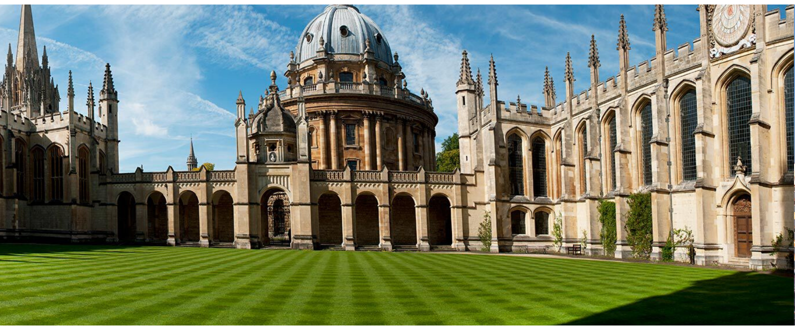
UNIVERSITY OF OXFORD

Engineering and Physical Sciences Research Council

Imperial College London

Centre for Doctoral Training Mathematics of Random Systems

The EPSRC CDT in Mathematics of Random Systems is a partnership between three world-class departments in the area of probabilistic modelling, stochastic analysis and their applications, the Oxford Mathematical Institute, the Oxford Department of Statistics and the Department of Mathematics, Imperial College London with the ambition of training the next generation of academic and industry experts in stochastic modelling, advanced computational methods and Data Science.



TRAINING THE NEXT GENERATION OF INTERDISCIPLINARY EXPERTS IN PROBABILITY, STOCHASTIC ANALYSIS AND APPLICATIONS

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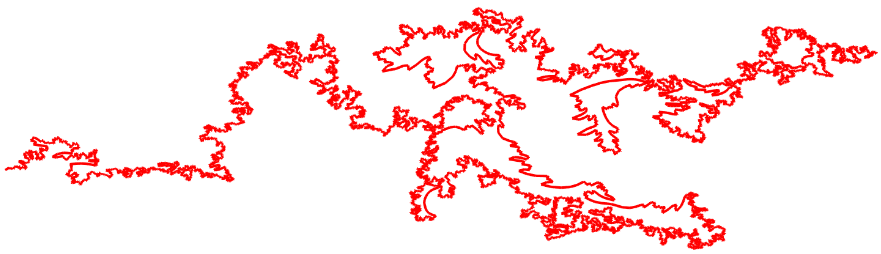
www.randomsystems-cdt.ac.uk

Centre for Doctoral Training

Mathematics of Random Systems

The CDT offers a 4-year comprehensive training programme at the frontier of scientific research in Probability, Stochastic Analysis, Stochastic Modelling, stochastic computational methods and applications in physics, finance, biology, healthcare and data science.



The centre provides funding for PhD studentships in the following areas

Foundations

- Stochastic analysis: foundations and new directions
- Stochastic partial differential equations
- Random combinatorial structures: trees, graphs, networks
- Stochastic computational methods and optimal control
- Random dynamical systems and ergodic theory

Applications

- Randomness and universal behaviour in physical systems
- Stochastic modelling and data-driven modelling in finance
- Mathematical modelling in biology and healthcare
- Mathematical and algorithmic challenges in data science
- Mean-field models and agent-based modelling

Our first cohort of 16 students joined the CDT in October 2019. Their research projects cover a broad range of topics, from foundational questions in stochastic analysis, rough path theory, regularity structures and stochastic partial differential equations, to applications in mathematical biology, computational finance, brain modelling and data science.

Course structure: 4-year PhD programme focused on research

Year 1: mandatory coursework involving

32 hours of introductory courses in the first 2 weeks (Sept-Oct):

- Foundations of Stochastic Analysis
- Foundations of Data Science
- Function spaces and Distributions

4 advanced Core course in Term 1 (Oct-Dec):

- Advanced Topics in Stochastic Analysis (Dr Andreas Sojmark, Imperial)
- Advanced topics in Stochastic Processes (Prof Xue-Mei Li, Imperial)
- Theories of Deep Learning (Prof Jared Turner, Oxford)
- Simulation Methods and Stochastic Algorithms (Prof. Mike Giles, Oxford)

3 Elective Courses chosen from Oxford or Imperial College London in Terms 2 and 3.

Years 2, 3 and 4

Supervised research. Supervisors chosen among a pool of over 50 mathematicians from the Oxford Mathematical Institute, the Oxford Department of Statistics and the Department of Mathematics, Imperial College London.

Throughout the 4-year period students participate in cohort activities:

- Monthly CDT seminars/workshops in Oxford and London
- Annual CDT Spring Retreat with tutorials and industry speakers
- Annual Summer School in Mathematics of Random Systems
- Industry workshops and internships
- 'Problem-solving' group projects

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PARTNERSHIP OPPORTUNITIES

Our industry partners provide:

- Funding of PhD studentships: a 4-year studentship involving collaborative research
- Internships for CDT students
- 1st year group research projects for CDT students
- Provision of databases for research projects

Our current Industry Partners include:

BNP PARIBAS

HSBC

Fidelity INVESTMENTS

InstaDeep™

J.P.Morgan

Deutsche Bank

CFM INSIGHT.DATA.CLARITY.

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