

## Portfolio Optimization

**Professor Michael J. Best**

**office:** MC 5042      **email:** [mjb@math.uwaterloo.ca](mailto:mjb@math.uwaterloo.ca)

**course home page:** <http://www.math.uwaterloo.ca/~mjb/>  
(under Winter 2008 Course Pages)

**office hours:** tba

- basic optimization: quadratic minimization subject to linear equality constraints
- efficient portfolios: the efficient frontier, the capital market line, Sharpe ratios and threshold returns
- practical portfolio optimization: short sales restrictions, target portfolios, transactions costs
- quadratic programming theory
- special purpose quadratic programming algorithms for portfolio optimization: today's large investment firms expect to solve problems with at least 1000 assets, transactions costs and various side constraints in just a few minutes of computation time. This requires very specialized QP algorithms. An overview of such algorithms will be presented with computational results from commercial problems.
- the efficient frontier, the capital market line, Sharpe ratios and threshold returns in practice

Course notes by the instructor will be made available. The primary reference is Harry M. Markowitz, *Portfolio Selection: Efficient Diversification of Investments*, Second Edition, Blackwell Publishers Ltd., Cambridge, 1991. Other reference texts will be given in the course notes.

**Organizational Meeting:** MC 4058, 1:30pm, Wednesday, January 9, 2008

**Note:** This course has been attended by students from the Departments of Combinatorics and Optimization, Actuarial Science and Statistics, Applied Math, Systems Design, Management Sciences and The Master's Programme in Finance.