

# VADEN MASRANI

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## EDUCATION

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PhD, Machine Learning, University of British Columbia January 2018 - May 2023  
MSc, Computer Science, University of British Columbia Sept 2015 - December 2017  
BSc, Combined Physics/Computer Science, University of British Columbia Sept 2010 - May 2014

## RESEARCH EXPERIENCE

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CEO, Sophia Consulting January 1st, 2025 - Current  
<https://www.sophiaconsulting.ai/>

Senior Research Scientist May 2023 - January 1st, 2025  
Huawei Technologies Canada

- Three patents, two papers
- <https://arxiv.org/abs/2412.12563>
- <https://arxiv.org/abs/2403.19754>
- **Keywords:** ChatGPT, large language models, artificial intelligence, huggingface, ollama, watermarking

PLAI Lab, Probabilistic Programming January 2018 – May 2023  
Supervisor: Frank Wood

- **Doctorate in generative models and artificial intelligence**, with a focus on variational autoencoders, large language models, and diffusion models.
- Thesis: <https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0430543>
- **Keywords:** variational inference, computer vision, probabilistic programming, deep generative models

Data Scientist, Think Tank Team April 2018 – September 2018  
Samsung Research America, Mountain View, CA

- <https://thinktankteam.info/>
- **Implemented end-to-end parallelized data pipeline** capable of processing > 100m rows of data
- Wrote deep models in Keras and TensorFlow, trained on GPU's, optimized hyperparameters, performed model selection.
- Was granted award for "exceptional contributions" and flown to Korea to meet members of Global Think Tank Team
- **Keywords:** End-to-end pipeline, big data, deep learning, signal processing, feature selection, supervised learning
- **Tools:** Python, Kera, Tensorflow, Pandas

RIKEN, Approximate Bayesian Inference April 2017 – October 2017  
Supervisor: Emtiyaz Khan

- **Variational Inference for Linear Dynamical Systems** with non-Gaussian likelihoods
- **Developed Kalman Filter Toolkit in Python** with filtering, smoothing, and parameter learning w/ EM
- **Keywords:** Bayesian inference, graphical models, time series models, variational inference, optimization, autograd, tensorflow
- **Tools:** Python, Matlab, Autograd, Scipy, Numpy, Seaborn

UBC LCI Lab, Laboratory for Computational Intelligence January 2016 – April 2017  
Supervisor: Giuseppe Carenini

- **Developed a model to predict Alzheimer's Disease from speech samples** which became my masters thesis
- **Developed system to perform extractive summarization of partial email threads** using graph-based centrality metrics and topic segmentation
- **Keywords:** natural language processing, topic modeling, summarization, medical applications, signal processing
- **Tools:** Python, NLTK, Scikit-Learn, Pandas

UBC SPL Lab, Software Practices Lab September 2014 – September 2015  
Supervisor: Gail Murphy

- **Data visualization using D3 + Django** to visualize relationships between Issues in General Motors' internal database
- **Keywords:** data visualization, frontend/backend development

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- **Tools:** Javascript, D3, Django, Python

UBC ATLAS Experiment, Particle Physics

May 2013 – September 2014

Supervisor: Colin Gay

- **Member of the Particle & Nuclear Physics** group searching for evidence of Beyond Standard Model physics (Supersymmetry)
- Trained random forests and multilayer perceptrons to detect rare particle decay using monte carlo data from the Large Hadron Collider
- **Keywords:** particle physics, deep learning, supervised learning
- **Tools:** C++ , ROOT

## PUBLICATIONS

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Vaden Masrani, Mohammad Akbari, David Ming Xuan Yue, Ahmad Rezaei, Yong Zhang, "**Task-Agnostic Language Model Watermarking via High Entropy Passthrough Layers**" Accepted by AAAI 2025. <https://arxiv.org/abs/2412.12563>

Mohsen Gholami, Mohammad Akbari, Cindy Hu, Vaden Masrani, Z. Jane Wang, Yong Zhang, "**GOLD: Generalized Knowledge Distillation via Out-of-Distribution-Guided Language Data Generation**" Accepted by NAACL 2024. <https://arxiv.org/abs/2403.19754>

Vaden Masrani "**Advancing Variational Inference via Thermodynamic Integration**" Ph.D Thesis, University of British Columbia (2023). <https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0430543>

Frank Wood, Andrew Warrington, Saied Naderiparizi, Christian Weilbach, Vaden Masrani, William Harvey, Adam Ścibior, Boyan Beronov, John Grefenstette, Duncan Campbell, and Ali S. Nasser, "**Planning as Inference in Epidemiological Dynamics Models**", Frontiers in Artificial Intelligence (2022). <https://www.frontiersin.org/articles/10.3389/frai.2021.550603/full>

Vaden Masrani\*, Rob Brekelmans\*, Thang Bui, Frank Nielsen, Aram Galstyan, Greg Ver Steeg, Frank Wood, "**q-Paths: Generalizing the Geometric Annealing Path using Power Means**" Uncertainty in Artificial Intelligence (2021). <https://arxiv.org/abs/2107.00745>

Rob Brekelmans\*, Vaden Masrani\*, Thang Bui, Frank Wood, Aram Galstyan, Greg Ver Steeg, Frank Nielsen, "**Annealed Importance Sampling with q-Paths**" NeurIPS Workshop on Deep Learning through Information Geometry (Best Paper Award) (2020). <https://arxiv.org/abs/2012.07823>

Vu Nguyen, Vaden Masrani, Rob Brekelmans, Michael A. Osborne, Frank Wood, "**Gaussian Process Bandit Optimization of the Thermodynamic Variational Objective**" Neural Information Processing Systems (2020). <https://arxiv.org/abs/2010.15750>

Rob Brekelmans\*, Vaden Masrani\*, Frank Wood, Greg Ver Steeg, Aram Galstyan, "**All in the Exponential Family: Bregman Duality in Thermodynamic Variational Inference**" International Conference on Machine Learning (2020). <https://arxiv.org/abs/2007.00642>

Peyman Bateni, Raghav Goyal, Vaden Masrani, Frank Wood, Leonid Sigal "**Improved Few-Shot Visual Classification.**" Conference on Computer Vision and Pattern Recognition (2020). <https://arxiv.org/pdf/1912.03432.pdf>

Vaden Masrani, Tuan Anh Le, Frank Wood "**The Thermodynamic Variational Objective.**" Neural Information Processing Systems (2019). <https://papers.nips.cc/paper/9328-the-thermodynamic-variational-objective.pdf>

Vaden Masrani, Gabriel Murray, Thalia Shoshana Field, Giuseppe Carenini "**Domain Adaptation for Detecting Mild Cognitive Impairment.**" Canadian Conference on Artificial Intelligence (2017). [https://link.springer.com/chapter/10.1007/978-3-319-57351-9\\_29](https://link.springer.com/chapter/10.1007/978-3-319-57351-9_29)

Vaden Masrani, Gabriel Murray, Thalia Shoshana Field, Giuseppe Carenini. "**Detecting Dementia through Retrospective Analysis of Routine Blog Posts by Bloggers with Dementia.**" BioNLP (2017). <http://www.aclweb.org/anthology/W17-2329>

Thalia Shoshana Field, Vaden Masrani, Gabriel Murray, Giuseppe Carenini. "**Improving Diagnostic Accuracy Of Alzheimer's Disease From Speech Analysis Using Markers Of Hemispatial Neglect.**" Alzheimer's & Dementia: The Journal of the Alzheimer's Association 13.7 (2017) [https://www.alzheimersanddementia.com/article/S1552-5260\(17\)32851-0/abstract](https://www.alzheimersanddementia.com/article/S1552-5260(17)32851-0/abstract)

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Jordan Johnson, Vaden Masrani, Giuseppe Carenini, Raymond Ng. "Generating and Evaluating Summaries for Partial Email Threads: Conversational Bayesian Surprise and Silver Standards." Proceedings of the 18th Annual SIGdial Meeting on Discourse and Dialogue. (2017). <http://aclweb.org/anthology/W17-5532>

Marc Palyart, Gail C. Murphy, Vaden Masrani. "A Study of Social Interactions in Open Source Component Use." IEEE Transactions on Software Engineering (2017). <https://ieeexplore.ieee.org/document/8049385/>

## CONSULTING

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### VodaSafe

February 2020 - Ongoing

<https://vodasafe.ca/>

- **Problem:** Develop an underwater sonar gun that can detect drowning swimmers up to 50
- **Solution:** Designed and built their core technology. Wrote an end-to-end machine learning pipeline going from raw sonar data to object localization on a 2D radial map using convo.

### Huge AI

January 1st, 2025 - Ongoing

<https://www.hugetech.ai>

- **Problem:** Existing AI assistants like ChatGPT are sandboxed and cannot interact with a user's local files, apps, or history.
- **Solution:** Leading development of a privacy-first, local-first AI assistant that runs entirely on-device and can perform complex file and task operations (e.g., summarizing podcasts, emailing summaries, file transfers).

### Animagic

July 1st, 2024 - Ongoing

<https://www.animagic.io/>

- **Problem:** Artists needed to draw 2D/3D characters repeatedly in multiple poses—a tedious bottleneck in game design.
- **Solution:** Designed an AI tool to generate consistent character poses from a base drawing, automating repetitive art tasks.

### Verify550

October 2024 – Ongoing

<https://verify550.com/>

- **Problem:** Client inherited a broken backend system and database from a former engineer, resulting in zero operational revenue.
- **Solution:** Reverse-engineered the stack without documentation, rebuilt backend infrastructure, and created AI agents for data cleaning. Developed an upload/clean/export interface for clients.

### Vybe Network

October 2021 - December 2022

<https://www.vybenetwork.com/>

- **Problem:** Client had >100B rows of Solana blockchain trade data but no effective way to present the information to users.
- **Solution:** Designed a novel network graph visualization that became a core product feature, allowing users to explore real-time on-chain analytics.
- **Demo:** <https://alpha.vybenetwork.com/network> .

### Legends of Learning

July 2021 – September 2021

<https://www.legendsoflearning.com/>

- **Problem:** Client needed to evaluate the effectiveness of K–12 educational games based on student performance.
- **Solution:** Built a method to score game efficacy using pre/post gameplay grade distributions. Developed a pandas pipeline for 250M+ rows and internal visualization tools to track results.

### CurbFlow

March 2020 – April 2020

<https://www.curbflow.com/>

- **Problem:** Existing camera deployments used fisheye lenses, making standard CV models ineffective due to **distortion**.
- **Solution:** Designed a custom fisheye lens calibration tool using supervised learning with annotated data. Implemented efficient sparse matrix code for real-time rectification.