Data & Decisions: PhD Programmes in Statistics and Optimization and Operational Research in Edinburgh

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THE UNIVERSITY *of* EDINBURGH

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Overview of Theme and Research Groups

- School of Mathematics comprised of 5 themes
- **Our Theme:** Data & Decisions
- **Research Groups:**
  1. Statistics: 20+ academic staff, 26 PhD students
  2. Optimization & Operational Research: 15+ academic staff, 21 PhD students
- **PhD Programmes:**
  1. PhD in Statistics
  2. PhD in Optimization and Operational Research

Why Study in Edinburgh?

- International leader in the mathematical and computing aspects of statistics, optimization and operational research
- Highly reputed group members, as evidenced by Editorial Board Memberships in major international journals, international research awards, fellowships and other peer recognitions, and memberships of prestigious international societies
- Maxwell Institute jointly run by the University of Edinburgh and Heriot Watt University
- Active collaborations with several research groups in the UK and overseas
- Active collaborations with industry and government
- Bayes Centre, City Deal, established tech sector with an interest in data science

Funding Opportunities

- School of Mathematics (stipend equivalent to UKRI stipend rates for a period of 4 years plus a tuition waiver)
- EPSRC
- Modelling, Analysis and Computation (MAC-MIGS) Centre for Doctoral Training
- Edinburgh Earth, Ecology and Environment Doctoral Training Partnership (E4 DTP)
- Satellite Data in Environmental Science – Centre for Doctoral Training (SENSE CDT)
- China Scholarship Council
- Carnegie Scholarships
- Externally funded projects
- International scholarships provided by other governments or funding agencies

Sample Research Projects in Statistics I

- Natalia Bochkina, n.bochkina@ed.ac.uk
  Theory of Nonparametric Bayesian Inference
- Vanda de Carvalho, vanda.inacio@ed.ac.uk
  Bayesian flexible models for the statistical evaluation of medical diagnostic tests
- Chris Dent, chris.dent@ed.ac.uk
  Bayesian decision analysis and uncertainty management for energy system planning
- Victor Elvira, victor.elvira@ed.ac.uk
  Sequential Bayesian inference in complex and realistic dynamical systems
- Ruth King, ruth.king@ed.ac.uk
  State-space models and efficient Monte Carlo techniques
- Finn Lindgren, finn.lindgren@ed.ac.uk
  Spatial and spatio-temporal modelling for environmetrics and ecology
  Fast computational Bayeisan methods for random field estimation with SPDEs

Sample Research Projects in Statistics II

- Yiannis Papastathopoulos, ipapasta@ed.ac.uk
  Graphical modelling of multivariate extremes
  Statistical modelling of grid cell firing using log Gaussian Cox processes through the SPDE approach.
- Daniel Paulin, dpaulin@ed.ac.uk
  Scalable optimization methods for sparse statistical models
- Gordon Ross, gordon.ross@ed.ac.uk
  Statistical Analysis of Literature and Social Media
  Earthquake Forecasting Using Machine Learning and Statistics
- Simon Wood, simon.wood@ed.ac.uk
  Computational statistics, smoothing and statistical ecology

Sample Research Projects in Optimization and Operational Research I

- Akshay Gupte
  Stochastic mixed-integer polynomial optimization with applications in resilient infrastructure and network design
- E. Alper Yıldırım
  Theoretical comparison and implementation of alternative convex relaxations of structured nonconvex optimization problems
- Andreas Grothey
  Scenario aggregation in stochastic programming (in particular with respect to Energy applications)
  Asynchronous decomposition for interior point methods (for a student with a programming interest)
- Burak Büke
  Design and Control of Service Systems with Heterogeneity: Modelling the Human Aspect (background in probability required)
  Subscription Based Online Systems: Pricing and Traffic Control (background in probability required)

Sample Research Projects in Optimization and Operational Research II

- Chris Dent
  Stochastic optimization for energy scenario analysis (in collaboration with Scottish government)
- Jacek Gondzio
  Cutting Plane Methods with Interior Point Solver
  Huge Scale Optimization with Inexact Newton Method
- Joerg Kalcsics
  Stochastic supply chain design
- John Pearson
  Optimization with PDE constraints: Modelling of such problems as well as numerical linear algebra for the resulting discretized systems
- Julian Hall
  High performance solution of large scale sparse LP problems with the simplex method

Sample Research Projects in Optimization and Operational Research III

- Lars Schewe
  Energy systems: Hierarchical MINLP modeling or "Finding the right optimization model automatically"
  Energy markets: How detailed should our model be?
  Algorithms for structured mixed integer nonlinear programming
- Miguel Anjos
  Exact algorithms for AC optimal power flow
  Large-scale integration of prosumers into electricity markets and systems operation

Suggested Action Plan

- Check eligibility requirements `https://www.maths.ed.ac.uk/school-of-mathematics/studying-here/pgr/phd-application`
- Study theme and group pages in detail for research opportunities
  - Theme: `https://www.maths.ed.ac.uk/school-of-mathematics/research/data-decisions`
  - Statistics: `https://www.maths.ed.ac.uk/school-of-mathematics/research/data-decisions/statistics`
  - Optimization and Operational Research: `https://www.maths.ed.ac.uk/school-of-mathematics/research/data-decisions/optimization-and-operational-research`
- Identify potential supervisors and contact them to discuss research opportunities
- Submit your application online by **31 January 2022** to receive full consideration for admission and funding
- Contact me for any further questions: `E.A.Yildirim@ed.ac.uk`