

# Dustin Tran

Research Scientist  
Google Brain  
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## Education

Ph.D. Computer Science, Columbia University Advisors: David M. Blei, Andrew Gelman	2016–2020
Ph.D. Statistics, Harvard University (transferred) M.S. Computational Science & Engineering, Harvard University Advisor: Edoardo M. Airoldi	2014–2015
B.A. (Hon.) Mathematics, Statistics, University of California, Berkeley	2010–2014

## Employment

Research Scientist Google Brain	2018–
Research Intern Google	Oct 2017 – Jan 2018
Research Intern OpenAI	May 2017 – Oct 2017
Visiting Student Graduate School of Business, Stanford University Collaborators: Susan Athey, Matt Hoffman, Kevin Murphy	May 2016 – Aug 2016

## Awards

John M. Chambers Statistical Software Award (for Edward)	2018
Google Ph.D. Fellowship in Machine Learning (\$34,000 + tuition/fees)	2017–2020
Columbia SEAS Fellowship (Full funding)	2016–20
Adobe Research Fellowship (\$10,000)	2016
LinkedIn Economic Graph Challenge	2015
Harvard GSAS Fellowship (Full funding)	2015
Dorothea Klumpke Roberts Prize in Mathematics	2014
Regents' and Chancellor's Scholarship (Full funding)	2010–2014
Cal Alumni Leadership Scholarship (\$2,500)	2010

## Publications

### PREPRINTS

1. **D. Tran**, J. Liu, M. W. Dusenberry, D. Phan, M. Collier, J. Ren, K. Han, Z. Wang, Z. Mariet, H. Hu, N. Band, T. G. J. Rudner, K. Singhal, Z. Nado, J. van Amersfoort, A. Kirsch, R. Jenatton, N. Thain, H. Yuan, K. Buchanan, K. Murphy, D. Sculley, Y. Gal, Z. Ghahramani, J. Snoek, and B. Lakshminarayanan. Plex: Towards reliability using pretrained large model extensions. 2022.
2. J. Z. Liu, S. Padhy, J. Ren, Z. Lin, Y. Wen, G. Jerfel, Z. Nado, J. Snoek, **D. Tran**, and B. Lakshminarayanan. A simple approach to improve single-model deep uncertainty via distance-awareness. 2022.
3. Z. Nado, N. Band, M. Collier, J. Djolonga, M. W. Dusenberry, S. Farquhar, Q. Feng, A. Filos, M. Havasi, R. Jenatton, G. Jerfel, J. Liu, Z. Mariet, J. Nixon, S. Padhy, J. Ren, T. G. J. Rudner, F. Sbahi, Y. Wen, F. Wenzel, K. Murphy, D. Sculley, B. Lakshminarayanan, J. Snoek, Y. Gal, and **D. Tran**. Uncertainty baselines: Benchmarks for uncertainty & robustness in deep learning. 2021.
4. M. Mladenov, C.-W. Hsu, V. Jain, E. Ie, C. Colby, N. Mayoraz, H. Pham, **D. Tran**, I. Vendrov, and C. Boutilier. RecSim NG: Toward principled uncertainty modeling for recommender ecosystems. 2021.
5. J. Lee, **D. Tran**, O. Firat, and K. Cho. On the discrepancy between density estimation and sequence generation. 2020.
6. J. Nixon, M. W. Dusenberry, L. Zhang, G. Jerfel, and **D. Tran**. Measuring calibration in deep learning. 2018.
7. M. Hoffman, P. Sountsov, J. V. Dillon, I. Langmore, **D. Tran**, and S. Vasudevan. Neutra-lizing bad geometry in Hamiltonian Monte Carlo using neural transport. 2019.
8. **D. Tran**, Y. Burda, and I. Sutskever. Feature-matching auto-encoders. 2017.
9. J. Dillon, I. Langmore, **D. Tran**, E. Brevdo, S. Vasudevan, D. Moore, B. Patton, A. Alemi, M. Hoffman, and R. Saurous. TensorFlow Distributions. 2017.
10. **D. Tran**, A. Kucukelbir, A. B. Dieng, M. Rudolph, D. Liang, and D. M. Blei. Edward: A library for probabilistic modeling, inference, and criticism. 2016.
11. **D. Tran**, F. J. R. Ruiz, S. Athey, and D. M. Blei. Model criticism for Bayesian causal inference. 2016.
12. **D. Tran**, P. Toulis, and E. M. Airoldi. Stochastic gradient descent methods for estimation with large data sets. 2016.

### JOURNAL ARTICLES

13. E. Nalisnick, P. Smyth, and **D. Tran**. A brief tour of deep learning from a statistical perspective. *Annual Review of Statistics and Its Application (To Appear)*, 2022.
14. M. Havasi, J. Snoek, **D. Tran**, J. Gordon, and J. M. Hernández-Lobato. Sampling the variational posterior with local refinement. *Entropy*, 23(11):1475, 2021.

15. A. Vehtari, A. Gelman, T. Sivula, P. Jylanki, **D. Tran**, S. Sahai, P. Blomstedt, J. P. Cunningham, D. Schiminovich, and C. P. Robert. Expectation propagation as a way of life: A framework for Bayesian inference on partitioned data. *Journal of Machine Learning Research*, 21(17):1–53, 2020.
16. **D. Tran** and D. M. Blei. Comment, “Fast approximate inference for arbitrarily large semiparametric regression models via message passing”. *Journal of the American Statistical Association*, 112(517):156–158, 2017.
17. A. Kucukelbir, **D. Tran**, R. Ranganath, A. Gelman, and D. M. Blei. Automatic differentiation variational inference. *Journal of Machine Learning Research*, 18(14):1–45, 2017.

#### CONFERENCE ARTICLES

18. J. U. Allingham, F. Wenzel, Z. E. Mariet, B. Mustafa, J. Puigcerver, N. Houlsby, G. Jerfel, V. Fortuin, B. Lakshminarayanan, J. Snoek, and others. Sparse MoEs meet efficient ensembles. *Transactions on Machine Learning Research*, 2022.
19. V. Fortuin, M. Collier, F. Wenzel, J. Allingham, J. Liu, **D. Tran**, B. Lakshminarayanan, J. Berent, R. Jenatton, and E. Kokiopoulou. Deep classifiers with label noise modeling and distance awareness. *Transactions on Machine Learning Research*, 2022.
20. M. Minderer, J. Djolonga, R. Romijnders, F. Hubis, X. Zhai, N. Houlsby, **D. Tran**, and M. Lucic. Revisiting the calibration of modern neural networks. In *Neural Information Processing Systems*, 2021.
21. N. Band, T. G. J. Rudner, Q. Feng, A. Filos, Z. Nado, M. W. Dusenberry, G. Jerfel, **D. Tran**, and Y. Gal. Benchmarking Bayesian deep learning on diabetic retinopathy detection tasks. In *Neural Information Processing Systems*, 2021.
22. A. Karandikar, N. Cain, **D. Tran**, B. Lakshminarayanan, J. Shlens, M. C. Mozer, and B. Roelofs. Soft calibration objectives for neural networks. In *Neural Information Processing Systems*, 2021.
23. Y. Wen, G. Jerfel, R. Muller, M. W. Dusenberry, J. Snoek, B. Lakshminarayanan, and **D. Tran**. Combining ensembles and data augmentation can harm your calibration. In *International Conference on Learning Representations*, 2021.
24. M. Havasi, R. Jenatton, S. Fort, J. Z. Liu, J. Snoek, B. Lakshminarayanan, A. M. Dai, and **D. Tran**. Training independent subnetworks for robust prediction. In *International Conference on Learning Representations*, 2020.
25. F. Wenzel, J. Snoek, **D. Tran**, and R. Jenatton. Hyperparameter ensembles for robustness and uncertainty quantification. In *Neural Information Processing Systems*, 2020.
26. J. Z. Liu, Z. Lin, S. Padhy, **D. Tran**, T. Bedrax-Weiss, and B. Lakshminarayanan. Simple and principled uncertainty estimation with deterministic deep learning via distance awareness. In *Neural Information Processing Systems*, 2020.
27. M. W. Dusenberry, G. Jerfel, Y. Wen, Y. Ma, J. Snoek, K. Heller, B. Lakshminarayanan, and **D. Tran**. Efficient and scalable Bayesian neural nets with rank-1 factors. In *International Conference on Machine Learning*, 2020.

28. Y. Wen, **D. Tran**, and J. Ba. Batchensemble: An alternative approach to efficient ensemble and lifelong learning. In *International Conference on Learning Representations*, 2020.
29. M. W. Dusenberry, **D. Tran**, E. Choi, J. Kemp, J. Nixon, G. Jerfel, K. Heller, and A. Dai. Analyzing the role of model uncertainty in electronic health records. In *ACM Conference on Health, Inference, and Learning*, 2020.
30. **D. Tran**, K. Vafa, K. K. Agrawal, L. Dinh, and D. Poole. Discrete flows: Invertible generative models for discrete data. In *Neural Information Processing Systems*, 2019.
31. **D. Tran**, M. W. Dusenberry, D. Hafner, and M. van der Wilk. Bayesian layers: A module for neural network uncertainty. 2019.
32. D. Hafner, **D. Tran**, A. Irpan, T. Lillicrap, and J. Davidson. Noise contrastive priors for functional uncertainty. In *Uncertainty in Artificial Intelligence*, 2019.
33. **D. Tran**, M. D. Hoffman, D. Moore, C. Suter, S. Vasudevan, A. Radul, M. Johnson, and R. A. Saurous. Simple, distributed, and accelerated probabilistic programming. In *Neural Information Processing Systems*, 2018.
34. N. Shazeer, Y. Cheng, N. Parmar, **D. Tran**, A. Vaswani, P. Koanantakool, P. Hawkins, H. Lee, M. Hong, C. Young, R. Sepassi, and B. Hechtman. Mesh-TensorFlow: Deep learning for supercomputers. In *Neural Information Processing Systems*, 2018.
35. M. D. Hoffman, M. Johnson, and **D. Tran**. Autoconj: Recognizing and exploiting conjugacy without a domain-specific language. In *Neural Information Processing Systems*, 2018.
36. N. Parmar, A. Vaswani, J. Uszkoreit, L. Kaiser, N. Shazeer, A. Ku, and **D. Tran**. Image Transformer. In *International Conference on Machine Learning*, 2018.
37. Y. Wen, P. Vicol, J. Ba, **D. Tran**, and R. Grosse. Flipout: Efficient pseudo-independent weight perturbations on mini-batches. In *International Conference on Learning Representations*, 2018.
38. **D. Tran** and D. M. Blei. Implicit causal models for genome-wide association studies. In *International Conference on Learning Representations*, 2018.
39. **D. Tran**, R. Ranganath, and D. M. Blei. Hierarchical implicit models and likelihood-free variational inference. In *Neural Information Processing Systems*, 2017.
40. A. B. Dieng, **D. Tran**, R. Ranganath, J. Paisley, and D. M. Blei. Variational inference via  $\chi$  upper bound minimization. In *Neural Information Processing Systems*, 2017.
41. **D. Tran**, M. D. Hoffman, R. A. Saurous, E. Brevdo, K. Murphy, and D. M. Blei. Deep probabilistic programming. In *International Conference on Learning Representations*, 2017.
42. R. Ranganath, J. Alotaibi, **D. Tran**, and D. M. Blei. Operator variational inference. In *Neural Information Processing Systems*, 2016.
43. R. Ranganath, **D. Tran**, and D. M. Blei. Hierarchical variational models. In *International Conference on Machine Learning*, 2016.
44. **D. Tran**, M. Kim, and F. Doshi-Velez. Spectral M-estimation with application to hidden Markov models. In *Artificial Intelligence and Statistics*, 2016.

45. P. Toulis, **D. Tran**, and E. M. Airolidi. Towards stability and optimality in stochastic gradient descent. In *Artificial Intelligence and Statistics*, 2016.
46. **D. Tran**, R. Ranganath, and D. M. Blei. The variational Gaussian process. In *International Conference on Learning Representations*, 2016.
47. **D. Tran**, D. M. Blei, and E. M. Airolidi. Copula variational inference. In *Neural Information Processing Systems*, 2015.

## Software

1. Uncertainty Baselines 2020
2. Robustness Metrics 2020
3. Bayesian Layers: A module for neural network uncertainty 2018  
**D. Tran**, M. Dusenberry, M. van der Wilk, D. Hafner.
4. Mesh-TensorFlow: Deep learning for supercomputers 2018  
N. Shazeer, Y. Cheng, N. Parmar, **D. Tran**, A. Vaswani, P. Koanantakool, P. Hawkins, H. Lee, M. Hong, C. Young, R. Sepassi, B. Hechtman.
5. Edward2: Simple, distributed, and accelerated probabilistic programming 2018  
**D. Tran**, M. D. Hoffman, D. Moore, C. Suter, S. Vasudevan, A. Radul, M. Johnson, and R. A. Saurous.
6. Tensor2Tensor: Library of deep learning models and datasets 2017
7. Observations: A one-line API for loading standard data sets in machine learning 2017  
**D. Tran**.
8. Edward: A library for probabilistic modeling, inference, and criticism 2016  
**D. Tran**, A. Kucukelbir, A.B. Dieng, D. Liang, M. Rudolph, and D.M. Blei.
9. sgdr: An R package for large-scale estimation 2015  
**D. Tran**, P. Toulis, and E.M. Airolidi.
10. Stan: A platform for statistical modeling and high-performance statistical computation 2012  
A. Gelman, B. Carpenter, M. Hoffman, D. Lee, B. Goodrich, M. Betancourt, M. Brubaker, J. Guo, P. Li, A. Riddell, M. Inacio, J. Arnold, M. Morris, R. Trangucci, R. Goedman, B. Lau, J. Gabry, A. Kucukelbir, R. Grant, **D. Tran**, K. Sakrejda, A. Vehtari, R. Lei, S. Weber.

## Teaching

1. Teaching Assistant | Columbia University 2016  
STAT/CS 6509: Foundations of Graphical Models
2. Teaching Fellow | Harvard University 2015  
AM 205: Advanced Scientific Computing–Numerical Methods

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| 3. Teaching Assistant   University of California, Berkeley<br>MATH 10B: Methods in Calculus, Statistics, Combinatorics | 2013 |
| 4. Teaching Assistant   University of California, Berkeley<br>MATH 128A: Numerical Analysis                            | 2011 |

## Professional Service

### PROGRAM COMMITTEE

Area Chair: Artificial Intelligence and Statistics	2019, 2022
Area Chair: Association for the Advancement of Artificial Intelligence	2020–
Area Chair: Neural Information Processing Systems	2019–
Area Chair: International Conference on Learning Representations	2020–
Area Chair: International Conference on Machine Learning	2019–
Senior Program Committee: International Joint Conferences on Artificial Intelligence	2020–

### JOURNAL REVIEWING

Foundations and Trends in Machine Learning	2016–
Information Sciences	2016–
Journal of Machine Learning Research	2016–
Statistics and Computing	2016–
Transactions on Pattern Analysis and Machine Intelligence	2016–

### CONFERENCE REVIEWING

Artificial Intelligence and Statistics	2017–2018
Association for the Advancement of Artificial Intelligence	2018–2019
International Conference on Learning Representations	2016–2019
International Conference on Machine Learning	2016–2018
International Joint Conference on Artificial Intelligence	2019
Knowledge Discovery and Data Mining	2016
Neural Information Processing Systems	2016–2018
Uncertainty in Artificial Intelligence	2016–2019

### WORKSHOP ORGANIZATION

Symposium: Advances in Approximate Bayesian Inference	2019
Symposium: Advances in Approximate Bayesian Inference	2018

UAI Workshop: Uncertainty in Deep Learning	2018
NIPS Workshop: Advances in Approximate Bayesian Inference	2017
ICML Workshop: Implicit Generative Models	2017
NIPS Workshop: Advances in Approximate Bayesian Inference	2016
NIPS Workshop: Advances in Approximate Bayesian Inference	2015

## MENTORING

Kelly Buchanan (Google Student Researcher, 2022)  
James Allingham (Google Brain Intern, Summer 2021, Summer 2022)  
Frances Hubis (Google AI Resident, 2021)  
Archit Karandikar (Google Software Engineer, 2021)  
Jeremy Nixon (Google Software Engineer, 2020–2021)  
Yeming Wen (Google Brain Intern, 2019–2020)  
Aditya Grover (Google AI Resident, Summer 2019)  
Jason Lee (Google AI Resident, Summer 2019–Spring 2020)  
Ghassen Jerfel (Google Student Researcher, 2019–)  
Kumar Krishna Agrawal (Google AI Resident, Spring 2019)  
Michael W. Dusenberry (Google AI Resident, 2018–2020)  
Keyon Vafa (Google Brain Intern, Summer 2018)  
Danijar Hafner (Google Brain Intern, Spring 2018–Fall 2018)  
Akshay Khatri (M.S. Columbia University, Spring 2017)