxford	Plant Oxford is the birthplace and heart of MINI production. Manufactured to individual customer specifications, hundreds of MINIs leave the plant's assembly lines each day, off to meet new owners in more than 110 countries around the world. In the Plant, we can gain insight into the automotive production during a guided plant tour. Experience the production of MINIs, from the welding of steel parts into car bodies to the individual interior equipment in the assembly.
Bletchley Park	Once the top-secret home of the World War II Codebreakers. It remains highly relevant to our lives today and for the future. It played a major role in World War II, producing secret intelligence which had a direct and profound influence on the outcome of the conflict. Students will explore the different types of machines and codes that were using during World War II and find out how enemy message get to Bletchley Park.



06| Course Fees

Description	Items
Tuition Fee GBP 5,680	Tuition fee includes: <ul style="list-style-type: none">- All courses fees- Course and lecture materials- Insurance fee- Accommodation and breakfast- Farewell dinner- Leisure activities, scheduled cultural excursions, and social activities- Airport pick up & drop off service- Shuttle service in UK
	Tuition fee excludes: <ul style="list-style-type: none">- Domestic or international travel to or from London at the start and end of the programme- Any associated costs e.g. visa application costs- Lunch and dinner costs- Laundry and other personal spending

07| Entry requirements

All students are required to have a good command of English and if it is not their first language, they will need to satisfy the College requirement as follows:

- A minimum score of IELTS (Academic Test) 6.5 overall (with no less than 6.0 in any element) or equivalent.
- TOEFL (iBT) 92 overall (minimum 20 in all elements)
- CET-4 (China) minimum score of 550
- CET-6 (China) minimum score of 520