

Alexander Alemi

424 Lakeshore Blvd
Kissimmee, FL 34741
Phone: 669-210-3866

email: alex.alemi@gmail.edu
URL: <http://alexalemi.com>
papers: [google scholar](#)
github: [alexalemi](#)

Current position

2018-present *Senior Research Scientist*, Google, Machine Perception

Previous experience

2016-2018 *Software Engineer*, Google, Mountain View, CA.
2015-2016 *Postdoc*, Disney Research, Boston
2009-2015 *Research Associate*, Laboratory of Atomic and Solid-State Physics (LASSP), Cornell
2015 *Research Intern*, Google, Mountain View, CA.
2014 *Research Intern*, Disney Research, Boston.

Areas of specialization

Approximate Bayesian Inference • Information Theory & Deep Learning • Representation Learning
• Physics • Machine Learning • Python Programming

Education

2015 PhD in Physics, Cornell with Jim Sethna
2013 MSc in Physics, Cornell
2009 BSc in Physics, California Institute of Technology (Caltech)

Publications

- 2023 AA Alemi, B Poole “Variational Prediction” Submitted to AABI
- 2022 Y Ruan, S Singh, WR Morningstar, AA Alemi, S Ioffe, I Fischer, JV Dillon “Weighted Ensemble Self-Supervised Learning” *ICLR 2023*, arXiv:2211.09981
- Y Du, D Ho, AA Alemi, E Jang, M Khansari “Bayesian Imitation Learning for End-to-End Mobile Manipulation” *ICML 2022*, arXiv:2202.07600
- 2021 I Korshunova, D Stutz, AA Alemi, O Wiles, S Goyal “A Closer Look at the Adversarial Robustness of Information Bottleneck Models” *ICML 2021 AML Workshop Poster*, arXiv:2107.05712
- S Stanton, P Izmailov, P Kirichenko, AA Alemi, AG Wilson “Does Knowledge Distillation Really Work?” *NeurIPS2021*, arXiv:2106.05945
- 2020 AA Alemi, WR Morningstar, B Poole, I Fischer, JV Dillon “VIB is Half Bayes”, *AABI 2021 Oral*, arXiv:2011.08711
- WR Morningstar, AA Alemi, JV Dillon “PAC^m-Bayes: Narrowing the Empirical Risk Gap in the Misspecified Bayesian Region” *AISTATS2022*, arXiv:2021.09629
- WR Morningstar, C Ham, AG Gallagher, B Lakshminarayanan, AA Alemi, JV Dillon “Density of States Estimation for Out-of-Distribution Detection”, *AISTATS 2022 Oral*, arXiv:2006.09273
- DS Karls, M Bierbaum, AA Alemi, RS Elliot, JP Sethna, EB Tadmor “The OpenKIM Processing Pipeline: A Cloud-Based Automatic Materials Property Computation Engine”, *ChemPhys* arXiv:2002.05380
- I Fischer, AA Alemi “CEB Improves Model Robustness”, arXiv:2002.05380
- 2019 R Novak, L Xiao, J Hron, J Lee, AA Alemi, J Sohl-Dickstein, SS Schoenholz “Neural Tangents: Fast and Easy Infinite Neural Networks in Python”, *ICLR 2020* arXiv:1912.02803
- AA Alemi “Variational Predictive Information Bottleneck”, arXiv:1910.10831
- R Shwartz-Ziv, AA Alemi “Information in Infinite Ensembles of Infinitely-Wide Networks”, *AABI* arXiv:1911.09189
- Z Dong, D Oktay, B Poole, AA Alemi “On Predictive Information in RNNs”, arXiv:1910.09578
- T Conte, E DeBenedictis, N Ganesh, T Hylton, JP Strachan, RS Williams, AA Alemi, L Altenberg, G Crooks, J Crutchfield, L del Rio, J Deutsch, M DeWeese, K Douglas, M Esposito, M Frank, R Fry, P Harsha, M Hill, C Kello, J Krichmar, S Kumar, SC Liu, S Lloyd, M Marsili, I Nemenman, A Nugent, N Packard, D Randall, P Sadowski, N Santhanam, R Shaw, A Stieg, E Stopnitzky, C Teuscher, C Watkins, D Wolpert, J Yang, Y Yufik, “Thermodynamic Computing”, *CCC* arXiv:1911.01968
- B Seybold, E Fertig, A Alemi, I Fischer, “Dueling Decoders: Regularizing Variational Autoencoder Latent Spaces”, arXiv:1905.07478
- I Fischer, A Alemi, JV Dillon, TFP Team, “Variational Autoencoders with Tensorflow Probability Layers”, *Tensorflow Blog*

- B Poole, S Ozair, A van den Oord, AA Alemi, G Tucker, "On Variational Bounds of Mutual Information", *ICML 2019* arXiv:1905.06922
- CB Clement, M Bierbaum, KP O’Keeffe, AA Alemi, "On the Use of ArXiv as a Dataset", *ICLR 2019 workshop RLGM* arXiv:1905.00075
- 2018 AA Alemi, JV Dillon, I Fischer, "Uncertainty in the Variational Information Bottleneck", *UAI 2018 workshop on Uncertainty in Deep Learning, contributed oral* arXiv:1807.00906
- AA Alemi, I Fischer, "TherML: Thermodynamics of Machine Learning", *ICML 2018 Workshop, contributed oral*.
- AA Alemi, I Fischer, "GILBO: One Metric to Measure Them All", *NIPS 2018 Spotlight* arXiv:1802.04874
- JV Dillon, I Langmore, D Tran, E Brevdo, S Vasudevan, D Moore, B Patton, A Alemi, M Hoffman, RA Saurous, "TensorFlow Distributions", *arXiv:1711.10604*
- S Abu-El-Haija, B Perozzi, R Al-Rfou, A Alemi, "Watch your step: Learning graph embeddings through attention", *NIPS 2018 Poster* arXiv:1710.09599
- AA Alemi, B Poole, I Fischer, JV Dillon, RA Saurous, K Murphy, "Fixing a Broken ELBO", *Oral ICML 2018* arXiv:1711.00464
- 2017 LX Hayden, AA Alemi, PH Ginparg, JP Sethna, "Jeffrey’s prior sampling of deep sigmoidal networks", *arXiv: 1705.10589*
- K Fragkiadaki, J Huang, A Alemi, S Vijayanarasimhan, S Ricco, R Sukthankar, "Motion Prediction Under Multimodality with Conditional Stochastic Networks" *arXiv: 1705.02082*
- M Bierbaum, BD Leahy, AA Alemi, I Cohen, JP Sethna, "Light Microscopy at Maximal Prediction", *PRX 7 (4), 041007*, arXiv: 1702.07336
- C Szegedy, S Ioffe, V Vanhoucke, AA Alemi, "Inception-v4, Inception-ResNet and the Impact of Residual Connections on Learning." *AAAI, 4278-4284*, arXiv: 1602.07261
- AA Alemi, I Fischer, JV Dillon, KP Murphy, "Deep Variational Information Bottleneck", *ICLR 2017*, arXiv: 1612.00410
- B Poole, AA Alemi, J Sohl-Dickstein, A Angelova, "Improved generator objectives for GANS" *NIPS GAN Workshop 2016*, arXiv: 1612.02780
- 2016 R Shin, AA Alemi, G Irving, O Vinyals, "Tree-Structured Variational Autoencoder" *ICLR 2017 Submission*
- G Irving, C Szegedy, AA Alemi, N EEn, F Chollet, J Urban, "Deepmath-deep sequence models for premise selection". *NIPS 2016*, arXiv: 1606.04442
- 2015 CJM Mathy, F Gonda, D Schmidt, N Derbinsky, AA Alemi, J Bento, FM Delle Fave, JS Yedidia, "SPARTA: Fast global planning of collision-avoiding robot trajectories". *Learning, Inference and*

Control of Multi-Agent Systems Workshop, NIPS 2015

AA Alemi, “Zombies Reading Segmented Graphic Articles on the ArXiv”. PhD Thesis, Cornell University

JM Cashore, X Zhao, AA Alemi, Y Liu, PI Frazier, “Clustering via Content-Augmented Stochastic Blockmodels”. arXiv: 1505.06538

LX Hayden, R Chachra, AA Alemi, PH Ginsparg, JP Sethna, “Canonical Sectors and Evolution of Firms in the US Stock Markets”. arXiv: 1503.06205. Submitted to PLoS one.

AA Alemi, P Ginsparg, “Text Segmentation Based on Semantic Word Embeddings”, arXiv: 1503.05543

AA Alemi, M Bierbaum, CR Myers, JP Sethna, “You Can Run, You Can Hide: The Epidemiology and Statistical Mechanics of Zombies”, arXiv: 1503.01104. Phys Rev E 92. 052801

2014 A Taloni, AA Alemi, E Ciusani, JP Sethna, S Zapperi, CAM La Porta, “Mechanical Properties of Growing Melanocytic Nevi and the Progression to Melanoma”, *PLoS one*, 9 (4), e94229

2013 MM Baraldi, AA Alemi, JP Sethna, S Caracciolo, C La Porta, S Zapperi, “Growth and Form of Melanoma Cell Colonies”, *Journal of Statistical Mechanics: Theory and Experiment*, 2013, 02, p02032

PY Huang, S Kurasch, JS Alden, A Shekhawat, AA Alemi, PL McEuen, JP Sethna, UTE Kaiser, DA Muller, “Imaging Atomic Rearrangements in Two-Dimensional Silica Glass: Watching Silica’s Dance”, *Science* 342, 6155 p224-227

2011 RS Ottens, V Quetschke, S Wise, AA Alemi, R Lundoc, G Mueller, DH Reitze, DB Tanner, BF Whiting, “Near-field radiative heat transfer between macroscopic planar surfaces”, *Physical Review Letters* 107 (1), 014301

Talks

2023 *Inferential Engines* - Theoretical Physics for Machine Learning, Aspen

2022 *PAC^m Bayes* - Your Model is Wrong Workshop, NeurIPS 2021

2021 *Machine Learning and Thermodynamics* - Scientific Machine Learning Mini-Course (SciML) @ CMU
VIB is Half Bayes - Advances in Approximate Bayesian Inference Symposium

2020 *Machine Learning and Thermodynamics* - Informal Statistical Physics Seminar, University of Maryland

TherML - American Physical Society Topical Group on Data Science

Variational Predictive Information Bottleneck - Information Theory and Applications Workshop

2019 *A Case for Compression* - NeurIPS Workshop on Information Theory and Machine Learning

TherML - Machine Learning and Physics, Aspen

2018 *Focusing on the Representation* - Cornell AI Seminar

Thermodynamics and Machine Learning - Machine Learning and Statistical Physics Workshop at CUNY

Thermodynamics and Machine Learning - Chez Pierre Seminar at MIT

Thermodynamics and Machine Learning - Physics Seminar at Cornell

Panelist at Advances in Approximate Bayesian Inference Symposium, colocated at NeurIPS.

Fixing a Broken ELBO - ICML

Uncertainty in VIB - UAI UDL Workshop

- 2015 *The Statistical Mechanics of Zombies* - APS March Meeting
- 2014 *Finding Structure in the ArXiv* - APS March Meeting
- 2012 *A Group Theoretic Approach to Nonlinear and Gradient Elastic Terms for Graphene and Carbon Nanotubes* - APS March Meeting
- 2006 *Why Venus has No Moon* - AAS Meeting

Community Contributions

- 2021-present Action Editor at TMLR
- 2021 Area Chair, NeurIPS
- 2020 Co-organizer for NeurIPS Workshop: Deep Learning through Information Geometry
Program Committee for Uncertainty in Deep Learning Workshop at ICML
- 2017-2023 Regular reviewer for ICML, ICLR, NeurIPS, UAI, AABI, TMLR, JMLR

Grants, honors & awards

- 2021 Top Reviewer for UAI
Expert Reviewer for ICML
- 2019 Best Reviewer, ICML
- 2010 Stephen and Margery Russel Distinguished Teaching Award
- 2009 Upperclass Merit Award
- 2008 Upperclass Merit Award
- 2007 Green Memorial Prize
- 2005 National Merit Scholar - Siemen's Scholar

Teaching & Outreach

- 2023 Brainiversity - Introduction to Statistics through Randomization
- 2022 Brainiversity - Order of Magnitude Physics
- 2021 Brainiversity - Information Theory
- 2019 Guest Lecturer for CS 294-131: Trustworthy Deep Learning (Special Topics in Deep Learning), Berkeley
- 2018 Life outside Academia Talk to Cornell Graduate Students
- 2015 GRASSHOPR - Computing with Bins and Beans
- 2014 Expanding Your Horizons - The Physics of Bubbles
- 2013 Expanding Your Horizons - The Physics of Bubbles
- 2012 Expanding Your Horizons - The Physics of Bubbles
TA - Physics 2218 - Physics III: Thermodynamics, Statistical Mechanics and Wave Phenomenon
- 2011 Physics Department Teaching Assistant Training Coordinator
Expanding Your Horizons - The Physics of Bubbles
GRASSHOPR - ... And Physics for All
- 2010 Physics Department Teaching Assistant Training Trainer
grader - Physics 3317 - Applications of Quantum Mechanics
TA - Physics 2217 - Physics II: Electricity and Magnetism
- 2009 TA - Physics 2213 - Physics II: Heat/Electromagnetism

Last updated: April 20, 2023 • Typeset in Xe_lLa_TE_X

<http://cv.alexalemi.com>