

Education

University of Toronto

Ph.D. Computer Science

Toronto, ON

2017 – 2022

- Probabilistic modeling, numerical methods, and differential equations in machine learning.
- Supervisor: David Duvenaud

University of British Columbia

M.Sc. Computer Science (Research Thesis Track)

Vancouver, BC

2015 - 2017

- Research thesis on kernel methods and probabilistic modeling applied to computer vision.
- Supervisor: Mark Schmidt

University of British Columbia

B.Sc. Combined Honours in Statistics and Computer Science

Vancouver, BC

2010 - 2015

- Awarded the annual Nash Medal for “most outstanding graduating student” in Statistics.
- Summer research supervisor: Kevin Leyton-Brown

Industry Experience

Research Scientist

Facebook AI Research

New York, NY

Oct 2021 – present

Research Scientist Intern

Facebook AI Research

New York, NY

Summer 2020

Student Researcher

Google Brain Team

Toronto, ON

Sept 2019 - May 2020

Research Scientist Intern

Google Brain Team

Toronto, ON

Summer 2019

Software Engineer Intern

Google

New York, NY

Summer 2018

Applied Scientist Intern

Amazon.com

Seattle, WA

Summer 2017

Software Developer Engineer Intern

Amazon.com

Seattle, WA

Summer 2013

Teaching Experience

Graduate Teaching Assistant

University of Toronto

Toronto, ON

2017 - 2020

- Graduate-level machine learning courses.

Graduate Teaching Assistant

University of British Columbia

Vancouver, BC

2015 - 2017

- Senior-level advanced machine learning and algorithm courses.

Undergraduate Teaching Assistant

University of British Columbia

Vancouver, BC

2012 - 2015

- Introductory-level courses on machine learning and algorithms.

Awards & Fellowships

NeurIPS Outstanding Reviewer Award (top 8%)	2021
Facebook Fellowship in Machine Learning	2019-2021
Time Series Workshop @ ICML 2019 Best Paper Honorable Mention	2019
NeurIPS 2018 Best Paper Award	2018
AABI Workshop 2018 Best Student Paper Award	2018
NSERC Postgraduate Scholarships–Doctoral	2018-2021
Graduate Teaching Assistant Award	2017
Nash Medal for “Most Outstanding Graduating Student” in Statistics	2015
Science Undergraduate Research Experience	2014

Invited Talks

Department of Computing, Imperial College London	Oct 2022
ICLR Workshop on Deep Generative Models for Highly Structured Data	Apr 2022
UCSD AI Seminar	Mar 2022
Sixth Machine Learning in High Energy Physics Summer School 2020	Jul 2020
CVPR 2020 Deep Declarative Networks	Jun 2020
ICLR 2020 Workshop on Integration of Deep Neural Models and Differential Equations	Apr 2020
(2) Spotlight Talks at Conference on Neural Information Processing Systems 2019	Dec 2019
(2) Contributed Talks at Invertible Networks & Normalizing Flows Workshop	Jun 2019
Contributed Talk at Time Series Workshop	Jun 2019
SIAM Conference on Computational Science and Engineering (CSE19)	Feb 2019
Google Brain Toronto	Jan 2019
Oral Presentation at NeurIPS Conference	Dec 2018
Princeton University, Laboratory for Intelligent Probabilistic Systems	Sep 2018
Columbia University, Statistical ML and Computational Neuroscience	Aug 2018
New York University, Center for Data Science	Aug 2018
Oral Presentation at Constructive Machine Learning Workshop	Dec 2016

Community Service

- Reviewer for JMLR, NeurIPS 2018-2022, ICLR 2019-2023, ICML 2019-2022.
- Co-organizer for Workshops on Invertible Networks and Normalizing Flows at ICML 2019-2021.

Research

Preprints

Flow Matching for Generative Modeling.

Yaron Lipman, Ricky T. Q. Chen, Heli Ben-Hamu, Maximilian Nickel, Matthew Le.
arXiv. 2022.

Latent State Marginalization as a Low-cost Approach for Improving Exploration.

Dinghuai Zhang, Aaron Courville, Yoshua Bengio, Qinqing Zheng, Amy Zhang, **Ricky T. Q. Chen**.
arXiv. 2022.

Peer-reviewed Conference & Journal Publications

Neural Conservation Laws: A Divergence-free Perspective.

Jack Richter-Powell, Yaron Lipman, **Ricky T. Q. Chen**.
Advances in Neural Information Processing Systems (NeurIPS). 2022.

Semi-Discrete Normalizing Flows through Differentiable Tessellation.

Ricky T. Q. Chen, Brandon Amos, Maximilian Nickel.
Advances in Neural Information Processing Systems (NeurIPS). 2022.

Theseus: A Library for Differentiable Nonlinear Optimization.

Meta AI, Reality Labs Research.
Advances in Neural Information Processing Systems (NeurIPS). 2022.

Matching Normalizing Flows and Probability Paths on Manifolds.

Heli Ben-Hamu, Samuel Cohen, Joey Bose, Brandon Amos, Aditya Grover, Maximilian Nickel, **Ricky T.Q. Chen**, Yaron Lipman.
International Conference on Machine Learning (ICML). 2022.

Infinitely Deep Bayesian Neural Networks with Stochastic Differential Equations.

Winnie Xu, **Ricky T. Q. Chen**, Xuechen Li, David Duvenaud.
International Conference on Artificial Intelligence and Statistics (AISTATS). 2022.

Fully differentiable optimization protocols for non-equilibrium steady states.

Rodrigo A Vargas-Hernández, **Ricky T. Q. Chen**, Kenneth A Jung, Paul Brumer.
New Journal of Physics. 2021.

“Hey, that’s not an ODE”: Faster ODE Adjoints via Seminorms.

P. Kidger, **R. T. Q. Chen**, T. Lyons.
International Conference on Machine Learning (ICML). 2021.

Convex Potential Flows: Universal Probability Distributions with Optimal Transport and Convex Optimization.

C. Huang, **R. T. Q. Chen**, C. Tsirigotis, A. Courville.

International Conference on Learning Representations (ICLR). 2021.

Learning Neural Event Functions for Ordinary Differential Equations.

R. T. Q. Chen, B. Amos, M. Nickel.

International Conference on Learning Representations (ICLR). 2021.

Neural Spatio-Temporal Point Processes.

R. T. Q. Chen, B. Amos, M. Nickel.

International Conference on Learning Representations (ICLR). 2021.

Scalable Gradients and Variational Inference for Stochastic Differential Equations.

X. Li, T. L. Wang, **R. T. Q. Chen**, D. Duvenaud.

International Conference on Artificial Intelligence and Statistics (AISTATS). 2020.

SUMO: Unbiased Estimation of Log Marginal Probability for Latent Variable Models.

[**Spotlight** 6%]

Y. Luo, A. Beatson, M. Norouzi, J. Zhu, D. Duvenaud, R. P. Adams, **R. T. Q. Chen**.

International Conference on Learning Representations (ICLR). 2020.

Neural Networks with Cheap Differential Operators. [**Spotlight** 2.4%]

R. T. Q. Chen, D. Duvenaud.

Advances in Neural Information Processing Systems (NeurIPS). 2019.

Residual Flows for Invertible Generative Modeling. [**Spotlight** 2.4%]

R. T. Q. Chen, J. Behrmann, D. Duvenaud, J. Jacobsen.

Advances in Neural Information Processing Systems (NeurIPS). 2019.

Latent ODEs for Irregularly-Sampled Time Series.

Yulia Rubanova, **R. T. Q. Chen**, D. Duvenaud.

Advances in Neural Information Processing Systems (NeurIPS). 2019.

Invertible Residual Networks. [**Long Oral** 1.5%]

J. Behrmann, W. Grathwohl, **R. T. Q. Chen**, D. Duvenaud, J. Jacobsen.

International Conference on Machine Learning (ICML). 2019.

FFJORD: Free-form Continuous Dynamics for Scalable Reversible Generative Models. [**Oral** 1.5%]

W. Grathwohl, **R. T. Q. Chen**, J. Bettencourt, D. Duvenaud.

International Conference on Learning Representations (ICLR). 2019.

Neural Ordinary Differential Equations. [**Best Paper Award** 0.08%]

R. T. Q. Chen, Y. Rubanova, J. Bettencourt, D. Duvenaud.

Advances in Neural Information Processing Systems (NeurIPS). 2018.

Isolating Sources of Disentanglement in Variational Autoencoders. [**Oral** 0.6%]

R. T. Q. Chen, X. Li, R. Grosse, D. Duvenaud.

Advances in Neural Information Processing Systems (NeurIPS). 2018.

Learning Motion Predictors for Smart Wheelchair using Autoregressive Sparse Gaussian Process.

Z. Fan, L. Meng, **T. Q. Chen**, J. Li, I. Mitchell.

International Conference on Robotics and Automation (ICRA). 2018.

Peer-reviewed Workshop Papers

Unifying Generative Models with GFlowNets.

Dinghuai Zhang, **Ricky T. Q. Chen**, Nikolay Malkin, Yoshua Bengio.

Beyond Bayes: Paths Towards Universal Reasoning Systems, ICML. 2022.

Learning to Discretize for Continuous-time Sequence Compression.

Ricky T. Q. Chen, Matthew Le, Matthew Muckley, Maximilian Nickel, Karen Ullrich.

Workshop on Continuous Time Perspectives in Machine Learning, ICML. 2022.

Semi-Discrete Normalizing Flows through Differentiable Voronoi Tessellation. [Oral]

R. T. Q. Chen, B. Amos, M. Nickel.

Workshop on Deep Generative Models for Highly Structured Data, ICLR. 2022.

Semi-Discrete Normalizing Flows through Differentiable Voronoi Tessellation. [Oral]

R. T. Q. Chen, B. Amos, M. Nickel.

Workshop on Deep Generative Models for Highly Structured Data, ICLR. 2022.

Self-Tuning Stochastic Optimization with Curvature-Aware Gradient Filtering. [Oral]

R. T. Q. Chen, D. Choi, L. Balles, D. Duvenaud, P. Hennig.

Workshop on “I Can’t Believe It’s Not Better!”, NeurIPS. 2020.

Inverse design of dissipative quantum steady-states with implicit differentiation.

R. A. Vargas-Hernández, **R. T. Q. Chen**, K. A. Jung, P. Brumer.

Workshop on Machine Learning and the Physical Sciences, NeurIPS. 2020.

“Hey, that’s not an ODE”: Faster ODE Adjoint with 12 Lines of Code.

P. Kidger, **R. T. Q. Chen**, T. Lyons.

Workshop on Machine Learning and the Physical Sciences, NeurIPS. 2020.

Infinitely Deep Bayesian Neural Networks through Stochastic Differential Equations.

W. Xu, **R. T. Q. Chen**, X. Li, D. Duvenaud.

Workshop on Uncertainty and Robustness in Deep Learning Workshop, NeurIPS. 2020.

SUMO: Unbiased Estimation of Log Marginal Probability for Latent Variable Models.

Y. Luo, A. Beatson, M. Norouzi, J. Zhu, D. Duvenaud, R. P. Adams, **R. T. Q. Chen**.

Symposium on Advances in Approximate Bayesian Inference. 2019.

Scalable gradients and variational inference for stochastic differential equations.

X. Li, T. L. Wang, **R. T. Q. Chen**, D. Duvenaud.

Symposium on Advances in Approximate Bayesian Inference. 2019.

Residual Flows: Unbiased Generative Modeling with Norm-Learned i-ResNets. [Oral]

R. T. Q. Chen, J. Behrmann, J. Jacobsen.

Workshop on Invertible Neural Nets and Normalising Flows, ICML. 2019.

Splicing Computation Graphs for Efficient Differential Operators. [Spotlight]

R. T. Q. Chen, D. Duvenaud.

Workshop on Invertible Neural Nets and Normalising Flows, ICML. 2019.

Latent Ordinary Differential Equations for Irregularly-Sampled Time Series. [Oral]

Yulia Rubanova, **R. T. Q. Chen**, D. Duvenaud.

Workshop on Time Series ICML. 2019.

Scalable Reversible Generative Models with Free-form Continuous Dynamics.

[**Best Student Paper**]

W. Grathwohl, **R. T. Q. Chen**, J. Bettencourt, D. Duvenaud.

Symposium on Advances in Approximate Bayesian Inference. 2018.

Isolating Sources of Disentanglement in Variational Autoencoders.

R. T. Q. Chen, X. Li, R. Grosse, D. Duvenaud.

Workshop Track at International Conference on Learning Representations, ICML. 2018.

Fast Patch-Based Style Transfer of Arbitrary Style. [**Oral**]

T. Q. Chen and M. Schmidt.

Workshop on Constructive Machine Learning, NeurIPS. 2016.