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

info@randomsystems-cdt.ac.uk
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Centre for Doctoral Training
Mathematics of Random Systems

The CDT offers a **fully funded** 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.
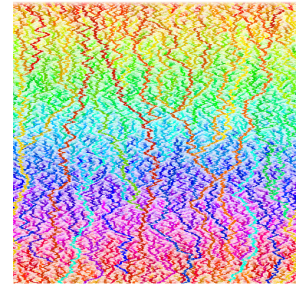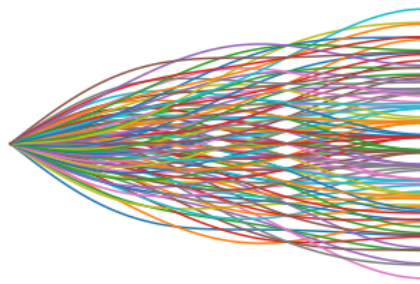

The centre provides funding for PhD studentships in the following areas

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
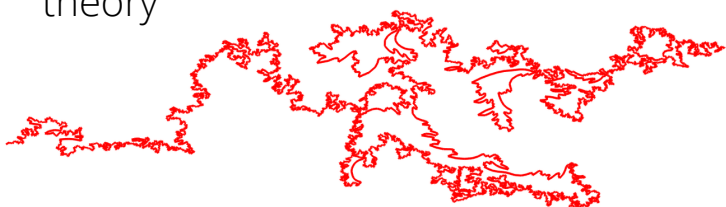
We welcomed our first cohort of students to the CDT in October 2019 and now have over 50 students in the programme. Their research projects cover a broad range of topics, from foundational questions in stochastic analysis, rough path theory, regularity structures and stochastic partial differential equations, 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 Camilo Hernández, 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:
- Regular CDT seminars/workshops hosted in Oxford and London
- CDT Spring Retreat with tutorials and industry speakers
- Summer School in Mathematics of Random Systems
- Industry workshops and internships
- 'Problem-solving' group projects

Admissions and Funding

The CDT in Mathematics of Random Systems welcomes applications from talented students with a strong mathematics background, especially in probability and analysis, for the academic year beginning in September 2022.

Applicants are expected to have
- a first class/honours degree in mathematics or a related discipline
- research interests related to the scientific areas covered by the CDT

Applicants meeting the selection criteria will be invited for an online interview.

The CDT offers **fully-funded studentships** covering all tuition fees and providing a stipend to support living expenses for the four years of the programme.

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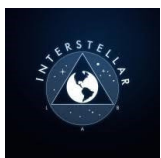**www.randomsystems-cdt.ac.uk**

Industry Partnerships

The CDT has multiple industry partners in the areas of data analytics, finance and healthcare. Industry partners provide funding for DPhil projects linked to their areas of activity. Candidates with an interest in industry-related research projects are encouraged to apply.