Biographical sketch for Andrew M Stuart

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Education and Training

1987	Ph.D.	Computing	University of Oxford
1983	B.S.	Mathematics	University of Bristol

Research and Professional Experience

2016 – present	Bren Professor of Computing and Mathematical Sciences, Caltech
1999 – 2016	Professor of Mathematics, University of Warwick
1995 – 1999	Associate Professor of Computer Science and Mechanical Engineering, Stanford University
1992 – 1995	Assistant Professor of Computer Science and Mechanical Engineering, Stanford University
1989 – 1992	Lecturer, Department of Mathematics, Bath University
1987 – 1989	Instructor, Department of Mathematics, MIT

Selected Publications

1. K.J.H. Law, A.M. Stuart and K.C. Zygalakis, *Data Assimilation: A Mathematical Introduction*. Springer, 2015, 257 pages.
2. M. Hairer, A.M. Stuart and S.J. Vollmer, *Spectral Gaps for a Metropolis–Hastings Algorithm in Infinite Dimensions.* The Annals of Applied Probability, **24**(2014), 2455-2490.
3. S.L.Cotter, G.O.Roberts, A.M. Stuart and D. White, *MCMC methods for functions: modifying old algorithms to make them faster*, Stat. Sci. **28**(2013), 424–446.
4. A.M. Stuart. *Inverse problems: a Bayesian perspective*. Acta Numerica 2010.
5. G.A. Pavliotis and A.M. Stuart, *Multiscale Methods: Averaging and Homogenization*. Springer, 2008, 328 pages.
6. O. Gonzalez and A.M. Stuart, *A First Course in Continuum Mechanics*. Cambridge University Press, 2008, 413 pages.
7. D. Givon, R. Kupferman and A.M. Stuart, *Extracting macroscopic dynamics: model problems and algorithms*. Nonlinearity, **17**(2004), R55–127.
8. D.J. Higham, X. Mao and A.M. Stuart *Strong Convergence of Numerical Methods for Nonlinear Stochastic Differential Equations*. SIAM J. Num. Anal **40**(2002), 1041–1063.
9. J. Mattingly, A.M. Stuart and D.J. Higham *Ergodicity for SDEs and approximations: locally Lipschitz vector fields and degenerate noise*. Stoch. Proc. and Applics. **101**(2002), 185–232.
10. A.M. Stuart and A.R. Humphries *Dynamical Systems and Numerical Analysis* Cambridge University Press, 1996, 686 pages.

Awards and Honors

- **Leslie Fox Prize For Numerical Analysis (IMA, UK). September 1989**.
- **Monroe Martin Prize in Applied Mathematics (IPST, Maryland). February 1996**.
- **James Wilkinson Prize in Numerical Analysis and Scientific Computing (SIAM). July 1997**.

- **Germund Dahlquist Prize (SIAM). September 1997**.
- **Richard C DiPrima Memorial Lecture, RPI. February 1999**.
- **Junior Whitehead Prize (London Mathematical Society). June 2000**.
- **Ron Di Perna Memorial Lecture, Berkeley. February 7th 2002**.
- **Royal Society/Leverhulme Trust Senior Research Fellowship. 2002.**
- **ICIAM 2007, Zurich. Plenary Lecturer**.
- **J.D. Crawford Prize (SIAM). May 2007**.
- **European Research Council Advanced Investigator. December 2008– November 2013.**
- **Inaugural SIAM Fellow. 2009.**
- **European Congress of Mathematicians 2012, Krakow. Invited Lecture**.
- **Royal Society Wolfson Merit Award 2013.**
- **International Congress of Mathematicians 2014, Seoul. Invited Lecture**.
- **Isaac Newton Institute Rothschild Fellow, January–June 2018.**

Additional Positions Held

- 1/15–12/16. SIAM Activity Group on Uncertainty Quantification, Chair.
- 1/05-6/07. Warwick University, Director, Centre for Scientific Computing.
- 7/97–6/99. Stanford University, Associate Director, Graduate Program in Scientific Computing and Computational Mathematics.
- 6/90–12/93. NASA Ames, Consultant.

Publications

Publications available online here:
`http://stuart.caltech.edu/publications/index.html`

[140] D.Calvetti, M.M.Dunlop, E.Somersalo, A.M.Stuart, Iterative Updating of Model Error for Bayesian Inversion. Inverse Problems, **34**(2018) 025008.

[139] A.M. Stuart and A.L. Teckentrup, Posterior consistency for Gaussian process approximations of Bayesian posterior distributions. Mathematics of Computation, **87**(2018) 721-753.

[138] C.-E. Brehier, M. Hairer and A.M.Stuart, Weak error estimates for trajectories of SPDEs under spectral Galerkin discretization. Journal of Computational Mathematics, **36**(2018) 159-182.

[137] Yulong Lu, Andrew Stuart, and Hendrik Weber, Gaussian Approximations For Transition Paths In Brownian Dynamics. SIAM J. Math. Anal. **49**(2017) 3005-3047.

[136] Yulong Lu, Andrew Stuart, and Hendrik Weber, Gaussian Approximations for Probability Measures on Rd. SIAM/ASA J. Uncertainty Quantification **5**(2017) 1136-1165. [Online Publication] [pdf] [BibTeX]

[135] T. Schneider, S. Lan, A. Stuart, J. Teixeira, Earth System Modeling 2.0: A Blueprint for Models That Learn From Observations and Targeted High-Resolution Simulations. Geophysical Research Letters **44**(2017).

[134] D. Sanz-Alonso, A.M. Stuart, Gaussian approximations of small noise diffusions in Kullback-Leibler divergence. Communications in Mathematical Sciences **15**(2017), 2087-2097.

[133] M.A. Iglesias, K. Lin, S. Lu, A.M. Stuart, Filter based methods for statistical linear inverse problems. Communications in Math. Sciences **15**(2017), 1867-1896.

[132] S. Agapiou, O. Papaspiliopoulos, D. Sanz-Alonso, A. M. Stuart, Importance sampling: computational complexity and intrinsic dimension. Statistical Science **32**(2017), 405-431.

[131] C.Schillings and A.M.Stuart, Analysis of the ensemble Kalman filter for inverse problems. SIAM J Numerical Analysis **55** (2017), 1264-1290.

[130] A. Beskos, M. Girolami, S. Lan, P. E. Farrell and A. M. Stuart, Geometric MCMC for Infinite-Dimensional Inverse Problems. Journal of Computational Physics **335** (2017), 327-351.

[129] R.Scheichl, A.M.Stuart and A.L.Teckentrup, Quasi-Monte Carlo and multi-level Monte Carlo for computing posterior expectations in elliptic inverse problems. JUQ **5** (2017), 493-518.

[128] W. Lee and A.M. Stuart, Derivation and analysis of simplified filters for complex dynamical systems. Communications in Mathematical Sciences **15**(2017), 413-450.

[127] M. Iglesias, Y. Lu and A.M. Stuart, A Bayesian level set method for geometric inverse problems. Interfaces and Free Boundaries **18**(2016), 181–217.

[126] M.M.Dunlop and A.M.Stuart, The Bayesian formulation of EIT: analysis and algorithms. Inverse Problems and Imaging **10**(2016) 1007-1036.

[125] M.M.Dunlop, M.A.Iglesias and A.M.Stuart, Hierarchical Bayesian level set inversion. Statistics and Computing (2016).

[124] M.M.Dunlop and A.M.Stuart, MAP estimators for piecewise continuous inversion. Inverse Problems **32**(2016) 105003.

[123] P.R.Conrad, M.Girolami, S.Sarkka, A.M.Stuart and K.C.Zygalakis, Statistical analysis of differential equations: introducing probability measures on numerical solutions. Statistics and Computing (2016).

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[119] D. Sanz-Alonso and A.M. Stuart, *Long-time asymptotics of the filtering distribution for partially observed chaotic dynamical systems,* SIAM J UQ **3**(2015), 1200–1220.

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`http://dx.doi.org/10.1016/j.spa.2009.05.003`

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[69] G. Pavliotis and A.M. Stuart, *Parameter Estimation for Multiscale Diffusions*. J. Stat. Phys. **127**(2007), 741–781.

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[11] J.Norbury and A.M. Stuart, *A Model For Porous Medium Combustion.* Quart. J. Mech. Appl. Math. **42**(1989),159-178.

[10] A.M.Stuart, *A Note On High/Low Wave Number Interactions In Spatially Discrete Parabolic Equations.* IMA J. Appl. Math. **42**(1989),27-42.

[9] A.M.Stuart, *Nonlinear Instability In Dissipative Finite Difference Schemes.* SIAM Review **31**(1989),191-220.

[8] A.M.Stuart, *Singular Free Boundary Problems And Local Bifurcation Theory.* SIAM J. Appl. Math. **49**(1989),72-85.

[7] A.M.Stuart *Similarity Solutions of a Heat Equation with Nonlinearly Varying Heat Capacity.* IMA J. Appl. Math. **40**(1988), 217–234.

[6] J.Norbury and A.M.Stuart *Parabolic Free Boundary Problems Arising in Porous Medium Combustion.* IMA J. Appl. Math. **39**(1988), 241–257.

[5] J.Norbury and A.M.Stuart *Travelling Combustion Waves in a Porous Medium. Part II – Stability* SIAM J. Appl. Math. **48**(1988), 374–392.

[4] J.Norbury and A.M.Stuart *Travelling Combustion Waves in a Porous Medium. Part I – Existence.* SIAM J. Appl. Math. **48**(1988), 155–169.

[3] A.M.Stuart *Existence of Solutions of a Two-Point Free Boundary Problem Arising in the Theory of Porous Medium Combustion.* IMA J. Appl. Math. **38**,(1987) 23–34.

[2] J.Norbury and A.M.Stuart *Volterra Integral Equations and a New Gronwall Inequality. Part II: The Nonlinear Case.* Proc. Roy. Soc. Edin. **106A**(1987), 375–384.

[1] J.Norbury and A.M.Stuart *Volterra Integral Equations and a New Gronwall Inequality. Part I: The Linear Case.* Proc. Roy. Soc. Edin. **106A**(1987), 361–373.

BOOKS

Publications available online here:
`http://stuart.caltech.edu/publications/books.html`

[5b] A.M. Stuart, T.J. Sullivan and J. Voss, *Matrix Analysis and Algorithms*. In preparation.

[4b] K.J.H. Law, A.M. Stuart and K.C. Zygalakis, *Data Assimilation: A Mathematical Introduction*. Springer, 2015, 257 pages.

[3b] G.A. Pavliotis and A.M. Stuart, *Multiscale Methods: Averaging and Homogenization*. Springer, 2008, 328 pages.

[2b] O. Gonzalez and A.M. Stuart, *A First Course in Continuum Mechanics*. Cambridge University Press, 2008, 413 pages.

[1b] A.M. Stuart and A.R. Humphries *Dynamical Systems and Numerical Analysis* Cambridge University Press, 1996, 686 pages.

ANNUAL REVIEWS, BOOK CHAPTERS, UNREFEREED ARTICLES.

Publications available online here:
`http://stuart.caltech.edu/publications/chapters.html`

[22c] P. Bühlmann and A.M. Stuart. *Mathematics, Statistics and Data Science.*, EMS Newsletter, **100**, June 2016, pages 28–30.

[21c] S. Reich and A.M. Stuart. *Data assimilation: new challenges in deterministic and random dynamical systems.* SIAM News, October and November 2015.

[20c] M. Dashti and A.M. Stuart. *The Bayesian Approach to Inverse Problems.* Handbook of Uncertainty Quantification, Editors R. Ghanem, D. Higdon and H. Owhadi, Springer, 2015.

[19c] M. Iglesias and A.M. Stuart. *Inverse problems and uncertainty quantification.* SIAM News, July/August 2014.

[18c] G. Pavliotis, Y. Pokern and A.M. Stuart. *Parameter estimation for multiscale diffusions: an overview.* Appears in "Statistical Methods for Stochastic Differential Equations (SemStat Proceedings 2007)", CRC Press, 2012.

[17c] J. Nolen, G. Pavliotis and A.M. Stuart. *Multiscale modelling and inverse problems*. Appears in Springer Lecture Notes in Computational Science, "Numerical Analysis of Multiscale Problems", editors I.G. Graham, T. Hou, O. Lakkis and R. Scheichl, Springer, 2011.

[16c] M. Hairer, A.M. Stuart and J. Voss. *Signal processing problems on function space: Bayesian formulation, stochastic PDEs and effective MCMC methods*. Appears in The Oxford Handbook of Nonlinear Filtering, Editors D. Crisan and B. Rozovsky, Oxford University Press, 2011.

[15c] A.M. Stuart. *Inverse problems: a Bayesian perspective*. Acta Numerica 2010.

[14c] D. White and A.M. Stuart. *Greens functions by Monte Carlo*. Appears in Monte Carlo and Quasi-Monte Carlo Methods 2008, Editors P. L' Ecuyer, A.B. Owen, Springer, 2009.

[13c] A. Beskos and A.M. Stuart. *Computational complexity of Metropolis-Hastings methods in high dimensions*. Appears in Monte Carlo and Quasi-Monte Carlo Methods 2008, Editors P. L' Ecuyer, A.B. Owen, Springer, 2009.

[12c] A. Beskos and A.M. Stuart. *MCMC methods for sampling function space.* Appears in ICIAM Invited Lectures 2007, Editors R. Jeltsch and G. Wanner, European Mathematical Society, 2008.

[11c] M. Hairer, A.M.Stuart and J. Voss. *Sampling conditioned diffusions.* Appears in "Trends in Stochastic Analysis", Editors J. Blath, P. Mörters and M. Sceutzow. LMS Lecture Notes 353, Cambridge University Press, (2008).

[10c] G.A. Pavliotis, A.M. Stuart and L. Band, *Monte Carlo studies of effective diffusivities for inertial particles.* Appears in *Monte Carlo and Quasi-Monte Carlo Methods 2004*, H. Niederreiter and D. Talay, Eds, Springer-Verlag Berlin, Heidelberg 2006, pp. 431–441.

[9c] A.R. Humphries and A.M. Stuart, *Numerical Analysis of Deterministic and Random Dynamical Systems*. Appears in *Modern Methods in Scientific Computing and Applications*, Anne Bourlioux and Martin J. Gander, Eds, Kluwer, NATO Science Ser. II, vol. 75.

[8c] H. Sigurgeirsson and A.M. Stuart *Statistics from computations*. Appears in *Foundations of Computational Mathematics*, Editors R.A. DeVore, A. Iserles and E. Suli.

[7c] H. Lamba and A.M. Stuart *Convergence proofs for numerical software*. Appears in "Dynamics of Algorithms", editors R. de la Llave, L. Petzold and J. Lorenz, IMA Volumes in Mathematics and its Applications, #188, Springer, 1999.

[6c] A.M. Stuart *Convergence and stability in the numerical approximation of dynamical systems*. Appears in "State of the Art in Numerical Analysis 1996", editors I.A. Duff and G.A. Watson, Oxford University Press, 1997.

[5c] A.M. Stuart *Perturbation Theory for Infinite Dimensional Dynamical Systems*. Appears in "Advances in Numerical Analysis", editor M. Ainsworth, J. Levesley, M. Marletta and W.A. Light, Oxford University Press, Oxford, 1995, 105 pages.

[4c] A.M. Stuart *Numerical Analysis of Dynamical Systems*. Acta Numerica 1994, Cambridge University Press, Cambridge, 1994, pages 467–572.

[3c] A.R. Humphries, D.A. Jones and A.M. Stuart *Approximation of dissipative partial differential equations over long time intervals*. Appears in: "Numerical Analysis", editors G.A.Watson and D.F. Griffiths, Longman 1994.

[2c] A.M.Stuart *The global attractor under discretisation.* Appears in *Continuation and Bifurcation: Numerical Techniques and Applications,* Eds: D. Roose, B. de Dier and A. Spence. NATO ASI Series, Kluwer, Dordecht, 1990.

[1c] A.M.Stuart *The Mathematics of Porous Medium Combustion.* Appears in *Nonlinear Diffusion Equations and Their Equilibrium States* Eds W.-M. Ni and J.Serrin. Springer, New York, 1988.

TO APPEAR/SUBMITTED

Preprints available online here:
`http://stuart.caltech.edu/publications/preprints.html`

Invited Lectures

PLENARY LECTURES

- **Biennial Numerical Analysis Conference, Dundee, Scotland; June 29th– July 2nd 1993**. *"Approximation of Dissipative Partial Differential Equations Over Long Time Intervals"*.
- **Canadian Applied Mathematics Society Meeting, St. John's, Newfoundland; May 31st– June 3rd 1995**. *"Deterministic and Probabilistic Analysis of Adaptive Algorithms for Initial-Value Problems"*.
- **The State of the Art in Numerical Analysis, University of York, England; April 1st–6th 1996**. *"Convergence and Stability in the Numerical Analysis of Dynamical Systems"*.
- **Australia-New Zealand Applied Mathematicis Annual Meeting, Melbourne, Australia; February 2nd–7th 1997.** *"Computational Aspects of Deterministic and Random Dynamical Systems"*.
- **SIAM Annual Meeting, Stanford, July 14th–18th 1997.** *"Numerical Algorithms as Dynamical Systems"*.
- **SciCADE 97, Scientific Computing and Differential Equations, University of Trieste; September 15th–19th 1997**. *" Statistical Properties of Computations for Large Coupled Systems of Oscillators"*.
- **Foundations of Computational Mathematics, Oxford, July 19th–28th 1999**. "Statistics and Computations".
- **IMACS World Congress, Lausanne, August 21st–25th 2000**. "Coupled Particle-Field Problems: Analysis and Computation."
- **British Applied Mathematics Colloqium, Reading, April 2nd 2001**. "Particles in a Turbulent Velocity Field: A Random Dynamical System."
- **Biennial Numerical Analysis Conference, Dundee, Scotland; June 2001**. "Particles in a Random Velocity Field".
- **SciCADE 2003, Norway; July 2003**. "Fitting SDEs to Partially Observed Dynamics".
- **First East Asia SIAM Conference**, Hong Kong, December 12th–16th 2005. "Stochastic PDEs, Data Assimilation and Signal Processing".
- **ICFD Conference on Numerical Methods for Fluid Dynamics**, Reading, March 26th–29th 2007. "Ensemble Data Assimilation".
- **ICIAM07: 6th International Congress on Industrial and Applied Mathematics**, Zurich, July 16–20th 2007. "MCMC Methods for Sampling Function Space: Applications and Algorithms".
- **MCQMC08: Eighth International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing**, Montreal, July 8–11th 2008. "MCMC in High Dimensions".
- **ICNAAM 2009**, Rethymnon, Crete, September 18–22, 2009. "Approximation of Inverse Problems."
- **DSPDEs'10: Emerging Topics in Dynamical Systems and Partial Differential Equations**, Barcelona, May 31-June 4, 2010. "Well-Posed Inverse Problems".
- **Meeting of the Dutch Probability and Statistics Community**, Lunteren. November 15 – 17, 2010. Two lectures on the "Bayesian Approach to Inverse Problems".
- **ENUMATH 2011, Leicester**. September 5–6, 2011. "Filtering the Navier-Stokes Equation".
- **Frontiers of Computational and Applied Mathematics**, BICMR Beijing, October 21–25, 2011. "Filtering the Navier-Stokes Equation".

- **ESF-JSPS Mathematics for Innovation: Large and Complex Systems**, Tokyo, February 28th–March 4th, 2012. "Bayesian Inverse Problems."
- **European Congress of Mathematics, Krakow, July 2nd–6th, 2012.** "Probing Probability Measures in High Dimensions".
- **ICNAAM 2012**, Kos, Greece, September 19–25, 2012. "Analysis of Ensemble Kalman methods for inverse problems."
- **SciCADE 2013**, Valladolid, Spain; September 2013. "Computational Methods for Bayesian Inverse Problems".
- **SIAM UQ**, Savannah, Georgia, USA; March 31st–April 3rd 2014. "Uncertainty Quantification in Bayesian Inversion".
- **ICM 2014**, Seoul, South Korea; August 19th 2014. "The Bayesian Approach To Inverse Problems".
- **ICCP9**, International Conference on Computational Physics, NUS Singapore, 7th–11th January 2015. "Well-Posed Bayesian Geometric Inverse Problems".
- **SIAM Dynamical Systems**, Snowbird, Utah, USA; May 17th–21st 2015. "Data Assimilation: New Challenges in Stochastic Dynamical Systems".
- **EQUADIFF**, Lyon, France; July 6th–July 10th 2015. "Data Assimilation: New Challenges in Stochastic Dynamical Systems".
- **Stochastic Processes and Applications**, Oxford, UK; July 13th–July 17th 2015. "Data Assimilation: New Challenges in High Dimensional Probability."
- **European Mathematical Society 25th Anniversary Meeting**, Paris, France; October 22nd 2015.
- **International Conference on Applied Mathematics 2016**, City University of Hong Kong, May 30th–June 2nd 2016.
- **CliMathNet Conference 2016**, Exeter University, July 5th–8th 2016.
- **Fifth International Symposium on Data Assimilation**, Reading University, July 18th–22nd 2016.
- **MCQMC2016**, Stanford, California, August 14th–19th 2016.
- **Applied Inverse Problems**, Hangzhou, China, May 29th–June 2nd 2017.
- **Strathclyde Numerical Analysis Meeting**. Glasgow, Scotland, June 27th–30th 2017.
- **FOCM 2017**. Barcelona, Spain, July 10th–14th 2017.
- **14th US National Congress on Computational Mechanics**. Montreal, Canada, July 17th–20th 2017.
- **BayesComp Inaugural Conference**. Barcelona, Spain, March 25th–28th 2018.

INVITED CONFERENCE/WORKSHOP PRESENTATIONS

- **LMS/SERC Symposium on Evolution Problems, University of Durham, England; July 1st–July 14th 1992.** *"Numerical Analysis of Dissipative and Gradient Dynamical Systems"*.
- **Canadian Applied Mathematics Society Meeting, York, Ontario; May 31st– June 3rd 1993**. *"Long Time Approximation Theory for Evolution Equations"*.
- **Symposium in Honour of Leslie Fox, Oxford, England; June 24th–June 25th 1993**. *"Analysis and Computations for a Model of Solid Phase Transitions"*.
- **NSF-CBMS Conference on Approximation Dynamics, Columbia, Missouri; June 1st–June 5th 1995**. *"Numerical Stability Issues in Long-Time Simulations."*
- **ODE to NODE, Norwegian Workshop on Future Directions in Numerical Solution of Ordinary Differential Equations; June 19th–22nd 1995**. *"Numerical Analysis and Dynamical Systems."*
- **Conference on Dynamical Numerical Analysis, Atlanta, Georgia; December 14th–16th 1995**. *"Software for Initial-Value Problems as a Discontinuous Dynamical System."*
- **Invariant Measures and Invariant Manifolds; Workshop on Ergodic Theory and Numerical Analysis of Dynamical Systems. Brakel, Germany, June 2nd–5th 1996.** *"Probabilistic Techniques in the Numerical Analysis of Dynamical Systems."*
- **Institute for Mathematics and Its Applications, Minnesota, Fall 1997**. Two lectures as part of the year long program in "Emerging Applications of Dynamical Systems".
- **South African Numerical Analysis Conference, Cape Town, April 15th–17th 1998**. Two presentations in "Computational Aspects of Stochastic Processes".
- **Meeting of the Dutch Numerical Analysis Community, Zeist, September 23th–25th 1998**. Two presentations in "Computational Aspects of Stochastic Processes".
- **Dynamics Days, Georgia Institute of Technology, January 4th-6th 1999**. "Computational Statistical Mechanics".
- **Workshop on Transfer Operators, Paderborn, March 5th–8th 2000**. "Ergodicity of Degenerate SDEs."
- **Workshop on Dynamical Systems, Fields Institute, Toronto, Canada; December 2–7th 2001**. "Particles in a Random Velocity Field".
- **Workshop on Differential Equations and Applications, Instanbul Technical University, Turkey; September 18–20 2002**. "Inertial Particles: Analysis and Algorithms."
- **Workshop on Multi-scale Modelling, SAMSI, North Carolina; February 2nd–7th**. "Inertial Particles: Analysis and Algorithms."
- **Workshop on Stochastic PDEs, Princeton IAS; March 3rd–7th 2003**. "White Noise Limits for Inertial Particles."
- **Conference on SDEs and SPDEs, ICMS, Edinburgh; March 31st – April 4th 2003**. "Fitting SDEs to Partially Observed Dynamics".
- **Markov Chains: Theory, Algorithms and Applications, Durham, UK**. July 25th–August 3rd 2003. "Ergodicity of SDEs and Approximation".
- **Isaac Newton Institute, Workshop on Computation in Granular and Particle Laden Flows.** October 15th, 2003. "Algorithms for Inertial Particles".

- **Stochastic PDEs and Applications, Trento, Italy**. January 7-10, 2004. "Nonlinear Stochastic PDEs Arising in Filtering".
- **Algorithms for Macromolecular Modelling IV, Lecicester, August 18–21st 2004. "Fitting SDEs to Molecular Dynamics"**
- **Raglan Dynamical Systems Meeting, New Zealand,** August 31st–September 3rd 2004. Two lectures on "Variable Reduction in Stochastic Systems".
- **Dave Sloan Retirement Meeting**, Strathclyde, Glasgow, September 9th-10th 2004. "Stochastic PDEs and Conditional Path Sampling".
- **Future Challenges in Multiscale Modelling and Simulation**, IMA Minnesota, November 18th–20th 2004. "Conditional Path Samplings of SDEs and the Langevin MCMC Method".
- **Prestissimo Workshop on Molecular Dynamics**, Institute Henri Poincare, December 1st–3rd 2004. "Infinite Dimensional Sampling".
- **Mathematical Issues and Challenges in Data Assimilation for Geophysical Systems: Interdisciplinary Perspectives,** IPAM, UCLA, February 22nd–26th, 2004. "Lagrangian Data Assimilation and Infinite Dimensional Sampling".
- **Qualitative Numerical Analysis of High-dimensional Nonlinear Systems,** Bristol University, March 21st–24th 2005. "Extracting Macroscopic Dynamics: Model Problems and Algorithms."
- **BIRS Workshop on Molecular Dynamics**, Banff, Alberta, Canada, June 5th-9th 2005. "Infinite dimensional MCMC methods".
- **Computational SDEs**, Bedlewo, Poland, September 9th–24th 2005. "Stochastic PDEs for Path Sampling".
- **Parameter Estimation in Continuous Time**, Edinburgh, Scotland, December 3rd-7th 2005. "Bayesian Sampling for Conditioned Diffusions".
- **Frankfurt Stochastik-Tage**, Frankfurt, Germany, March 14th-17th 2006. "Stochastic PDEs for Sampling Conditioned Diffusions".
- **Sandy Davie 60th Birthday Conference**, Edinburgh, Scotland, March 24th 2006. "MCMC in Infinite Dimensions".
- **Stochastic Analysis and Stochastic PDEs**, Giorgi Center, Pisa, April 3rd-8th 2006. "MCMC in Infinite Dimensions".
- **The Mathematics of Data Assimilation**, Warwick University, May 22-24th 2006. "Path sampling and data assimilation."
- **New Developments in MCMC - Diffusions, Images and Other Challenges**, Warwick, August 22-24, 2006. "Sampling Conditioned Diffusions".
- **Stochastic Complex Systems**, Bath, England, September 18th-20th 2006. "MCMC in High Dimensional Spaces".
- **Analysis, Modeling and Simulation of Multiscale Problems**, Munich, October 9-11, 2006. "Parameter Estimation for Multiscale Diffusions".
- **Advances and Challenges in the Solution of Stochastic Partial Differential Equations**, Brown University, October 20–22, 2006.

- **Numerics and Theory for Stochastic Evolution Equations**, Bielefeld, November 22nd–24th 2006. "MCMC Methods for Sampling Conditioned Diffusions."
- **SIAM UK/IE Annual Meeting**, Oxford, January 5th 2007. "MCMC Methods in High Dimensions."
- **Stanford 50: State of the Art and Future Directions of Computational Mathematics and Numerical Computing**, Stanford, March 29th–31st 2007. "MCMC in Infinite Dimensions."
- **MSRI Berkeley, Mathematical Issues in Stochastic Approaches for Multiscale Modeling**, May 21st-25th 2007. "Computational Complexity of MCMC Methods in High Dimensions."
- **SIAM Conference on Dynamical Systems**, Snowbird, UTAH. May 27th–June 1st 2007. "Sampling the Posterior for Partially Observed Dynamics."
- **Isaac Newton Workshop on Effective Computational Methods for Highly Oscillatory Problems: The Interplay between Mathematical Theory and Applications**, Cambridge, July 2nd–7th 2007.
- **Hausdorff Centre, Workshop on Stochastic Processes and Algorithms**, Bonn, September 3rd–7th 2007.
- **Monte Carlo Methods: Theory and Applications**. Brown University, Rhode Island, USA, April 25th–26th 2008. "Data Assimilation: Mathematical Foundations and Effective Algorithms".
- **Numerical Modelling of Complex Dynamical Systems**. Lorentz Center, Leiden, Netherlands, May 6th–9th 2008. "Inverse Problems for the Navier-Stokes Equation".
- **Stochastic Analysis, Random Fields and Applications**. Ascona, Switzerland, May 19th–23rd 2008. "Mathematical Foundations of Data Assimilation".
- **Workshop on Ensemble Kalman Filter for Reservoir Simulation Models**. Voss, Norway, June 18th–20th 2008. "Data Assimilation: Mathematical Foundations and Effective Algorithms".
- **Mathematical challenges in climate science**. Lorentz Center, Leiden, Netherlands, March 9th–13th 2009. "A Mathematical Framework For Data Assimilation".
- **Peter Kloeden 60th Birthday Conference**. Sevilla, Spain, June 22nd–26th 2009. "A Mathematical Framework For Data Assimilation".
- **SAMSI Program on Stochastic Dynamics**. Research Triangle Park North Carolina, August 30 - September 2, 2009. Two talks: "MCMC in High Dimensions" and "Approximation of Inverse Problems."
- **Sparse Representation of Multiscale Data and Images: Theory and Applications**. Nanyang University, Singapore, December 14 – December 17, 2009. "Well-Posed Bayesian Inverse Problems"
- **Newton Institute: SPDE Opening Workshop**, "SPDE Limits of MCMC Methods". January 4–8, 2010.
- **ICMS Workshop on Uncertainty Quantification**, Edinburgh, May 24–28, 2010. "Bayesian Approach to an Elliptic Inverse Problem from Groundwater Flow."
- **Newton Institute: Approximation of SPDEs**, "Hybrid Monte Carlo on Hilbert Spaces". June 28–July 2, 2010.
- **Scottish Computational Mathematics Symposium 2010 (Dave Griffiths Retirement Meeting)**, "Hybrid Monte Carlo: geometric integration and statistics". September 6, 2010.
- **European Science Foundation conference on Highly Oscillatory Problems: From Theory to Applications**. INI Cambridge, September 12–17, 2010. "Hybrid Monte Carlo on Hilbert Spaces".

- **NASPDE 2010**, Freiberg, September 20-21, 2010. "Weak approximation of an elliptic inverse problem".
- **BIRS Workshop on Stochastic Multiscale Methods**, Banff, Alberta, Canada, March 27th-April 1st 2011. "Bayesian Approach to Inverse Problems".
- **FoCM 2011, Workshop on Computational PDEs**. Budapest, July 12-14, 2011. "Diffusion Limits for MCMC in High Dimensions".
- **LMS-EPSRC Durham Symposium: Data Assimilation**, August 2–14 2011. Two lectures on "Filtering in Data Assimilation."
- **Fudan University, Workshop on Statistical Inverse Modelling**. Shanghai, September 5th–9th, 2011. "Filtering The Navier-Stokes Equation" and "MCMC in High Dimensions".
- **Brown University, Workshop on Geometric Methods for Infinite Dimensional Dynamical Systems**. November 4th–6th, 2011. "Filtering The Navier-Stokes Equation".
- **Warwick Symposium/Easter Probability Meeting**. Warwick, March 26th–30th, 2012. "Bayesian posterior consistency for linear inverse problems."
- **SIAM Conference on Uncertainty Quantification**. Raliegh, North Carolina, April 2nd–5th, 2012. "Bayesian Inversion."
- **SUSTAIN Workshop on Confronting Statistical Intractability**. Bristol, April 16th–19th, 2012. "Bayesian posterior consistency for linear inverse problems."
- **ICMS Edinburgh: Advances in MCMC**. Edinburgh, April 21st–23rd, 2012. "MCMC in High Dimensions".
- **Fudan University, Workshop on Stochastic and Statistical Modelling of Turbulent Dynamical Systems**. Shanghai, May 22nd–27th, 2012. "How does EnKF Work?" and "How does 3DVAR Work?".
- **Oxford University, Workshop on Data Assimilation**. Oxford, September 24th-28th, 2012. "Ensemble Kalman Methods for Inverse Problems."
- **IMA, Minnesota, Workshop on Theory and Applications of Stochastic PDEs**. Minneapolis, January 14-18, 2013. "The Continuous-Time 3DVAR Filter for the Navier-Stokes Equation."
- **ICES, UT Austin, Workshop on Multiscale Modeling**. Austin, April 28th–May 1st, 2013. "Approximate Gaussian Filters for High Dimensional Problems".
- **Haussdorff Center, Bonn, Workshop on Uncertainty Quantification**. May 13th–17th 2013. "Well-posedness and accuracy for approximate Gaussian filters."
- **SciCADE 2013**. Valladolid, Spain, September 16th–20th 2013. "Gibbs sampling for hierarchical Bayesian inverse problems".
- **German Probability and Statistics Meeting**, March 4th–6th 2014, Ulm, Germany. "Approximation of probability measures with respect to Kullback-Leibler divergence."
- **Monte Carlo Inference for Complex Statistical Models**, Isaac Newton Institute, Cambridge, April 22nd–25th 2014. "The Filtering Distribution For Partially Observed Chaotic Dynamical Systems".
- **Multiscale Problems from Physics, Biology and Materials Science** Shanghai Jiaotong University, May 28th–31st 2014. "The Filtering Distribution For Partially Observed Chaotic Dynamical Systems."

- **Chemniz Symposium on Inverse Problems**, Chemniz, Germany, September 18th–19th 2014. "Bayesian Geometric Inverse Problems."
- **Workshop on Data Assimilation**, Fudan University, Shanghai. March 23rd–26th 2015. "Long-time asymptotics of the filtering distribution for partially observed chaotic dynamical systems."
- **Workshop on Uncertainty Quantification for Multiscale Stochastic Systems and Applications**, IPAM, UCLA, USA. January 19th–22nd 2016. "Hierarchical Bayesian Level Set Inversion."
- **Workshop on Challenges in High-Dimensional Analysis and Computation**, San Servolo, Venice, Italy. May 2nd–6th 2016. "Importance sampling: computational complexity and intrinsic dimension."
- **Workshop Celebrating the work of JB Keller**, Stanford, May 19th–20th 2017.
- **Worhshop on Machine Learning**, CMU, March 14th–17th 2017.
- **Workshop on Uncertainty Quantification**, Cambridge University, June 19th–23rd 2017.
- **Workshop on Inverse Problems**, Rice University, Houston, January 23rd–26th 2018.
- **Workshop on UQ for Inverse Problems in Complex Systems**, Cambridge University, April 9th–13th 2018.

INVITED TRAINING SCHOOL LECTURE SERIES

- VI^{th} **Science and Engineering Research Council Summer School in Numerical Analysis, University of Leicester, England; July 18th–July 29th 1994**. "Numerical Analysis of Dynamical Systems".
- **Seminaire de Mathematiques Superieures, Montreal, July 8th–22nd 2001**. "Numerical Analysis of Deterministic and Random Dynamical Systems."
- **Séminaire Europeéens de Statistique**, La Manga, Spain, May 5th–12th 2007. "Applications of Stochastic Differential Equations".
- **MSRI Berkeley**, April 2nd-5th 2007. "An Introduction to Multiscale Methods."
- **LMS-EPSRC Short Course**, April 15th-20th 2007. Warwick University. "An Introduction to Multiscale Methods."
- **LMS-EPSRC Durham Symposium: Numerical Analysis of Multiscale Problems**, July 5–15 2010. Series of lectures on "Multiscale modelling and inverse problems."
- **CEA-EDR-Inria Schools: Simulation of hybrid dynamical systems and applications to molecular dynamics, IHP Paris**, September 27th–30th 2010. Lectures on "MCMC in High Dimensions".
- **LMS-EPSRC Short Course on Probability**, Oxford, April 3rd–8th 2011. Series of five lectures on "Bayesian approach to inverse problems".
- **LMS-EPSRC Durham Symposium: Mathematics of Data Assimilation**, August 1st–1th 2011. Two lectures on "Filtering Infinite Dimensional Dynamical Systems."
- **Göttingen (Statistics Department)** May 29th–May 31st 2012. Six hours of lectures on "Bayesian Inverse Problems".
- **Beijing (School of Mathematical Sciences)** July 23rd–August 3rd 2012. Ten lectures on "Bayesian Inverse Problems"; ten lectures on "Data Assimilation".
- **ETH (Seminar for Applied Mathematics** October 2012. Six hours of lectures on "Bayesian Inverse Problems".

- **CSCAMM, University of Maryland** June 3rd–14th 2013. Three hours of lectures on "Analysis of Approximate Gaussian Filters for Data Assimilation."
- **Woudschoten, Netherlands**. October 2nd–4th 2013. "The Bayesian Approach to Inverse Problems: Mathematical Foundations and Algorithms."
- **KAUST, Saudi Arabia** February 16th–20th 2014. Six hours of lectures on "Data Assimilation".
- **Fudan University, China** January 12th–15th 2015. Ten hours of lectures on "Uncertainty Quantification".
- **RWTH Aachen, Germany**. February 11th 2015. Short course on "Bayesian Inverse Problems".
- **University of Valladolid**. June 10th–12th 2015. Short course on "MCMC Methods".
- **Chinese Academy Of Sciences, Beijing**. August 7th 2015. Short course on "Uncertainty Quantification".
- **Oberwolfach, Germany** May 16th–20th 2016. Six hours of lectures on "Data Assimilation".

Research Supervision

0.1 Postdoctoral Research Assistants

• Fengshan Bai. Postdoc. Bath University, 3/91–12/93 (jointly supervised with Alastair Spence). (Currently a permanent faculty member in Applied Mathematics at Tsinghua University, Beijing).
• Harbir Lamba. Postdoc. Stanford University, 9/96–8/98. (Currently a permament faculty member in Mathematics at George Mason University).
• Ping Lin. Postdoc. Stanford University, 9/96–8/98. (Currently a permament faculty member in Mathematics at The University of Dundee, Scotland).
• Justin Wan. Postdoc. Stanford University, 9/96–8/98 (jointly supervised with Gene Golub). (Currently a permament faculty member in Computer Science at The University of Waterloo, Canada).
• John Terry. Postdoc. Warwick University, 4/00-11/01. (Currently a permanent faculty member at the University of Exeter).
• Xinyu He. Postdoc. Warwick University, 4/00-11/01. (Currently a visitor at Warwick University).
• Petter Wiberg. Postdoc. Warwick University, 10/02-9/04. (Currently at Goldman-Sachs).
• Greg Pavliotis. Postdoc. Warwick University, 10/02-9/04. (Currently a permanent faculty member at Imperial College).
• Jochen Voss. Postdoc. Warwick University, 10/04–3/09. (Currently a permanent faculty member at Leeds University).
• Alex Beskos. Postdoc. Warwick University, 10/05–9/08.) (Currently a permanent faculty member at University College London).
• Natesh Pillai. Postdoc. Warwick University (Statistics), 10/08–9/10 (jointly supervised with Gareth Roberts.) (Currently a tenure-track faculty member at Harvard University).
• Masoumeh Dashti. Postdoc. Warwick University, 10/08–9/11. (Currently a permanent faculty member at the University of Sussex).
• David White. Postdoc. Warwick University, 10/09–3/12. (Currently a software engineer).
• Wongjung Lee. Postdoc. Warwick University, 10/09–12/11 and 1/14–12/14. (Currently a permanent faculty member at Hong Kong City University).
• Kody Law. Postdoc. Warwick University, 02/10–present. (Currently working at Oak Ridge National Laboratory, USA).
• Marco Iglesias. Postdoc. Warwick University, 9/11–10/13. (Currently a permanent faculty member at the University of Nottingham).
• David Kelly. Postdoc. Warwick University, 9/12–10/13. (Currently an Instructor at Courant Institute, NYU).
• Michela Ottobre. Postdoc. Warwick University, 10/12–9/13. (Currently a permanent faculty member at the Heriot-Watt University).
• Kasia Wolny. Postdoc. Warwick University, 10/13–10/14. (Currently a postdoc at Warwick University in Statistics).
• Hamid Bazargan. Postdoc. Warwick University, 10/13–12/14. (Currently consulting in the oil industry).
• Sergios Agapiou. Postdoc. Warwick University, 10/13–present. (Currently a permanent faculty member at the University of Cyprus, 08/15).
• Claudia Shillings. Postdoc. Warwick University, 09/14–present.
• Aretha Teckentrup. Postdoc. Warwick University, 09/14–present.
• Patrick Conrad. Postdoc. Warwick University, 09/14–present.
• Shiwei Lan. Postdoc. Warwick University/Caltech, 08/14–07/18.
• Matt Dunlop. Postdoc. Caltech, 08/16–07/18.
• Susana Gomes. Postdoc. Imperial College, 04/17–09/18.
• Bamdad Hosseini. Postdoc. Caltech, 1/18–09/20.

0.2 Research Students

• Gabriel Lord. PhD. Bath University, 9/90–5/94. (Currently a permanent faculty member in the Mathematics Department at Heriot-Watt University).

• Anthony Humphries. PhD. Bath University, 9/90–2/94. (Currently a permanent faculty member in the Mathematics Department at McGill University).
• Jeremy Smith. PhD. Stanford University, 9/92–6/96. (Currently employed in a software company in Portland, Oregon).
• Hamid Samandari. PhD. Stanford University, 9/92–4/97. (Currently employed by McKinsey in Montreal).
• Tony Shardlow. PhD. Stanford University, 9/93–6/97. (Currently a permanent faculty member in the Mathematics Department at Bath University).
• Oscar Gonzalez. PhD. Stanford University, 9/94–3/96. *Formerly Juan Simo's student*. (Currently a permanent faculty member in the Mathematics Department at UT Austin).
• Martin Gander. PhD. Stanford University, 9/95–9/97. (Currently a permanent faculty member in the Mathematics Department at The University of Geneva).
• Hersir Sigurgeirsson. PhD. Stanford University, 1/98–10/01. (Currently employed at Saga Capital, Rekyajivik).
• Paul Tupper. PhD. Stanford University, 1/98–present. (Currently a permanent faculty member in the Mathematics Department at Simon Fraser University).
• Yvo Pokern. PhD. Warwick University, 9/02–8/06. (Currently a permanent faculty member in the Statistics Department at University College London). 1/07–12/09).
• Kostas Zygalakis. PhD. Warwick University, 9/04–11/08. (Jointly supervised with Greg Pavliotis). (Currently a permanent faculty member in the Mathematics Department at The University of Edinburgh).
• David White. PhD. Warwick University, 10/05-9/09. (Currently working for an optimization software company in Cambridge, UK.).
• Simon Cotter. PhD. Warwick University, 10/06–4/10. (Currently an assistant professor at Manchester University).
• Mike Zhang. PhD. Warwick University, 10/06–9/10. (Jointly supervised with Tessy Papavasiliou). (Currently employed by the IMF, Washington DC.)
• Damon Macdougall. PhD. Warwick University, 10/08–present. (Jointly supervised with Chris Jones). (Currently a research Scientist, ICES, AT Austin.)
• Sebastian Vollmer. PhD. Warwick University, 10/09–9/13. (Jointly supervised with Martin Hairer). (Currently an associate professor at Warwick University).
• Andrew Duncan. PhD. Warwick University, 10/09–9/13. (Jointly supervised with Charlie Elliott). (Currently a postdoc at Imperial College).
• Sergios Agapiou. PhD. Warwick University, 10/09–9/13. (Jointly supervised with Neil O'Connell). (Currently a permanent faculty member at the University of Cyprus, 08/15).
• Alex Theiry. PhD. Warwick University, 10/09–9/13. resent. (Jointly supervised with Gareth Roberts). (Currently a permanent faculty member at National University, Singapore).
• Kui Lin. PhD. Fudan University, 01/13–present. (Visting student at Warwick, supervised by Shuai Lu in Fudan. Now a quantitivae analyst, China.)
• Abhishek Shukla. PhD. Warwick University, 10/11–present. (Jointly supervised with Gareth Roberts).
• Daniel Sanz-Alonso. PhD. Warwick University, 10/12–present. (Jointly supervised with Gareth Roberts). (Currently permanent faculty member, Statistics, University of Chicago).
• Matt Dunlop. PhD. Warwick University, 10/13–present. (Jointly supervised with Marco Iglesias). (Postdoc, Computing and Mathematical Sciences, Caltech, from August 2016).
• Yulong Lu. PhD. Warwick University, 10/13–present. (Jointly supervised with Hendrik Weber).
• Neil Chada. PhD. Warwick University. (Jointly supervised with Jonathan Carter, EoN, and Mike Christie, Heriot-Watt, and Charlie Elliott, Aretha Teckentrup and Claudia Schillings, Warwick). 10/14–present.
• Nikola Kovachki. PhD. Caltech. 9/16–present.
• Matt Levine. PhD. Caltech. 9/18–present.
• Andrew Peplow. MSc. Math University, 10/89-9/90. (Permanent faculty member at UWE).
• Bjarki Elfarsson. MSc. Warwick University, 10/04-9/05. (Studying for a PhD).
• Billy Donnegan. MPhil. Warwick University, 9/01–present. (Working for a software company).