

David R. Burt

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Employment

Massachusetts Institute of Technology 2022–Present
Postdoctoral Associate. Laboratory for Information and Decision Systems
Advisor: Tamara Broderick

Education

University of Cambridge 2018–2022
Ph.D. Engineering (Machine Learning Group)
Advisor: Carl Rasmussen
Thesis: Scalable Approximate Inference and Model Selection in Gaussian Process Regression

University of Cambridge 2017–2018
M.Phil. Engineering (Machine Learning, Speech and Language Technology)
Advisors: Mark van der Wilk and Carl Rasmussen
Pass with Distinction

Williams College 2013–2017
B.A. (Mathematics)
Summa cum laude (GPA in top 2% of graduating class)

In Preparation and Under Submission

* denotes equal contribution

David R. Burt, Renato Berlinghieri, and Tamara Broderick. [Wrong Model, Right Uncertainty: Spatial Associations for Discrete Data with Misspecification](#), 2025. Accepted at the NeurIPS AI4Science Workshop.

Renato Berlinghieri*, **David R. Burt***, Paolo Giani, Arlene M. Fiore, and Tamara Broderick. [Are Hourly PM_{2.5} Forecasts Sufficiently Accurate to Plan Your Day? Individual Decision Making in the Face of Increasing Wildfire Smoke](#), 2025.

Publications

* denotes equal contribution

David R. Burt*, Renato Berlinghieri*, Stephen Bates, and Tamara Broderick. [Smooth Sailing: Lipschitz-Driven Uncertainty Quantification for Spatial Associations](#). In *Neural Information Processing Systems (NeurIPS)*, 2025. *To appear*.

Jenny Y. Huang, **David R. Burt**, Yunyi Shen, Tin D. Nguyen, and Tamara Broderick. [Approximations to Worst-Case Data Dropping: Unmasking Failure Modes](#). *Transactions on Machine Learning Research (TMLR)*, 2025.

David R. Burt, Yunyi Shen, and Tamara Broderick. [Consistent Validation for Predictive Methods in Spatial Settings](#). In *Artificial Intelligence and Statistics (AISTATS)*, 2025.

Renato Berlinghieri, Brian L. Trippe, **David R. Burt**, Ryan Giordano, Kaushik Srinivasan, Tamay Özgökmen, Junfei Xia, and Tamara Broderick. [Gaussian Processes at the Helm\(holtz\): A More Fluid Model for Ocean Currents](#). In *International Conference on Machine Learning (ICML)*, 2023.

Alexander Terenin*, **David R. Burt***, Artem Artemev*, Seth Flaxman, Mark van der Wilk, Carl Edward Rasmussen, and Hong Ge. [Numerically Stable Sparse Gaussian Processes via Minimum Separation Using Cover Trees](#). *Journal of Machine Learning Research (JMLR)*, 2023.

Vidhi Lalchand, Wessel P. Bruinsma, **David R. Burt**, and Carl Edward Rasmussen. [Sparse Gaussian Process Hyperparameters: Optimize or Integrate?](#) In *Neural Information Processing Systems (NeurIPS)*, 2022.

Beau Coker*, Wessel P. Bruinsma*, **David R. Burt**, Weiwei Pan, and Finale Doshi-Velez. [Wide Mean-Field Bayesian Neural Networks Ignore the Data](#). In *Artificial Intelligence and Statistics (AISTATS)*, 2022.

Andrew Y.K. Foong*, Wessel Bruinsma*, **David R. Burt**, and Richard E. Turner. [How Tight Can PAC-Bayes be in the Small Data Regime?](#) In *Neural Information Processing Systems (NeurIPS)*, 2021.

Artem Artemev*, **David R. Burt**, and Mark van der Wilk. [Tighter Bounds on the Log Marginal Likelihood of Gaussian Process Regression Using Conjugate Gradients](#). In *International Conference on Machine Learning (ICML)*, 2021. (Oral, Top 3% of submissions).

David R. Burt, Carl Edward Rasmussen, and Mark van der Wilk. [Convergence of Sparse Variational Inference in Gaussian Processes Regression](#). *Journal of Machine Learning Research (JMLR)*, 2020. Extended version of *Rates of convergence for sparse variational Gaussian process regression*.

Andrew Y.K. Foong*, **David R. Burt**, Yingzhen Li, and Richard E. Turner. [On the Expressiveness of Approximate Inference in Bayesian Neural Networks](#). In *Neural Information Processing Systems (NeurIPS)*, 2020.

David Janz, **David R. Burt**, and Javier González. [Bandit Optimisation of Functions in the Matérn Kernel RKHS](#). In *Artificial Intelligence and Statistics (AISTATS)*, 2020.

David R. Burt, Carl Edward Rasmussen, and Mark van der Wilk. [Rates of Convergence for Sparse Variational Gaussian Process Regression](#). In *International Conference on Machine Learning (ICML)*, 2019. **Best Paper Award**.

Workshop Papers

* denotes equal contribution

David R. Burt, Artem Artemev*, and Mark van der Wilk. [Barely Biased Learning for Gaussian Process Regression](#). In *I (Still) Can't Believe It's Not Better! NeurIPS Workshop*, 2021.

David R. Burt, Sebastian W. Ober, Adrià Garriga-Alonso, and Mark van der Wilk. [Understanding Variational Inference in Function-Space](#). In *Symposium on Advances in Approximate Bayesian Inference*, 2020.

Andrew Y.K. Foong*, **David R. Burt**, Yingzhen Li, and Richard E. Turner. [Pathologies of Factorised Gaussian and MC Dropout Posteriors in Bayesian Neural Networks](#). In *Workshop on Bayesian Deep Learning, NeurIPS*, 2019. Extended to *On the expressiveness of approximate inference in Bayesian neural network*.

David R. Burt, Carl Edward Rasmussen, and Mark van der Wilk. [Explicit Rates of Convergence for Sparse Variational Inference in Gaussian Process Regression](#). In *Symposium on Advances in Approximate Bayesian Inference, NeurIPS*, 2018. Extended to *Rates of convergence for sparse variational Gaussian process regression*.

Other Research

Andrew Y.K. Foong, Wessel P. Bruinsma, and **David R. Burt**. [A Note on the Chernoff Bound for Random Variables in the Unit Interval](#), 2022.

David R. Burt, Carl Edward Rasmussen, and Mark van der Wilk. [Variational Orthogonal Features](#), 2020.

Awards	Neural Information Processing Systems (NeurIPS) top reviewer Awarded to $\approx 10\%$ of reviewers	2021, 2024
	EnviBayes Workshop on Complex Environmental Data early career travel award	2023
	Qualcomm Innovation Fellowship (Europe)	2020
	International Conference on Learning Representations (ICLR) highlighted reviewer Awarded to $\approx 10\%$ of reviewers	2022
	International Conference on Machine Learning (ICML) Best Paper Award 2 awards out of 744 accepted papers and 3424 total submissions	2019
	Advances in Approximate Bayesian Inference Travel Award	2018
	Dr. Herchel Smith Fellowship Awarded to graduating seniors at Williams College for graduate study at University of Cambridge	2017
	Rosenberg Prize for Excellence in Mathematics Awarded to one or several seniors at Williams College for excellence in mathematics	2017
	Barry M. Goldwater Scholarship	2016
	The Erastus C. Benedict, Class of 1821, Prize in Mathematics Williams College prize for outstanding sophomores in mathematics	2015
Teaching	University of Cambridge <i>Undergraduate Supervisor, Dept. of Engineering</i> 3F3: Statistical Signal Processing 3F8: Inference	Fall 2019 Winter 2020, Winter 2021
	Williams College <i>Teaching Assistant, Dept. of Mathematics and Statistics</i> Math 341: Probability	Spring 2015, Spring 2017
Invited Talks	<i>Quantifying Uncertainty in Spatial Associations under Simultaneous Model Misspecification and Irregular Sampling</i> Royal Statistical Society International Conference, Edinburgh, UK Sept. 2025	
	<i>Consistent Validation for Predictive Methods in Spatial Settings</i> University of Oxford—Dept. of Statistics, Oxford, UK Feb. 2024	
	<i>University of Cambridge—CBL, Dept. of Engineering, Cambridge, UK Feb. 2024</i>	
	<i>Gaussian Processes at the Helm(holtz)</i> Virtual Seminar Series on Bayesian Decision-making and Uncertainty Apr. 2023	
	<i>Understanding Approximate Inference in Bayesian Neural Networks: A Joint Talk</i> University of Oxford—OATML Research Group, Virtual Mar. 2021	

Contributed Talks	<i>Can Individuals Use Smoke Forecasts for Personal Decision-Making? A Call to Action</i> NASA HAQAST Public Meeting, Cambridge, MA, USA	June 2024
	<i>Consistent Predictive Validation of Bayesian Spatial Models Under Infill Asymptotics</i> BAYSM, Venice, Italy	July 2024
	<i>Tighter Bounds on the Log Marginal Likelihood of Gaussian Process Regression Using Conjugate Gradients</i> ICML, Oral presentation, Virtual	July 2021
	<i>Rates of Convergence for Sparse Variational Gaussian Process Regression</i> ICML, Best paper award presentation, Long Beach, CA, USA	June 2019
	<i>Explicit Rates of Convergence for Sparse Variational Inference in Gaussian Process Regression</i> Advances in Approximate Bayesian Inference, Montreal, QC, CA	Dec. 2018
Press Coverage of Research	MIT News, Validation Technique Could Help Scientists Make More Accurate Forecasts	2025
	MIT News, A Better Way to Study Ocean Currents	2023
Reviewing	2025: AISTATS, ICML, NeurIPS; 2024: ICML, NeurIPS (<i>top reviewer</i>); 2023: Advances in Approximate Bayesian Inference, ICLR, TMLR, JMLR; 2022: ICLR (<i>highlighted reviewer</i>), NeurIPS, TMLR, JMLR; 2021: AISTATS; NeurIPS (<i>outstanding reviewer</i>), JMLR; 2020: I Can't Believe It's Not Better! NeurIPS Workshop.	
Other Service	Student Math and Statistics Advisory Board, Williams College	2017