Ricky Tian Qi CHEN

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Google Scholar

Professional Experience

Research Scientist — New York, NY
FAIR, Meta — *Oct 2021 – present*

Research Scientist Intern — New York, NY
FAIR, Facebook — *Summer 2020*

Student Researcher — Toronto, ON
Google Brain — *Sept 2019 - May 2020*

Research Scientist Intern — Toronto, ON
Google Brain — *Summer 2019*

Software Engineer Intern — New York, NY
Google — *Summer 2018*

Applied Scientist Intern — Seattle, WA
Amazon — *Summer 2017*

Software Developer Engineer Intern — Seattle, WA
Amazon — *Summer 2013*

Education

University of Toronto — Toronto, ON
Ph.D. Computer Science — *2017 – 2021*

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

University of British Columbia — Vancouver, BC
M.Sc. Computer Science (Research Thesis Track) — *2015 - 2017*

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

University of British Columbia — Vancouver, BC
B.Sc. Combined Honours in Statistics and Computer Science — *2010 - 2015*

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

Research

Preprints

Adjoint Matching: Fine-tuning Flow and Diffusion Generative Models with Memoryless Stochastic Optimal Control.
Carles Domingo-Enrich, Michal Drozdzal, Brian Karrer, **Ricky T. Q. Chen**.
Preprint. 2024.

Peer-reviewed Conference & Journal Publications

Discrete Flow Matching. [`Spotlight`]
Itai Gat, Tal Remez, Neta Shaul, Felix Kreuk, **Ricky T. Q. Chen**, Gabriel Synnaeve, Yossi Adi, Yaron Lipman
Advances in Neural Information Processing Systems (NeurIPS). 2024.

FlowLLM: Flow Matching for Material Generation with Large Language Models as Base Distributions.
Anuroop Sriram, Benjamin Kurt Miller, **Ricky T. Q. Chen**, Brandon Wood
Advances in Neural Information Processing Systems (NeurIPS). 2024.

Stochastic Optimal Control Matching.
Carles Domingo-Enrich, Jiequn Han, Brandon Amos, Joan Bruna, **Ricky T. Q. Chen**.
Advances in Neural Information Processing Systems (NeurIPS). 2024.

FlowMM: Generating Materials with Riemannian Flow Matching.
Benjamin Kurt Miller, **Ricky T. Q. Chen**, Anuroop Sriram, Brandon M Wood.
International Conference on Machine Learning (ICML). 2024.

Bespoke Non-Stationary Solvers for Fast Sampling of Diffusion and Flow Models.
Neta Shaul, Uriel Singer, Matthew Le, **Ricky T. Q. Chen**, Ali Thabet, Albert Pumarola, Yaron Lipman.
International Conference on Machine Learning (ICML). 2024.

Bespoke Solvers for Generative Flow Models. [`Spotlight` 5.0%]
Neta Shaul, Juan Perez, **Ricky T. Q. Chen**, Ali Thabet, Albert Pumarola, Yaron Lipman.
International Conference on Learning Representations (ICLR). 2024.

Riemannian Flow Matching on General Geometries. [`Oral` 1.2%]
Ricky T. Q. Chen, Yaron Lipman.
International Conference on Learning Representations (ICLR). 2024.

Generalized Schrödinger Bridge Matching.
Guan-Horng Liu, Yaron Lipman, Maximilian Nickel, Brian Karrer, Evangelos A Theodorou, **Ricky T. Q. Chen**.
International Conference on Learning Representations (ICLR). 2024.

Taskmet: Task-driven metric learning for model learning.
Dishank Bansal, **Ricky T. Q. Chen**, Mustafa Mukadam, Brandon Amos.
Advances in Neural Information Processing Systems (NeurIPS). 2023.

Multisample Flow Matching: Straightening Flows with Minibatch Couplings.
Aram-Alexandre Pooladian, Heli Ben-Hamu, Carles Domingo-Enrich, Brandon Amos, Yaron Lipman, **Ricky T. Q. Chen**.
International Conference on Machine Learning (ICML). 2023.

On Kinetic Optimal Probability Paths for Generative Models.
Neta Shaul, **Ricky T. Q. Chen**, Maximilian Nickel, Matt Le, Yaron Lipman.
International Conference on Machine Learning (ICML). 2023.

Flow Matching for Generative Modeling. [`Spotlight` 8.0%]
Yaron Lipman, **Ricky T. Q. Chen**, Heli Ben-Hamu, Maximilian Nickel, Matthew Le.
International Conference on Learning Representations (ICLR). 2023.

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**.
International Conference on Learning Representations (ICLR). 2023.

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.
neu *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. Benhrmann, 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.

Teaching Experience

Graduate Teaching Assistant — Toronto, ON
University of Toronto — *2017 - 2020*
- Graduate-level machine learning courses.

Graduate Teaching Assistant — Vancouver, BC
University of British Columbia — *2015 - 2017*
- Senior-level advanced machine learning and algorithm courses.

Undergraduate Teaching Assistant — Vancouver, BC
University of British Columbia — *2012 - 2015*
- Introductory-level courses on machine learning and algorithms.

Awards & Fellowships

ICLR 2024 Outstanding Paper Honorable Mention 2024
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

GenU Workshop (Generative models and uncertainty quantification) . . . . . Sep 2024
ICML Workshop on Structured Probabilistic Inference & Generative Modeling . . . . . Jul 2024
Vanderbilt University . . . . . Mar 2024
Oral presentation at ICLR 2024 . . . . . May 2024
Vanderbilt University . . . . . Mar 2024
Learning Meets Geometry, Graphs, and Networks, NJIT . . . . . Feb 2024
Measure Transport, Diffusion Processes and Sampling Workshop, Flatiron Institute . . . Dec 2023
ICIAM minisymposium on theoretical and computational advances in measure transport . Aug 2023
AFOSR Monterey Training Workshop on Computational Issues in Nonlinear Control . . . May 2023
Deep Learning Lecture, Yale University . . . . . Mar 2023
Visitor Talk at DeepMind London . . . . . Oct 2022
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 NeurIPS, ICLR, ICML, and machine learning journals.
- Co-organizer for Workshops on Invertible Networks and Normalizing Flows at ICML 2019-2021.