

# Curriculum Vitae,

**Dr. Grant Lythe**

Department of Applied Mathematics, School of Mathematics, University of Leeds

January 2010

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# 1 Personal information

JOB TITLE: Reader in Applied Mathematics

DATE OF BIRTH: 22/11/66

EMAIL: grant@maths.leeds.ac.uk

WEB PAGE: <http://www.amsta.leeds.ac.uk/~grant>

AREAS OF RESEARCH: Stochastic dynamics and Mathematical Immunology.

## Previous employment

- 2000 Fellowship, Spanish Ministry of Education and Culture. Held at the Universidad Carlos III de Madrid, Spain
- 1996-9 Director's Postdoc, Los Alamos National Laboratory, USA
- 1995-6 Postdoc, Optique nonlinéaire théorique, Université Libre de Bruxelles, Belgium.

## Education

- 1994 Completed Ph.D Thesis *Stochastic slow-fast dynamics*,  
Department of Applied Mathematics and Theoretical Physics,  
University of Cambridge, U.K. (Trinity College)  
*Senior Rouse-Ball Scholar 1993, Knight Prize 1992*
- 1990 Master of Science (Physics, 1st Class Hons), University of Auckland, New Zealand.  
*Commonwealth Scholarship 1990*
- 1988 Visiting Scholarship, Nuclear Physics, Australian National University.
- 1987 Bachelor of Science, University of Auckland, New Zealand.  
*Senior Scholarship Physics 1987, Senior Prize Mathematics 1987*

## 2 Publications

### i Refereed contributions to journals

1. Authors: Emily Stirk, Grant Lythe, Hugo van den Berg and Carmen Molina-París.  
Title: Stochastic competitive exclusion in the maintenance of the nave T cell repertoire  
Journal of Theoretical Biology **265** 396-410 (2010)
- 

2. Authors: Emily Stirk, Grant Lythe, Hugo van den Berg, Gareth Hurst and Carmen Molina-París.  
Title: The limiting conditional distribution in a stochastic model of T cell repertoire maintenance  
Journal: Mathematical Biosciences **224** 74-86 (2010)
- 

3. Authors: Kevin Burrage and Grant Lythe  
Title: Accurate Stationary Densities with Partitioned Numerical Methods for Stochastic Differential Equations  
Journal: SIAM<sup>1</sup> Journal on Numerical Analysis **47** 1601-1618 (2009)
- 

4. Authors: Mario Castro and Grant Lythe  
Title: Numerical experiments on noisy chains: from collective transitions to nucleation-diffusion,  
Journal: SIAM Journal on Applied Dynamical Systems **7** 207-219 (2008)
- 

5. Authors: Kevin Burrage, Ian Lenane and Grant Lythe  
Title: Numerical methods for second-order stochastic differential equations  
Journal: SIAM Journal on Scientific Computing **29** 245-264 (2007)
- 

6. Authors: Grant Lythe  
Title: Diffusion-limited reaction in one dimension  
Journal: Physica D **222** 159-163 (2006)
- 

<sup>1</sup>Society for Industrial and Applied Mathematics

7. Authors: Grant Lythe and Salman Habib  
Title: Kink stochastics  
Journal: Computing in Science and Engineering **8**,3 10-15 (2006)
- 
8. Authors: Kalvis Jansons and Grant Lythe  
Title: Multidimensional exponential timestepping with boundary test  
Journal: SIAM Journal on Scientific Computing **27** 793–808 (2005)
- 
9. Authors: Alp T. Findıkođlu, Roberto Camassa, Grant Lythe and Q.X. Jia  
Title: Transmission, reflection and second-harmonic generation in a nonlinear waveguide  
Journal: SIAM Journal on Applied Mathematics **66** 1–28 (2005)
- 
10. Authors: Kalvis Jansons and Grant Lythe  
Title: Exponential timestepping with boundary test for stochastic differential equations  
Journal: SIAM Journal on Scientific Computing **24** 1809–1822 (2003)
- 
11. Authors: Grant Lythe and Franz Mertens  
Title: Rice’s ansatz for overdamped  $\phi^4$  kinks at finite temperature  
Journal: Physical Review E **67** 027601–027604 (2003)
- 
12. Authors: Alp T. Findıkođlu, Roberto Camassa, Grant Lythe and Q.X. Jia  
Title: Dielectric nonlinearity and stochastic effects in strontium titanate  
Journal: Applied Physics Letters **80** 3391–3393 (2002)
- 
13. Authors: Salman Habib, Katja Lindenberg, Grant Lythe and Carmen Molina-París  
Title: Diffusion-limited reaction in one dimension: paired and unpaired nucleation  
Journal: J. Chem. Phys. **115** 73–89 (2001)
- 
14. Authors: Grant Lythe and Salman Habib  
Title: Stochastic PDEs: convergence to the continuum?  
Journal: Computer Physics Communications **142** 29–35 (2001)
-

15. Authors: Kalvis Jansons and Grant Lythe  
Title: Efficient numerical solution of stochastic differential equations using exponential timestepping  
Journal: Journal of Statistical Physics **100** 1097–1109 (2000)
- 
16. Authors: Salman Habib and Grant Lythe  
Title: Dynamics of kinks: nucleation, diffusion and annihilation  
Journal: Physical Review Letters **84** 1070–1073 (2000)
- 
17. Authors: Luís Bettencourt, Salman Habib and Grant Lythe  
Title: Controlling one-dimensional Langevin dynamics on the lattice  
Journal: Physical Review D **60** 105039 (1999)
- 
18. Authors: Grant Lythe and M.R.E. Proctor  
Title: Predictability of noise-controlled dynamics  
Journal: Physica D **133** 362 (1999)
- 
19. Authors: Esteban Moro and Grant Lythe  
Title: Dynamics of defect formation  
Journal: Physical Review E **59** R1303–1306 (1999)
- 
20. Authors: Kalvis Jansons and Grant Lythe  
Title: Stochastic Stokes' drift  
Journal: Physical Review Letters **81** 3136–3139 (1998)
- 
21. Authors: J.C. Celet, D. Dangoisse, P. Glorieux, Grant Lythe and T. Erneux  
Title: Slowly passing through resonance strongly depends on noise  
Journal: Physical Review Letters **81** 975–978 (1998)
- 
22. Authors: A. T. Findikoglu, Q. X. Jia, D. W. Reagor, Y. Fan, Grant Lythe, R. A. Camassa, D. Cai, N. Gronbech-Jensen and A. R. Bishop  
Title: New potential applications of nonlinear dielectrics: microwave solitons and stochastic resonance  
Journal: Integrated Ferroelectrics **22** 259–268 (1998)
-

23. Authors: Kalvis Jansons and Grant Lythe  
Title: Stochastic Calculus: application to dynamic bifurcations and threshold crossings  
Journal: Journal of Statistical Physics **90** 227–251 (1998)
- 
24. Authors: Grant Lythe, T. Erneux, A. Gavrielides and V. Kovanis  
Title: Low pump limit of the bifurcation to periodic intensities in a semiconductor laser subject to external optical feedback  
Journal: Physical Review A **55** 4443–4448 (1997)
- 
25. Authors: A. Gavrielides, V. Kovanis, P.M. Varangis, T. Erneux and Grant Lythe  
Title: Coexisting periodic attractors in injection-locked diode lasers  
Journal: Quantum and semiclassical optics **9** 785–796 (1997)
- 
26. Authors: A. Gavrielides, V. Kovanis, P.M. Varangis, T. Erneux and Grant Lythe  
Title: Quasiperiodicity in semiconductor lasers  
Journal: Proceedings of the SPIE **2994** 624-634 (1997)
- 
27. Author: Grant Lythe  
Title: Domain formation in dynamic transitions with noise  
Journal: Physical Review E **53** R4271–4274 (1996)
- 
28. Author: Grant Lythe  
Title: Dynamics controlled by additive noise  
Journal: Nuovo Cimento D **17** 855–861 (1995)
- 
29. Author: Grant Lythe  
Title: A noise-controlled dynamic bifurcation  
Journal: Nonlinear Science B, **7** 147–158 (1994)
- 
30. Authors: M.R.E. Proctor and Grant Lythe  
Title: Noise and resonant mode interactions  
Journal: Annals New York Academy of Sciences **706** 42–53 (1993)
-

31. **Authors:** Grant Lythe and M.R.E. Proctor  
**Title:** Noise and slow-fast dynamics in a three-wave resonance problem  
**Journal:** Physical Review E **47** 3122–3127 (1993)
- 
32. **Authors:** Allen WH, Bond IA, Budding E, Conway MJ, Daniel A, Fenton KB, Fujii H, Fujii Z, Hayashida N, Hibino K, Honda M, Humble JE, Kabe S, Kasahara K, Kifune T, Lythe GD, Masaike A, Matsubara Y, Mitsui K, Miura Y, Mori M, Muraki Y, Nagano M, Nakamura T, Nishizawa M, Morris PM, Ogio S, Saito T, Sakata M, Sato H, Shimizu HM, Spencer M, Storey JR, Tanimori T, Teshima M, Torii S, Wadsworth A, Watase Y, Woodhams MD, Yamamoto Y, Yock PCM and Yuda T  
**Title:** Upper limits on TeV gamma-ray emission from Cen A, Vela X-1, Cen X-3, Cir X-1  
**Journal:** The Astrophysical Journal 405 554–557 (1993)
- 
33. **Authors:** Allen WH, Bond IA, Budding E, Conway MJ, Daniel A, Fenton KB, Fujii H, Fujii Z, Hayashida N, Hibino K, Honda M, Humble JE, Kabe S, Kasahara K, Kifune T, Lythe GD, Masaike A, Matsubara Y, Mitsui K, Miura Y, Mori M, Muraki Y, Nagano M, Nakamura T, Nishizawa M, Morris PM, Ogio S, Saito T, Sakata M, Sato H, Shimizu HM, Spencer M, Storey JR, Tanimori T, Teshima M, Torii S, Wadsworth A, Watase Y, Woodhams MD, Yamamoto Y, Yock PCM and Yuda T  
**Title:** Survey of ultra-high-energy gamma-ray emission in the Magellanic clouds  
**Journal:** The Astrophysical Journal **403** 239–248 (1993)
- 
34. **Authors:** Bond IA, Budding E, Conway MJ, Daniel A, Fenton KB, Fujii H, Fujii Z, Hayashida N, Hibino K, Honda M, Humble JE, Kabe S, Kasahara K, Kifune T, Lythe GD, Masaike A, Matsubara Y, Mitsui K, Miura Y, Mori M, Muraki Y, Nagano M, Nakamura T, Nishizawa M, Morris PM, Ogio S, Saito T, Sakata M, Sato H, Shimizu HM, Spencer M, Storey JR, Tanimori T, Teshima M, Torii S, Wadsworth A, Watase Y, Woodhams MD, Yamamoto Y, Yock PCM and Yuda T  
**Title:** Search for point sources of ultra high energy  $\gamma$  rays in the southern sky  
**Journal:** Physical Review D **48** 466–478 (1993)
- 
35. **Authors:** Bond IA, Budding E, Conway MJ, Daniel A, Fenton KB, Fujii H, Fujii Z, Hayashida N, Hibino K, Honda M, Humble JE, Kabe S, Kasahara K, Kifune T, Lythe GD, Masaike A, Matsubara Y, Mitsui K, Miura Y, Mori M, Muraki Y, Nagano M, Nakamura T, Nishizawa M, Morris PM, Ogio S, Saito T, Sakata M, Sato H, Shimizu HM, Spencer M, Storey JR, Tanimori T, Teshima M, Torii S, Wadsworth A, Watase Y, Woodhams MD, Yamamoto Y, Yock PCM and Yuda T

Title: Upper limits for ultra-high-energy gamma-rays from SN1987A obtained by Cerenkov technique at large zenith angles

Journal: The Astrophysical Journal **344** L17–L19 (1989)

## ii Editor of books

A contract with Springer has been signed to edit the following book

*Current Mathematical Models in T cell Biology* Grant Lythe and Dr. Carmen Molina-París (editors)

## iii Parts of Books

1. Authors: Grant Lythe and Salman Habib

Title: Kinks in a stochastic PDE

In: Proceedings of the IUTAM symposium on Nonlinear Stochastic Dynamics N. Sri Namachchivaya and Y.K.LIN (Eds.) (Kluwer, Dordrecht 2003), pp435–444.

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2. Author: Grant Lythe

Title: Stochastic PDEs: domain formation in dynamic transitions

In: Proceedings of FISES 97, J.A. Cuesta and A Sánchez, eds. (Editorial del CIEMAT, Madrid, 1998)

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3. Authors: Grant Lythe

Title: Noise and dynamic transitions

In: Stochastic Partial Differential Equations, A. Etheridge (ed.) (Cambridge University Press, 1995), pp181–188

## iv Other research outputs

Websites that I developed and maintain:

1. <http://www.maths.leeds.ac.uk/Applied/I2M>
2. <http://www.maths.leeds.ac.uk/Applied/INTI>
3. <http://www.maths.leeds.ac.uk/Applied/NBDES>
4. <http://www.maths.leeds.ac.uk/~grant/immunet>
5. <http://www.randomideas.org>
6. <http://www.stochastic.org.uk>
7. <http://www.stochastics.org>

### 3 Talks and seminars

- *Kink stochasticity*  
Seminar, Applied Mathematics and Mathematical Physics, Imperial College London, 3 Nov 2009
- *Discrete and continuous stochastic modelling*  
Leeds Summer School, *Theoretical and experimental immunology*. 4 Sep 2009
- *Numerical methods for stochastic dynamics*  
Opening tutorial, SAMSI programme. 30 Aug 2009.
- *A Taste of Mathematical Immunology*  
Seminar, Department of Biochemistry, Indian Institute of Science, Bangalore. 12th Aug 2009.
- *Stochastic modelling in immunology*  
Seminar, Department of Mathematics, Indian Institute of Science, Bangalore. 6th Aug 2009.
- *Mathematical Immunology*  
Seminar, Instituto Superior Técnico, Lisbon. 26 Jun 2009.
- *Timescales of lymphocyte motion and collisions in a lymph node*  
Seminar, John Innes Centre, Norwich. 19 Jun 2009
- *Timescales of lymphocyte motion and collisions in a lymph node*  
Conference: *British Society for Immunology Congress 2008*  
Glasgow. 24 Nov 2008.
- *Timescales of the Immune response*  
Seminar, Leeds MathBiol seminars, Faculty of Biological Sciences. 13 Nov 2008
- *Kink Stochasticity*  
Conference: *SIAM nonlinear waves and coherent structures*  
Rome, Italy. 21 Jul 2008.
- *Modelos Matemáticos en Immunología: homeostasis e interacción entre células T y células dendríticas*  
Seminar, Centro de Biología Molecular, Madrid. 24 Jul 2008
- *Immunología Matemática*  
Conference: *Nolineal 2008*  
Barcelona, Spain. 15 Jun 2008.
- *Kink stochasticity and diffusion-limited reaction*  
Seminar, Engineering Mathematics, University of Bristol, 6 Jun 2008
- *Seminar: Kink stochasticity and diffusion-limited reaction*  
Mathematics, University of Strathclyde, 19 Mar 2008
- *Kink stochasticity and diffusion-limited reaction*  
Seminar, Mathematics, University of Essex, 13 Mar 2008
- *Kink stochasticity and diffusion-limited reaction*  
Seminar, Fluids and MHD seminars, School of Mathematics, Leeds. 24 Jan 2008.
- *Kink stochasticity*  
Seminar, Mathematics and Statistics, University of Limerick, 13 Dec 2007
- *Long-term dynamics of a stochastic PDE with kinks*  
Conference: *Numerical analysis of Stochastic PDEs*  
MIMS, Manchester. 3-4 Sep 2007
- *Diffusion-limited reaction in one dimension*

- Conference: SciCADE 2007  
St Malo, France. 9-13 Jul 2007
- *Statistics and Dynamics of Kinks*  
MSRI workshop *Mathematical Issues in Stochastic Approaches for Multiscale Modelling*  
Berkeley, USA. 21-25 May 2007
  - *Stochastic Modelling in Immunology*  
Conference: *Host-pathogen interactions*  
Biopolis, Singapore. 19 March 2007
  - *Noisy kinks and diffusion-limited reaction*  
Conference: macsdiem 2007  
Brighton. 22-24 Feb 2007
  - *Noisy kinks and diffusion-limited reaction*  
Department of Mathematics, University of Sussex, 9 Nov 2006
  - *Eventos de nucleacion en cadenas de particulas sujetas a fluctuaciones*  
Conference: *Física Estadística*  
Granada 14-16 Sep 2006
  - *Noisy kinks and diffusion-limited reaction*  
Conference: *First-Passage and Extreme-Value problems in Random Processes*  
Isaac Newton Institute, Cambridge. 29 June 2006
  - *Dinámica estocástica de kinks*  
Seminar, E.T.S.I. Aeroáuticos, Universidad Politecnica de Madrid, 31 May 2006
  - *Timescales and lengthscales from noise*  
Conference: *UK-German Frontiers of Science (Royal Society-von Humboldt Foundation)*  
Robinson Centre, Wyboston. 30 March-1 April 2006  
<http://www.avh.de/en/netzwerk/frontiers/index.htm>
  - $\phi^4$  *kinks and diffusion-limited reaction in one dimension*  
Seminar, Physics, University of Manchester, 2 Nov 2005  
<http://theory.phy.umist.ac.uk/index.php?doc=seminars>
  - *Diffusion-limited reaction in one dimension*  
Seminar, Applied Mathematics, University of Manchester, 9 Nov 2005  
<http://www.maths.man.ac.uk/Research/seminars.html>
  - *Diffusion-limited reaction in one dimension*  
Seminar, Mathematics, University of Glasgow, 17 Jun 2005  
<http://www.maths.gla.ac.uk/events/seminars>
  - *Numerical methods for second-order stochastic equations*  
Conference: *Computational Stochastic Differential Equations*  
Banach Centre, Bedlewo, Poland. 19-24 September 2005  
[http://www.nada.kth.se/szepessy/spde work.html](http://www.nada.kth.se/szepessy/spde%20work.html)
  - *Diffusion-limited reaction in one dimension*  
Conference: *Workshop on Coagulation-Fragmentation Processes: Theory and Applications*  
ICMS, Edinburgh, 4 - 8 July 2005  
<http://www.icms.org.uk/meetings/2005/coagfrag/index.html>
  - *Diffusion-limited reaction in one dimension*  
Mathematics Seminar, University of Glasgow, 17 June 2005

- <http://www.maths.gla.ac.uk/events/seminars>
- *Diffusion-limited reaction in one dimension*  
 Mathematics Colloquium, Heriot-Watt University, 4 March 2005  
<http://www.ma.hw.ac.uk/math/math.html>
  - *Transmisión, reflexión y generación del segundo armónico en una guía de ondas no lineal*  
 Seminar: GISC (in spanish).  
 Departamento de Matemáticas, Universidad Carlos III de Madrid, Spain, 22 Nov 2004  
<http://www.gisc.es>
  - *Dielectric nonlinearity and stochastic effects in Strontium Titanate*  
 Seminar: Superconductivity Technology Center  
 Los Alamos National Laboratory, 20 Aug 2004
  - *Transmisión, reflexión y generación del segundo armónico en una guía de ondas no lineal*  
 Conference: Nolineal 2004 (in spanish).  
 Toledo, Spain, 31 May 2004  
<http://matematicas.uclm.es/nolineal2004/>
  - *Exponential timestepping for SDEs*  
 Seminar, School of Mathematics and Computer Science, University of Leicester, 20 May 2004  
<http://www.mcs.le.ac.uk/seminars/applicable/Programme.html>
  - *Exponential timestepping for SDEs*  
 Seminar, Department of Mathematical Sciences, University of Bath, 21 May 2004  
<http://www.bath.ac.uk/~massch/Seminars/Formal>
  - *Dynamic bifurcations: lengthscales from noise*  
 Conference: *Multiscale Analysis for Stochastic Dynamics*  
 Mathematics Institute, University of Warwick, UK, 14 Aug 2003  
<http://www.maths.warwick.ac.uk/miraw>
  - *Kink dynamics: from an SPDE to diffusion-limited reaction*  
 Conference: *Workshop on Stochastic Partial Differential Equations and Related Topics*  
 Mathematics Institute, University of Warwick, 20 Oct 2003  
<http://www.maths.warwick.ac.uk/research/>
  - *Exponential timestepping for stochastic differential equations*  
 Conference: *SIAM dynamical systems*  
 Snowbird, Utah, USA, 27 May 2003  
<http://www.siam.org/meetings/ds03>
  - *Timescales and lengthscales from noise*  
 PANDA Meeting, University of Leeds, 1 August 2003  
[http://www.maths.leeds.ac.uk/~alastair/03\\_lms/](http://www.maths.leeds.ac.uk/~alastair/03_lms/)
  - *Exponential timestepping for stochastic differential equations*  
 Conference: *SDEs and SPDEs : Numerical Methods and Applications*  
 Edinburgh, 4 Apr 2003  
<http://www.ma.hw.ac.uk/icms/meetings/2003/sde/>
  - *Dynamics of kinks at finite temperature*  
 Seminar: Facultat de Física  
 Universitat de Barcelona Spain, 21 Oct 2002

- *Stochastic PDEs: convergence to the continuum?*  
 Conference: *IUTAM Symposium on Nonlinear Stochastic Dynamics*  
 Urbana-Champaign, Illinois, USA. August 2002  
<http://bacmac.aae.uiuc.edu/iutam/>
- *Exponential timestepping for stochastic differential equations*  
 Conference: *Scientific Computation*  
 University of Geneva, 26-29 June 2002
- *Dynamics of Kinks*  
 Seminar, Département de Physique Théorique  
 University of Geneva, 23 June 2002
- *Resolución de ecuaciones diferenciales estocásticas con el método exponencial*  
 Conference: *NoLineal 2002*, Cuenca, Spain. 5-8 June 2002 (in spanish).  
<http://matematicas.uclm.es/nolineal2002/>
- *Exponential timestepping for stochastic differential equations*  
 Conference: *Half-day stochastic meeting*  
 University of Strathclyde, Glasgow, UK. 1 Dec 2001
- *Introducción a la ecuacion de Langevin* (in spanish).  
 Seminar: Grupo de Fisica del plasma, Universidad Carlos III de Madrid. 2 March 2001
- *Stochastic PDEs: convergence to the continuum?*  
 Conference: *Conference on Computational Physics 2000*  
 Gold Coast, Australia. 2000
- *Resolución de ecuaciones diferenciales estocásticas con el método exponencial*  
 Conference: *Física Estadística* (poster, in spanish).  
 Universidad de Santiago de Compostela, Spain. 2000  
<http://fmars.usc.es/fises2000/>
- *Dynamics of defect formation*  
 Conference: *Peyresq workshop*  
 Haute Provence, France Jul 2000
- *Dinámica de kinks calientes*  
 Conference: *Nolineal 2000* (in spanish).  
 Almagro, Castilla-La Mancha, Spain 2000  
<http://www.uclm.es/cursos/nolineal/>
- *Dynamics of kinks at finite temperature*  
 Conference: *Computational issues in stochastic processes*  
 CECAM, Ecole Normale Supérieure de Lyon, France. 2000  
<http://www.gst.net/~algarci/cecam/abstract.htm>
- *Exponential timestepping for stochastic DEs*  
 Conference: *ANODE 99*  
 Auckland, New Zealand. 1999
- *Exponential timestepping for stochastic DEs* “Young talent” award.  
 Conference: *SciCADE (Scientific Computation and Differential Equations)*  
 Fraser Island, Australia. 1999
- *Stochastic PDEs*  
 Conference: *Stochastic Evolutionary Equations*  
 Los Alamos, USA 1999
- *Dynamics of defect formation*

- Wake Forest University, North Carolina. 31 Aug 1999
- *Vida y muerte de los kinks* (poster, in spanish).  
Conference: *Física Estadística*  
Instituto de Física, Santander. 1999
  - *Secret lives of kinks*  
Conference: *SIAM dynamical systems*  
Snowbird, Utah, USA. 1999  
<http://www.siam.org/meetings/ds99/cp21.htm>
  - *Stochastic Stokes' drift*  
Conference: *American Physical Society Centennial Meeting*  
Atlanta, USA. 1999
  - *Real time dynamics of kinks*  
Conference: *Nonequilibrium quantum field theory*  
ITP, Santa Barbara, USA 1999  
<http://online.itp.ucsb.edu/online/noneq99/lythe/>
  - *The secret lives of kinks*  
Seminar: *Department of Mathematics, Massey University*  
Palmerston North, New Zealand. 1 Dec 1998
  - *Finite-temperature dynamics of kinks*  
Conference: *IGPP/NPACI Workshop: Accurate Simulation and Modeling of Physical Systems*  
San Diego, USA. 1998
  - *Dynamique très sensible au bruit* (in french).  
Seminar, Laboratoire de Physique, ENS.  
Lyon, France 1998
  - *Dynamics of defect formation*  
Seminar, Theoretical Division T6.  
Los Alamos, USA. 21 Oct 1996.
  - *Passage through resonance in a driven Nd:YAG*  
Conference: *Laser Optics 98*  
St. Petersburg, Russia. 1998  
<http://www.ilph.spb.ru/lo98/lo98call.htm>
  - *EDP estocásticas* (in spanish).  
Conference: *Física Estadística*  
Universidad Carlos III, Getafe (Madrid), Spain. 1997
  - *Stochastic Calculus: Application to Dynamic Bifurcations and Neuron Dynamics.*  
Conference: *SIAM Annual Conference*  
Stanford, USA. 1997  
<http://www.siam.org/meetings/archives/an97/ms12.htm>
  - *Effect of Noise on Bifurcations in Spatially Extended Systems.*  
Conference: *SIAM, Applications of dynamical systems*  
Snowbird, USA. 1997  
<http://www.siam.org/meetings/archives/ds97/ms12.htm>
  - *Noise-controlled dynamics in normal forms.*  
Conference: *SIAM, Applications of dynamical systems*  
Snowbird, USA. 1997  
<http://www.siam.org/meetings/archives/ds97/ms48.htm>

- *Slow passage through resonance in a periodically modulated laser*  
Conference: *Noise and Nonlinearity*  
Heraklion, Greece. 1996
- *Domain formation with noise and time-dependent bifurcation parameter.*  
Conference: *New Developments and Applications in Stochastic PDEs*  
Los Alamos, USA. 1996
- *Dynamic transitions*  
Conference: *International Conference on Industrial and Applied Mathematics*  
(Hamburg, Germany 1995)
- *Dynamics of stability loss*  
Conference: *Mathematical Theory of Phase Transitions*  
Brighton, UK. 1994.
- *Dynamics controlled by additive noise*  
Conference: *Fluctuations in Physics and Biology*  
Elba, Italy 1994.
- *Noise-controlled dynamics of stability loss*  
Conference: *Stochastic partial differential equations*  
ICMS, Edinburgh, UK. 1994.
- *A noise-controlled dynamic bifurcation*  
Conference: *Euromech 308: Chaos and noise in dynamical systems*  
Spała, Poland. 1993.
- *A noise-controlled dynamic bifurcation*  
Conference: *Fluctuations and Order*  
Los Alamos, USA. 1993.
- *Noise-controlled dynamics*  
Conference: *British Applied Mathematics Colloquium*  
Glasgow, UK. 1993.
- *The effect of noise on solutions of some ODEs*  
Conference: *IAAS Workshop on Stochastic Numerics*  
Gosen, Germany. 1992.

## 4 Recent and current research grants

I am jointly coordinating the BBSRC MATSYB network **I<sup>2</sup>M: Immunology, Imaging and Modelling** with Dr. Carmen Molina-París. This initiative, which seeks to make use of mathematical modelling to study the dynamic interactions of immune cells and pathogens, is paying five per cent of my salary for three years, under the FEC system. (Total funding £104,000.) Our network is supported for three years under the BBSRC Mathematical Tools for Systems Biology call. The I<sup>2</sup>M network is one of five such networks in the UK and the first one to be funded in immunology. We featured in the October 2007 issue of the BBSRC quarterly magazine: [http://www.bbsrc.ac.uk/media/releases/2007/071009\\_immune\\_system.html#at](http://www.bbsrc.ac.uk/media/releases/2007/071009_immune_system.html#at). We have also established, with 230,000€ funding under the FP7 scheme, Marie Curie Actions, People, International Research Staff Exchange Scheme (IRSES), the **International Network in Theoretical Immunology** (INTI). In 2008, we obtained European Science Foundation funding for the Exploratory Workshop *New in vivo imaging techniques : challenges for experimental and*

*theoretical immunology*. In 2007, we obtained £13.5K. funding form the University of Leeds' pump-priming WUN International Research Collaboration fund to hold a workshop *New imaging techniques: challenges for experimental and theoretical immunology*.

The two current networks are supported by websites that I developed and maintain:

<http://www.maths.leeds.ac.uk/Applied/I2M>

<http://www.maths.leeds.ac.uk/Applied/INTI>

My other funded research projects include a British Council Collaboration Development Award, Ethel Raybould travelling fellowship, Nuffield Foundation (Newly Appointed Lecturer's Award), EPSRC Conference grant, and a European Infrastructure program (Framework 4) human mobility grant.

- European Science Foundation *New in vivo imaging techniques : challenges for experimental and theoretical immunology* Exploratory Workshop (with Carmen Molina-París)
- University of Leeds WUN research fund  
*New imaging techniques: challenges for experimental and theoretical immunology*. (P.I. Carmen Molina-París)
- BBSRC  
*Immunology Imaging and Modelling Network – I<sup>2</sup>M*  
BB/F003811/1 (P.I. Carmen Molina-París)
- British Council Collaboration Development Award *Stochastic Models of intracellular signalling and cell motility*. Collaborator: Keng-Hwee Chiam
- PPARC *MHD Turbulence and the generation of large-scale magnetic fields in the Sun*  
PP/D00179X/1(P.I. Steve Tobias).
- Ethel Raybould travelling fellowship, Department of Mathematics, University of Queensland (2002). Host: Kevin Burrage.
- Nuffield Foundation, Newly Appointed Lecturer's Award  
*Theory, numerics and applications of stochastic differential equations and stochastic partial differential equations*  
NAL/00496/G
- EPSRC Conference grant  
*SDEs and SPDEs: numerical methods and applications* (P.I. Gabriel Lord.)  
GR/R91106/01  
Used to hold the conference *SDEs and SPDEs : Numerical methods and applications*, in Edinburgh, 31 March to 4th April 2003.
- European Infrastructure program (Framework 4)  
*Large scale solutions of stochastic partial differential equations*  
HPRI-1999-CT-00071

Used to visit the Large Scale Computing Facility CESCA-CEPBA, Barcelona, 2002.  
Collaborator: Jordi García-Ojalvo.

- Los Alamos National Laboratory, LDRD-IP  
*Stochastic Resonance in Arrays with Tunable Nonlinearity and Coupling* 1998-2001  
\$600,000.  
(P.I. Alp Findikoglu)

## 5 Conference Organising Committee

- *New in vivo imaging techniques : challenges for experimental and theoretical immunology* University of Leeds September 2008  
<http://www.maths.leeds.ac.uk/~grant/CETI>
- Royal Society “Frontiers of Science”, Hyderabad, India. 4-6 March 2008
- *New imaging techniques: challenges for experimental and theoretical immunology* University of Leeds September 2007  
<http://www.maths.leeds.ac.uk/~grant/immunet>
- *Host-pathogen interactions*  
Biopolis, Singapore. 19 March 2007
- *Stochastic differential equations and stochastic partial differential equations: numerics and applications.* ICMS, Edinburgh 31 March-4 April 2003.  
<http://www.ma.hw.ac.uk/icms>
- *Nonequilibrium dynamics*  
Los Alamos National Laboratory, USA. 1998.

## 6 Referee service

Referee for Applied Numerical Mathematics, Computers and Mathematics with Applications, Computational and Mathematical Methods in Medicine, Electronic Transactions on Numerical Analysis, Fluctuation and Noise Letters, IMA Journal of Applied Mathematics, Journal of Computational and Applied Mathematics, Journal of Computational Physics, Journal of Statistical Physics, Journal of Physics A, Mathematika, Nonlinearity, Quarterly Journal of Mechanics and Applied Mathematics, Physica A and Physica D, Physical Review E, Physics Letters A, Probabilistic Engineering Mechanics Royal Society Interface, SIAM Journal of Numerical Analysis, SIAM Journal of Scientific Computing, Springer books.

## 7 Teaching

### i Postgraduate teaching and supervision

- Phd student (co-)supervision
  1. Joseph Reynolds (2010-)
  2. Mark Day (2009-)
  3. James Currie (2008-)
  4. Emily Stirk (2006-)
  5. Ayari Fuentes (2007-2008)
  6. Jacqueline Saville (2004-6)
  
- MATH5565 *Mathematical Biology*  
15 students, 2010.
  
- MAGIC065 *Stochastic processes*  
Four lectures given, over the MAGIC grid, to a consortium of Universities. (Core course.)  
October 2010.
  
- MAGIC047 *Stochastic Modelling in Biology*  
Six lectures given, over the MAGIC grid, to a consortium of Universities.  
October-November 2008, October-November 2009.
  
- Summer School: Theoretical and Experimental Immunology  
School of Mathematics, University of Leeds  
31 Aug-4 Sep 2009.
  
- *Stochastics and Modelling*  
Graduate School: Nonlinear and Stochastic Systems in Biology School of Mathematics, University of Leeds  
30th March - 1st April 2009
  
- *Markov chains and stochastic processes*  
Intensive two-day course, part of the European Phd Programme in Computational Biology, given at the Gulbenkian Institute, Lisbon, Portugal.  
24-24 November 2008
  
- MATH5300 *Applied Financial Modelling*  
Graduate level course, Business School.  
2004,2005,2006,2007,2008,2009                      Number of students: 10-20.

This course, a new venture for the School of Mathematics, started in 2004. It is offered in the Business School to students taking the Masters in International Finance, and Masters in Banking and Finance.

I designed and prepared the course from scratch. It is taught *à la* Business School: two-hour sessions centred around a computer presentation. The students receive a printed version of all the visual material before each session. Despite the difficulty of combining a refresher course on calculus and probability with a graduate-level introduction on stochastic calculus and the principles of arbitrage pricing, and of having to sit a mathematical exam after years of essay-based assessment, more than half of the students achieve very good or outstanding final marks.

<http://www.maths.leeds.ac.uk/Applied/5300/>

- Since 2006, I have been teaching one-day  $\text{\LaTeX}$  courses several times a year to graduate students in the MAPS faculty. This comes under EPSRC's Researcher Skills training programme.

<http://www.maths.leeds.ac.uk/LaTeX/>

- Internal Examiner, PhD viva. Georgios Aivaliotis (2008-9).
- Internal Examiner, PhD viva. Niloufar Abourashchi (2009).
- Assessor, Naglu Jagjit, First year report (2004).
- Assessor, Wang Wen Kai, First year report (2007).

## ii Undergraduate teaching, supervision and tutoring

- MATH3565 Mathematical Biology  
2010 Number of students: 40.
- MATH2450 Mathematics for Geophysics III  
Service teaching  
2009-2010 Number of students: 23
- MATH1915/6/7 Basic use of Computers for Mathematics.  
First year, G100, 1MK and Joint Honours.  
2004,5,6. Number of students: 100.

This course on use of software, including MAPLE, has been modernised and augmented with the addition of  $\text{\LaTeX}$ .

<http://www.maths.leeds.ac.uk/Applied/1916/>

- MATH1970 Differential Equations  
First year, G100, Engineering and Theoretical Physics.  
2004,2005 Number of students: 125-150.

In 2003, G100 was rearranged and two new courses, MATH1960 and MATH1970, created from the ashes of MATH1932 and MATH1942. I had to produce a new lecture course, plus examples sheets and answers for the G100 tutorials. I have produced a quantum leap forward in the quality of handouts and notes, typing up LaTeX versions of the examples and answers and making them available on the web.

<http://www.maths.leeds.ac.uk/Applied/1970/>

- MATH1942                      Further ODEs and Multivariable Calculus  
First year, G100, Engineering and Theoretical Physics.  
2002, 2003.

- MATH0380                      Foundation Applied Mathematics for Business  
Foundation year.  
2001, 2002, 2003.                      Number of students: 60-120.

This course did not exist before I taught it. It involved teaching large groups of foreign students the basics of matrix algebra and quantitative techniques. Two lectures and one examples class per week. Most students go on to the Business School, but some have been accepted into the MK and MM programs. I found a large number of capable students that could be a future source of foreign students for the School of Maths.

<http://www.maths.leeds.ac.uk/Applied/0380/>

- In 2006, I taught MATH1382 while Dr. Molina-París was on maternity leave.
- Assessor MATH0370 (2001-2006).
- Assessor MATH1150 (2004-2008).
- **[Research Council funded summer project supervision]**
  1. David Franco 2008
  2. Mark Day 2009
- **[Final-year Project supervision]**
  - 2008-2009 Mark Day (MNatSci) “Stochastic Modelling in Immunology”
  - 2007-2008 Debra McDonagh (3MM) “Stochastic Differential Equations and Finance”
  - 2006-2007 Stephen Ryder (3MK) “First-order Stochastic Differential Equations and Maple Applications”
  - 2004-2005 Eleanor Walton (3MK) “Stochastic calculus and Stochastic Differential Equations”
  - 2003-2004 Paula West (4MM) “Stochastic modelling of particle collisions”
- **[Short Project supervision (MATH3000)]**

2008-9 Alasdair Hunter

2006-7 Sarah Holian, Laura Smithson, Mark Wells.

2005-6 Alexander Wood, Claire Pacini, Xu Jianyun, Zeki Tezcan.

- **[Small group teaching (tutorials)]**

I have experience with G100, Joint Honours, G150 and theoretical physics tutorials and tutorials for students taking maths modules as electives. In addition, 2nd-, 3rd- and 4th-year students come to see me on a one-to-one basis when they have difficulties, both my assigned personal tutees and other students.

I took “supervisions” of undergraduate mathematics students at Trinity College, Cambridge, in 1992 and 1993.

## **8 Administrative Responsibilities.**

### **i Admissions**

Assistant 2005-2007. Admissions tutor since September 2007. This is a 52-week responsibility, particularly intense in August and September (Alevel results and clearing), October (processing of UCAS applications), November and February (Post-Application visit days by prospective students). In addition, we give multiple talks as part of the University's open days in September and June and organise the creation and editing of the School's publicity material.

Since 2005, the number of applications has increased to over 1100. The quality of our intake, as measured by their Alevel scores, has also improved and it seems we are moving up in the pecking order of Schools of Mathematics at Universities with similar resources and ambitions. With the expansion of the EU, we are having to evaluate applicants with a myriad of qualifications.

### **ii Socrates/Erasmus**

Committee member since 2003; coordinator since 2010.

### **iii Other administrative tasks**

- Programme coordinator, Mathematics and Biology
- Learning and Teaching Committee 2007-9
- MAPS faculty board 2006-9.
- Seminar co-organiser 2001-2005.
- "Webmaster" for the Applied Maths web pages 2003-5.
- Admissions interviewing 2003-2005.
- Organised new students' party 2002, 2003, 2004.
- Fire Warden since 2003 (attended university training courses 2003, 2004, 2010). Induction talk to new students 2007.

### **iv Miscellaneous**

- One-day visit including talks to Year 10,11 and 12 students at King's school, Peterborough. 20 June 2007.
- *Why do maths at University?*, talk given at Haberdashers boys' school, Hertsfordshire. 1 March 2007.
- *Why do maths at University?*, talk given at UCAS Convention, Harrogate, 27 April 2007.

**END**