

PhD Opportunities

Optimization/Operational Research

School of Mathematics

<http://www.maths.ed.ac.uk/ERGO>

Optimization and Scientific Computing

are at the heart of many areas of applied mathematics, computer science and engineering.

For example optimization helps to:

- detect crucial features in huge data bases
- deblure partly destroyed images
- design bridges which withstand winds/waves
- design secure electricity transmission networks
- select optimal portfolios which maximize return and minimize risk
- choose best animal diet

and in many other real-world applications.

Optimization Group: 7 Permanent Staff:

- Dr Buke: queueing theory, stochastic optimization, simulation, revenue management
- Dr Garcia Quiles: p-median problems, clustering in networks/surveys
- Prof Gondzio: interior point methods for linear, quadratic and nonlinear optimization
- Dr Grothey: interior point methods, stochastic optimization, applications in energy
- Dr Hall: simplex method and sparse matrices
- Prof McKinnon: integer and global optimization
- Dr Richtárik: first-order optimization methods, complexity of algorithms

Example past PhD projects:

- Kristian Woodsend (2005-2009): used IPMs to solve Support Vector Machine (SVM) problems
- Pablo González-Brevis (2009-2013): used IPMs to solve combinatorial (integer) optimization problems

Current PhD projects:

- Kimon Fountoulakis (2011-): uses new 2nd-order optimization methods in machine learning and signal/image processing
- Robert Gower (2012-): develops new techniques for nonlinear optimization

Possible PhD project themes:

- linear algebra methods for huge scale optimization
- optimization-based machine learning techniques and their applications
- optimization methods in signal/image processing
- optimization governed by PDE constraints

If you are interested in developing new techniques for optimization with me, then please read about IPMs:

J. Gondzio, Interior Point Methods 25 Years Later,
European J. of Operational Research, vol. 218 (2012)
587–601.

and get in touch with me:

Prof Jacek Gondzio

J.Gondzio@ed.ac.uk

<http://www.maths.ed.ac.uk/~gondzio/>