

## Ben Calderhead

Date of Birth: 3rd February 1983                      Nationality: British  
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### Post-Graduate Experience

- 2011 - Present    **Research Associate**, "The Molecular Nose" EPSRC Project  
Department of Statistical Science, University College London
- 2007 - 2010      **Microsoft Research European PhD Scholar**  
Computational Statistics, University of Glasgow  
**Differential Geometric MCMC Methods for Bayesian Inference of Complex Statistical Models**  
Supervisor Prof. Mark Girolami  
Expected viva Summer 2011, to be examined by Prof. Stephen Roberts (University of Oxford) and Prof. Mike Titterton (University of Glasgow)
- 2006 - 2007      MSc (Research) in Computational Statistics, University of Glasgow  
**Population MCMC & Thermodynamic Integration for estimating Bayes factors**  
Examined (without correction) by Prof. Chris Holmes (University of Oxford)

### Undergraduate Education

- 2006              MSci in Mathematics, University of Glasgow
- 2004 - 2005      Erasmus Year, Mathematics, University of Mainz, Germany  
Grade A, taught and examined in German (written and oral)
- 2003 - 2004      Grade A, Mathematics and German, University of Glasgow
- 2002 - 2003      Grade A, Mathematics, Physics and German, University of Glasgow

### School Education

- 2000 - 2001      650 UCAS points over 2 years at Dollar Academy  
Advanced Higher Mathematics (A), Advanced Higher German (A),  
A-Level Physics (A), CSYS Chemistry (B),  
6 Highers (All grade A, Band 1, 85%+)
- 1999              7 Standard Grades at Grade 1

### Awards and Scholarships

- 2007 - 2010      Microsoft Research European PhD Scholarship (£66,000)
- 2009              \$600, Travel Grant, Canadian Pacific Institute for Mathematical Sciences
- 2008              £500, Travel Grant, University of Glasgow  
\$600, Travel Grant, NIPS Foundation
- 2004-2005      Erasmus Exchange Scholarship, University of Glasgow/University of Mainz  
DAAD Scholarship, (Deutscher Akademischer Austausch Dienst)  
Intensive Language Course funding
- 2001              Milne Medal for top pupil in S6, Dollar Academy  
British Informatics Olympiad Finalist (5th place),  
Corpus Christi College, Cambridge  
(Self-taught and programmed in Visual Basic)
- 2000              Kennedy Medal for top pupil in S5, Dollar Academy

## Publications and Book Chapters

- 1) *Ben Calderhead* & Mark Girolami  
**Statistical Analysis of Nonlinear Dynamical Systems using Differential Geometric Sampling Methods**  
Journal of the Royal Society, Interface (Invited paper - under submission) (2011)
- 2) Mark Girolami & *Ben Calderhead*  
**Riemann Manifold Langevin and Hamiltonian Monte Carlo Methods**  
Journal of the Royal Statistical Society - Series B (with discussion), (2011)  
Vol. 73(2), 123-214

This is the most discussed paper in the history of the RSS with 64 discussion articles published alongside the original paper by professors and academics from universities all over the world, including Harvard, MIT, Oxford, Cambridge etc.

Open source Matlab code available from: <http://www.dcs.gla.ac.uk/inference/rmhmc/>

- 3) L. Mohamed, *B. Calderhead*, M. Filippone, M. Christie & M. Girolami  
**Population MCMC methods for history matching and uncertainty quantification**  
Journal of Computational Geosciences, (2011)  
DOI: 10.1007/s10596-011-9232-8
- 4) *Ben Calderhead*, Mark Girolami & Desmond J. Higham  
**Is it Safe to Go Out Yet? Statistical Inference in a Zombie Outbreak Model**  
Prepared for the proposed book "Academics on Zombies", edited by R. Smith? (2010)
- 5) Mark Girolami, *Ben Calderhead* & Vladislav Vyshemirsky  
**System Identification and Model Ranking: The Bayesian Perspective**  
Learning and Inference in Computational Systems Biology,  
edited by N.D. Lawrence et. al., MIT Press, ISBN 978-0262013864 (2010)

The image on the front cover of this book was taken from my Masters thesis.

- 6) *Ben Calderhead*, Mark Girolami & Neil Lawrence  
**Accelerating Bayesian Inference over Nonlinear Differential Equations with Gaussian Processes,**  
Advances in Neural Information Processing Systems 21, (2009), MIT Press, 217-224
- 7) *Ben Calderhead* & Mark Girolami  
**Estimating Bayes Factors via Thermodynamic Integration and Population MCMC**  
Computational Statistics and Data Analysis, (2009), Elsevier Press, Vol. 53, 4028-4045
- 8) Xiaoyu Luo, *Ben Calderhead*, Haofei Liu & Wenguang Li  
**On the Initial Configurations of Collapsible Channel Flow**  
Computers and Structures, (2007), Elsevier Press, Vol. 85, 977-987

## Invited Talks and Conferences

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|------|---|
| 2011 | Systems Biology Centre, University of Warwick (Invited Talk)  |
| 2010 | Machine Learning and Perception Group Seminar (Invited Talk)<br>Microsoft Research, Cambridge   |
|      | 5th International Workshop on Applied Probability, (Invited Talk)<br>Universidad Carlos III de Madrid, Spain<br>(Work with Prof. Mark Girolami) |

Differential Geometric Structure in MCMC  
Ninth Valencia International Meeting on Bayesian Statistics (Poster)  
(work with Prof. Mark Girolami and Prof. Gareth Roberts)

2009 Mathematical and Statistical Aspects of Molecular Biology Conference  
Natural History Museum, London

2008 Fifth International Workshop on Computational Systems Biology  
University of Leipzig, Germany  
(Work with Prof. Mark Girolami)

### **Research Skills**

- Methodological development and implementation of advanced Bayesian and probabilistic approaches for reasoning under uncertainty
- Academic and industrial experience programming in Matlab, Visual Basic, VBA, SQL, Perl and C#
- Experience of interdisciplinary collaboration with biologists, geopetroleum engineers and chemists

### **Industrial Experience**

#### **Lazard**

Financial Analyst, Summer Internship (2005)

- Member of a generalist M&A team in Lazard's London office in Mayfair
- Financial analysis, research and preparation of client presentations
- Exposure to a wide range of sectors, and close daily contact with the other members of my team at all levels
- Presentation on a possible £1 billion travel company acquisition, investigating the financial implications, company strategies and potential cost-saving synergies

#### **Procter & Gamble**

Electronic Customer & Business Development, Internship (2004)

- Development of datamining method to increase sales by using electronic till roll data to identify out of stock problems in the Tesco stores nationwide
- Presentation and written recommendation to senior management on the application of my solution throughout P&G in the UK & Western Europe
- Delivered a package that was vital to a wide variety of projects and worth millions of pounds in savings

#### **State Street Bank**

Project Analyst, Summer Internship (2003)

- C21 scholarship by Glasgow University in conjunction with the State Street Bank
- Paid work experience in the State Street Bank's Edinburgh offices, and a cheque for £1000
- SQL database programming project assigned to me and completed well ahead of time

#### **Metaswitch Networks (formerly Data Connection)**

Software Development, Summer Intern (2003, 2002, 2001)

- Selected for Software Developer post during my participation in the British Informatics Olympiad
- Three separate internships, during which I worked on a variety of software and algorithmic development projects
- Work was considered to be of such a high standard that I was awarded a bonus and offered another internship for the following summer

### **Steigerwald Landschulheim, Germany**

English Teaching Assistant (2001 - 2002)

- English assistant at Steigerwald Landschulheim in Northern Bavaria, Germany
- Taught maths and English at various levels throughout the school, and took responsibility for groups of younger children in the boarding house after school and at weekends
- Invited to accompany groups of children on trips abroad, to the Czech Republic, Austria, and the Ukraine, acting as an additional member of staff

### **Future Computers (Scotland) Ltd**

Founder/Manager (1998 - 2001)

- My interest in computing led me to form my own computer company, Future Computers (Scotland) Ltd, in August 1998
- I ran all aspects of the business, including the management of my own shop, construction of PCs to customer requirements, repair and maintenance for private individuals and medium sized enterprises, and design and publishing of company websites
- Steady increase in company turnover resulting in local and national press recognition

### **Other Interests**

2011	Member of "Giving What We Can" ( <a href="http://www.givingwhatwecan.org">www.givingwhatwecan.org</a> )
2010	Bronze medalist, British Universities Trampolining Championships Semi-Finalist (Individual) Scottish Universities Pool Championships Gold medalist (Team) Scottish Universities Pool Championships
2009	Reviewer for Bioinformatics and Pattern Recognition Letters Qualified Trampoline Club Coach (Level 3), British Gymnastics Trampoline Coach (10-16 year olds), Glasgow Trampoline Club
2008	Quarter Finalist, British Universities Snooker Championships Quarter Finalist, British Universities Pool Championships Gold Medalist, British Universities Trampolining Championships
2005 - 2006	Vice-President Glasgow University Mathematics Society 1st and 2nd year Mathematics Tutor, University of Glasgow
2003 - 2004	President of the Glasgow University Photographic Society

### **References**

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