

Matt Dunlop | Curriculum Vitae

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Education

- 2013–2016 **PhD Mathematics and Statistics**, *University of Warwick*, UK.
Title: Analysis and Computation for Bayesian Inverse Problems.
Supervisors: Prof. Andrew Stuart and Dr. Marco Iglesias.
- 2012–2013 **MSc Mathematics and Statistics**, *University of Warwick*, UK.
Dissertation title: On the support of diffusion processes with irregular drift coefficients.
Supervisor: Prof. Xue-Mei Li.
Grade: Distinction.
- 2008–2012 **MMath Mathematics**, *University of Warwick*, UK.
Dissertation title: Malliavin calculus and applications.
Supervisor: Prof. Xue-Mei Li.
Grade: First class honours.

Professional Experience

- 2019– **Postdoctoral Associate**, *New York University*, New York, USA.
Courant Institute of Mathematical Sciences.
Supervisor: Prof. Georg Stadler.
- 2018–2019 **Postdoctoral Researcher**, *University of Helsinki*, Helsinki, Finland.
Department of Mathematics and Statistics.
Supervisor: Dr. Tapio Helin.
- 2016–2018 **Postdoctoral Scholar**, *California Institute of Technology*, Pasadena, USA.
Department of Computational and Mathematical Sciences.
Supervisor: Prof. Andrew Stuart.

Research Papers

Published & Submitted

- [14] C. Li, M. M. Dunlop, G. Stadler “Bayesian neural network priors for edge-preserving inversion.” *Inverse Problems and Imaging* (2022) *Online First*.
- [13] M. M. Dunlop, G. Stadler. “A gradient-free subspace-adjusting ensemble sampler for infinite-dimensional Bayesian inverse problems.” *Submitted* (2021).
- [12] M. M. Dunlop, Y. Yang. “Stability of Gibbs Posteriors from the Wasserstein loss for Bayesian full-waveform inversion.” *SIAM/ASA Journal on Uncertainty Quantification* **9** 4 (2021) 1499-1526.
- [11] M. M. Dunlop, Y. Yang. “New likelihood functions and level-set prior for Bayesian full-waveform inversion.” *SEG Technical Program Expanded Abstracts 2020* (2020) 825-829.
- [10] M. M. Dunlop, T. Helin, A. M. Stuart. “Hyperparameter estimation in Bayesian MAP estimation: parameterizations and consistency.” *SMAI Journal of Computational Mathematics* **6** (2020) 69-100.

- [9] O. R. A. Dunbar, M. M. Dunlop, C. M. Elliott, V. Ha Hoang, A. M. Stuart. "Reconciling Bayesian and perimeter regularization for binary inversion." *SIAM Journal on Scientific Computing* **42** 4 (2020) A1984-A2013.
- [8] M. M. Dunlop, D. Slepčev, A. M. Stuart, M. Thorpe. "Large data and zero noise limits of graph-based semi-supervised learning algorithms." *Applied and Computational Harmonic Analysis* **49** 2 (2020) 655-697.
- [7] M. M. Dunlop. "Multiplicative noise in Bayesian inverse problems: Well-posedness and consistency of MAP estimators." *Submitted* (2019).
- [6] V. Chen, M. M. Dunlop, O. Papaspiliopoulos, A. M. Stuart. "Robust MCMC sampling with non-Gaussian and hierarchical priors in high dimensions." *Submitted* (2018).
- [5] M. M. Dunlop, M. Girolami, A. M. Stuart, A. L. Teckentrup. "How deep are deep Gaussian processes?" *Journal of Machine Learning Research* **19** 54 (2018) 1-46.
- [4] D. Calvetti, M. M. Dunlop, E. Somersalo and A. M. Stuart. "Iterative updating of model error for Bayesian inversion." *Inverse Problems* **34** 2 (2017) 025008.
- [3] M. M. Dunlop, M. A. Iglesias, A. M. Stuart. "Hierarchical Bayesian level set inversion." *Statistics and Computing* **27** 6 (2017) 1555 - 1584.
- [2] M. M. Dunlop, A. M. Stuart. "The Bayesian formulation of EIT: analysis and algorithms." *Inverse Problems and Imaging* **4** 4 (2016) 1007 - 1036.
- [1] M. M. Dunlop, A. M. Stuart. "MAP estimators for piecewise continuous inversion." *Inverse Problems* **32** 10 (2016) 105003.

Supervision and Organization

- 2018 **Co-organizer** (with Kody Law) of the minisymposium "Data and UQ: Bayesian learning" at SIAM UQ 2018, Garden Grove, California, USA.
- 2017 **Co-supervisor** (with Andrew Stuart) of Victor Chen, undergraduate research student, California Institute of Technology.
- 2016 **Co-organizer** (with Marco Iglesias, Claudia Schillings and Aretha Teckentrup) of the minisymposium "Large-Scale PDE constrained Bayesian Inverse Problems" at SIAM UQ 2016, Lausanne, Switzerland.
- 2015 **President of Warwick SIAM student chapter.**
Duties included sourcing speakers for a seminar series, and co-organization of two small conferences.

Teaching Experience

- 2016–2018 **Teaching Assistant**, *California Institute of Technology*, Pasadena, USA.
Graduate course: Introduction to Linear Analysis with Applications.
- 2011–2016 **Undergraduate Supervisor**, *University of Warwick*, UK.
- 2014–2015 **Teaching Assistant**, *University of Warwick*, UK.
Third year course: Matrix Analysis and Algorithms.
Second year course: Analysis III.
First year course: Probability A & B.

Selected Presentations

- Mar 2021 **Virtual**, *SIAM CSE 2021*.
Minisymposium: Computational Techniques for Uncertainty Quantification in Large-scale Inverse Problems

- Aug 2019 **Alan Turing Institute, UK**, *Effective and Efficient Gaussian Processes*.
- July 2019 **Valencia, Spain**, *ICIAM 2019*.
Minisymposium: Inverse problems and stochastic PDEs
- Feb 2019 **New York University, USA**, *Numerical Analysis and Scientific Computing Seminar*.
- Aug 2018 **University of Oulu, Finland**, *Workshop on Computational Math and Data Science*.
- June 2018 **Bologna, Italy**, *SIAM IS 2018*.
Minisymposium: Discrete-to-continuum graphical methods for large-data clustering, classification and segmentation.
- May 2018 **INdAM, Italy**, *Reconstruction Methods in Inverse Problems*.
- Nov 2017 **Isaac Newton Institute, UK**, *Uncertainty quantification for complex systems: theory and methodologies*.
- Nov 2017 **University of Tennessee, Knoxville**, *Mathematical Data Science Seminar*.
- Nov 2017 **UCLA, California**, *Uncertainty Quantification for Stochastic Systems and Applications*.
- Sept 2017 **Erlangen, Germany**, *SIAM GS 2017*.
Minisymposium: Dynamics and data in stochastic systems, far from equilibrium.
- Aug 2017 **Lorentz Center, Netherlands**, *Bayesian and Nonlinear Inverse Problems*.
- May 2017 **Hangzhou, China**, *AIP 2017*.
Minisymposium 1: Bayesian inverse problems with non-Gaussian priors.
Minisymposium 2: Structure exploiting methods in large-scale Bayesian computation.
- Feb 2017 **Atlanta, Georgia**, *SIAM CSE 2017*.
Minisymposium: Efficient Algorithms for Bayesian Inverse Problems Governed by PDE Forward Problems.
- Aug 2016 **University of Helsinki, Finland**, *Inverse Problems Seminar*.
- July 2016 **Orlando, Florida**, *11th AIMS Conference on Dynamical Systems*.
Minisymposium 1: Uncertainty Quantification in Dynamical Systems.
Minisymposium 2: Uncertainty Quantification.
- June 2016 **Santiago de Compostela, Spain**, *ECMI 2016*.
Minisymposium: Stochastic Inverse Problems.
- April 2016 **Lausanne, Switzerland**, *SIAM UQ 2016*.
Minisymposium 1: Large-Scale PDE-constrained Bayesian Inverse Problems.
Minisymposium 2: Advances in Sampling Methods for Bayesian Inverse Problems.
- Nov 2015 **Stony Brook University, New York**, *Sensitivity, Error and UQ for Atomic, Plasma, and Material Data*.
- May 2015 **University of Reading, UK**, *SIAM National Student Chapter Conference 2015*.
- April 2015 **University of Cambridge, UK**, *4th CCA-MASDOC Student Conference*.
- Nov 2014 **University of Warwick, UK**, *Applied PDEs Seminar*.
- May 2014 **University of Warwick, UK**, *Reading-Warwick Data Assimilation Meeting*.

Computer skills

- Coding MATLAB, Mathematica, Python, C++, PHP, HTML, CSS, SQL, \LaTeX .
- Software Microsoft Office, Adobe Photoshop.

References

Available upon request.