

VIDHI LALCHAND

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Broad Institute of MIT and Harvard; Massachusetts Institute of Technology

EDUCATION

University of Cambridge, UK 2024

Ph.D. Probabilistic Machine Learning

Thesis title: On Hierarchical Gaussian Processes [↗](#)

Supervisors: Prof. Carl E. Rasmussen [↗](#), Prof. Neil D. Lawrence [↗](#)

Research Focus: Gaussian Processes, Kernel Engineering, Latent Variable Models, Generative Models.

M.Phil. Scientific Computing (Distinction) 2017

Department of Physics

Research Focus: Algorithms for rare event classification from the CERN Large Hadron Collider datasets.

London School of Economics & Political Science, UK 2011

M.Sc. Applied Mathematics (Distinction)

Supervisor: Prof. Norman Biggs [↗](#)

Research Focus: Cryptographic hash functions.

B.Sc. Mathematics & Economics (First Class Honors)

Notes: University of London, External System

APPOINTMENTS

Imperial College London Sept 2026

Incoming Chapman Fellow in Statistics

Broad Institute of MIT & Harvard; Massachusetts Institute of Technology Oct 2023 - Sept 2026

Eric & Wendy Schmidt Postdoctoral Fellow [↗](#)

PI: Prof. Caroline Uhler

- Research focus: Probabilistic Generative Models, Geometric techniques for understanding latent spaces. Applications: De novo generation of small molecules for therapeutics.

University of Cambridge

Dept. of Computer Science

Feb 2022 - Oct 2023

Research Assistant, PI: Prof. Neil D. Lawrence [↗](#)

- Research Focus: Scalable probabilistic algorithms for dimensionality reduction.

AFFILIATIONS

Massachusetts Institute of Technology (MIT)

Kavli Institute for Astrophysics and Space Research

since March 2023

Host: Prof. Anna-Christina Eilers [↗](#)

- Research focus: Development of scalable unsupervised probabilistic latent variable models for generative modelling of quasar spectra and simultaneous black-hole mass estimation.

FELLOWSHIPS & AWARDS

G-Research PhD Thesis prize (U. of Cambridge), Runner-up 2023

Eric & Wendy Schmidt Center Postdoctoral Fellowship 2023-Current

NeurIPS Scholar Award (WiML) 2019, 2022, 2023

Qualcomm Innovation Fellowship (European Cohort) 2020-2021

Turing Doctoral Fellowship, The Alan Turing Institute, UK 2017-2020

University of London Award for Academic Excellence 2009

(Given to 3 external students worldwide out of ≈ 55000)

INDUSTRY

Adjunct Research Consulting

IMU Biosciences (Series A startup) — London, UK June 2025

Bespoke generative modelling for multi-modal biomedical data such as the UK Biobank, cancer immunotherapy datasets and drug delivery platforms.

Sixfold Biosciences (Series B startup) — London, UK

June 2023 - Oct 2024

Full-time

Citadel Securities, LLC — London, UK

Quantitative Strategies Group

Aug 2014 - Sep 2016

Non-Compete (Sep 2015 - Sep 2016)

- Proprietary high-frequency algorithmic trading for pan-European equities stock exchanges.

Credit Suisse Securities (Europe) Limited — London, UK

Quantitative Research (Electronic FX and Options)

June 2012 - July 2014

- Developed statistical models for automated two-way FX market making engines.

UBS, London

Quantitative Associate Internship Programme

June 2011 - Sept 2011

PUBLICATIONS

Conferences & Workshops

18. **Vidhi Lalchand**, Anna-Christina Eilers. *Shared Stochastic Gaussian Process Latent Variable Models: A Multi-modal Generative Model for Quasar Spectra* [↗](#). Transactions on Machine Learning Research (**TMLR**), Jan 2025. [Probabilistic Methods, Generative Models, Astronomy]
17. Leiv Rønneberg, **Vidhi Lalchand**. *Scalable Permutation Invariant Multi-Output Gaussian Processes for Cancer Drug Response* [↗](#). **NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty**, Vancouver, 2024. [Probabilistic Methods, Kernel Design, ML for Medicine]
16. **Vidhi Lalchand**, Dave Lines, Neil D. Lawrence. *Recurrent VAE with Gaussian Process Decoders for De novo Molecular Generation*. **ICML Workshop on Next Generation of Sequence Modeling Architectures**, 2024, Vienna, Austria. [Generative Models, Drug Discovery]
15. Sarah Zhao, Aditya Ravuri, **Vidhi Lalchand**, Neil D. Lawrence. *Scalable Amortized GPLVMs for Single Cell Transcriptomics Data* [↗](#). **ICLR Machine Learning for Genomics Explorations Workshop**, Vienna, 2024. [Generative Models, Computational Biology]
14. **Vidhi Lalchand**, Aditya Ravuri, Neil D. Lawrence. *Generalised GPLVM with Stochastic Variational Inference* [↗](#). International Conference on Artificial Intelligence and Statistics (**AISTATS**), 2023. [Probabilistic Methods, Generative Models]
13. Aditya Ravuri, Francisco Vargas, **Vidhi Lalchand**, Neil D. Lawrence [↗](#). *Dimensionality Reduction as Probabilistic Inference*. 5th Symposium on Advances in Approximate Bayesian Inference (**AABI**), 2023. [Probabilistic Methods, Dimensionality Reduction]
12. **Vidhi Lalchand**, Anna-Christina Eilers. *Shared Stochastic Gaussian Process Decoders: A Probabilistic Generative Model for Quasar Spectra* [↗](#). 2nd **ICML Workshop on Machine Learning for Astrophysics**, Hawaii, 2023. [Probabilistic Methods, Generative Models, Astronomy]
11. **Vidhi Lalchand**, Wessel Bruinsma, David R. Burt, Carl E. Rasmussen. *Sparse Gaussian Process Hyperparameters: Optimise or Integrate?* [↗](#). Advances in Neural Information Processing Systems (**NeurIPS**), New Orleans, 2022. [Probabilistic Methods, Sparse Inference]
10. **Vidhi Lalchand***, Aditya Ravuri*, Emma Dann*, Natsuhiko Kumasaka, Dinithi Sumanaweera, Rik G. H. Lindeboom, Shaista Madad, Neil D. Lawrence, Sarah A. Teichmann. *Modelling Technical and Biological Effects in single-cell RNA-seq data with Scalable Gaussian Process Latent Variable Models (GPLVM)* [↗](#). Machine Learning in Computational Biology (**MLCB**), 2022. [Computational Biology, Probabilistic Methods]
9. **Vidhi Lalchand**, Kenza Tazi, Talay M. Cheema, Richard E. Turner, Scott Hosking. *Kernel Learning for Explainable Climate Science* [↗](#). 16th Bayesian Modelling Applications Workshop, Uncertainty in Artificial Intelligence (**UAI**), 2022, Eindhoven, Netherlands. [Applied Probabilistic Methods, Kernel Learning]
8. Fergus Simpson*, **Vidhi Lalchand***, Carl E. Rasmussen. *Marginalised Gaussian Processes with Nested Sampling* [↗](#). Advances in Neural Information Processing Systems (**NeurIPS**), 2021. [Probabilistic Methods, Sampling]
7. Fergus Simpson, Ian Davies, **Vidhi Lalchand**, Alessandro Vuollo, Nicolas Durrande, Carl E. Rasmussen. *KITT: Kernel Identification Through Transformers* [↗](#). Advances in Neural Information Processing Systems (**NeurIPS**), 2021. [Probabilistic Methods, Deep Learning, Kernel Learning]
6. Ryan-Rhys Griffiths, Alexander A. Aldrick, Miguel Garcia-Ortegon, **Vidhi R. Lalchand**, Alpha A. Lee. *Achieving Robustness to Aleatoric Uncertainty with Heteroscedastic Bayesian Optimisation* [↗](#). Machine Learning: Science and Technology (**MLST**), 2021. [Probabilistic Methods, Active Learning]

5. A. Hanuka, X. Huang, J. Shtalenkova, D. Kennedy, A. Edelen, Z. Zhang, **Lalchand V. R.**, D. Ratner, J. Duris. *Physics model-informed Gaussian process for online optimization of particle accelerators* [↗](#). Physical Review Accelerators and Beams, 24(7):072802, 2021. [Probabilistic Methods, Particle Physics]
4. **Vidhi Lalchand** and Carl E. Rasmussen. *Approximate Inference for Fully Bayesian Gaussian Process Regression* [↗](#). In Proceedings of the 2nd Symposium on Advances in Approximate Bayesian Inference, volume 118 of Proceedings of Machine Learning Research (**PMLR**), pages 1–12, 2020. [Probabilistic Methods, Bayesian Techniques]
3. **Vidhi Lalchand**, Aditya Ravuri, Neil D. Lawrence. *Gaussian Process Latent Variable Flows for Massively Missing Data* [↗](#). 3rd Symposium on Advances in Approximate Bayesian Inference (**AABI**), 2020. [Probabilistic Methods, Missing Data]
2. **V. R. Lalchand**. *Extracting more from Boosted Decision Trees: A High Energy Physics case study* [↗](#). 2nd Workshop on Machine Learning and the Physical Sciences (**NeurIPS**), Vancouver, 2019. [Frequentist Methods, Particle Physics]
1. **V. R. Lalchand**, A. C. Faul. *A Fast and Greedy Subset-of-Data (SoD) Scheme for Sparsification in Gaussian Processes* [↗](#). 38th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science & Engineering (MaxEnt), 2018. [Probabilistic Methods, Sparse Inference]

Manuscripts under Review

1. Chi-Jen Roger Lo, **Vidhi Lalchand**, Carl Edward Rasmussen, Joan Lasenby. *Sparsifying Bayesian Gaussian Processes: Reversible Jumps and Automatic Occam’s Razor Revisited*. (Under review at NeurIPS, Sydney, 2026). [Probabilistic Methods, Gaussian Processes, Sparse Inference]

Working manuscripts

1. **Vidhi Lalchand**, Dave Lines, Caroline Uhler. 2026. *Warped Latent Spaces and Traversal in Deep Chemical Generative Models*. [Generative Models, Drug Discovery]
2. Sana Tonekaboni, **Vidhi Lalchand**, Kumail Alhamoud, Marzyeh Ghassemi. 2026. *Measuring Representation Uncertainty in Self-Supervised Embedding Models*. [Representation Learning, Uncertainty Quantification, Self-Supervised Learning]
3. **Vidhi Lalchand**, Leiv Rønneberg. 2026. *Modelling Cancer Drug-pair Synergy Surfaces using Gaussian Processes and Drug Embeddings*. [Probabilistic Methods, ML for Medicine]
4. **Vidhi Lalchand**, Caroline Uhler. 2026. *Conditioning Mechanisms in Deep Generative Models: A Review across Methods, Architectures and Applications*. [Deep Learning, Generative Models]

ACADEMIC SERVICE

- Reviewer for ICLR (2025), JMLR (2023, 2024), ICML (2022, top 10%; 2026, Silver Reviewer), AISTATS (2022, 2023), NeurIPS (2021, 2022, 2023, 2025), Advances in Approximate Bayesian Inference Symposium (2023).
- Reviewer for Broad Institute Summer School programme for high-school students. Feb 2025
- Member of the Organising Committee for the *Machine Learning for Drug Discovery Symposium* at the Broad Institute. Nov 2026
- Co-organized the *Mathematics of Data-driven & Mechanistic Modelling* workshop at the Mathematisches Forschungsinstitut Oberwolfach (MFO), Germany. June 2023
- Co-organised [Machine Learning Winter School for Scientists](#) at the University of Cambridge. Feb 2021
- Organised a department-wide conference at the Dept. of Engineering at the University of Cambridge. Sept 2020

TEACHING AND MENTORSHIP

2024	MIT Undergraduate Research Opportunities Program Jue Gong, Candidate for Bachelor of Science in Physics and in Computer Science Khizer Shahid, Candidate for Bachelor of Science in Computer Science and Mathematics
2022-23	Part III Computer Science / M.Phil. Advanced Computer Science (Research Supervision): Kushagr Ahuja (Distinction) Sarah Zhao (Distinction)
2022	Supervised 40+ undergraduates for 3F8: Inference (Part II, Engineering Tripos)
2021	TA for Module 4F13: Probabilistic Machine Learning (MPhil, Department of Engineering)

MEDIA

YouTube podcast on AI Research (link).	2025
Cambridge University: Women in STEM Interview (link)	2019
The Cambridge Union: Immigrant Identities Panel.	2022
Twitter: @VRLalchand	

INVITED TALKS

MIT EECS, Cambridge, USA <i>Warped Latent Spaces for Chemical Deep Generative Models</i>	2025
Stanford University, USA <i>Probabilistic Latent Variable Models for Astronomy</i>	2025
Princeton University, USA <i>Chemical Generative Models for De Novo Drug Design</i>	2025
University of Cambridge, UK <i>Generative Models for Astronomy</i>	2025
University of Oxford, UK <i>Gaussian Processes, Generative Models and Kernel Design</i>	2025
Broad Institute of MIT and Harvard, Cambridge, USA <i>Bayesian Optimisation in the Latent Space of Generative Models</i>	2024
Harvard School of Engineering and Applied Sciences, Cambridge, USA <i>Can we scale Gaussian process latent variable models to big data?</i>	2023
MIT Kavli Institute for Astrophysics, Cambridge, USA <i>Scalable Gaussian process latent variable models for Quasar Spectra reconstruction</i>	2023
High Performance Computing Seminar, Cambridge, UK <i>Machine Learning & Modern Science</i>	2022
UAI 16th Bayesian Modelling Applications Workshop, Netherlands <i>Kernel learning for Interpretable Climate Science</i>	2022
21st Cambridge PyData Meet-up, Cambridge, UK <i>Modelling with Gaussian Processes</i> (link)	2020
Jump Trading, London <i>Advances in Gaussian Processes</i>	2019
ML Meets Particle Physics Workshop, Weizmann Institute, Israel <i>Hierarchical Probabilistic Mixture Models for density estimation in HEP</i>	2019
Cavendish Laboratory Graduate Conference, University of Cambridge <i>Bayesian Machine Learning in High Energy Physics</i>	2018
38th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science & Engineering <i>A progressive framework for Gaussian Process Regression</i>	2018
CogX 2018, Research Stage <i>Deconstructing Gaussian Processes.</i> (link)	2018