AVISHEK (JOEY) BOSE

joey.bose@mail.mcgill.ca

EDUCATION

University of Oxford — Februrary 2024 - Present
Post-Doc — Supervisor: **Prof. Michael Bronstein**

McGill University & — September 2018 - September 2023
Mila - Quebec AI Institute — Supervisors: **Prof. Prakash Panangaden**
Phd in Computer Science — **Prof. William Hamilton**
Prof. Gauthier Gidel

University of Toronto — September 2017 - August 2018
M.aSc Department of Electrical and Computer Engineering — Supervisor: **Prof. Parham Aarabi**

University of Toronto — September 2012 - April 2017
B.aSc Department of Electrical and Computer Engineering
Minor in Mechatronics

POSITIONS HELD

Imperial College London — Jan 2026 - Present
Assistant Professor of Computing

Mila — Sept 2024 - Present
Mila Affiliate Faculty member

Dreamfold — July 2023 - Jan 2025
Distinguished Machine Learning Scientist

Qualcomm AI research — Oct 2022 - Feb 2023
Research Intern, Supervisors: Johann Bremer and Taco Cohen

Facebook AI Research — May 2021 - Dec 2021
Research Intern, Supervisor: Aditya Grover

Uber AI — May 2019 - Aug 2019
Research Intern, Supervisors: Ankit Jain and Piero Molino

FaceShield (Acquired in 2020 by D-ID) — Aug 2018 - Jun 2020
Founder and CEO

Borealis AI — May 2017 - July 2018
Research Intern, Supervisor: Yanshuai Cao

TEACHING EXPERIENCE

McGill University — Sept 2022 - Dec 2022
Co-Instructor

- Formulated a new graduate seminar course COMP760 at McGill/Mila at the intersection of geometric deep learning and generative models.

McGill University — Jan 2019 - Dec 2019
Head TA

- Responsible for the successful organization of COMP 551: Applied ML Graduate Course.

University of Toronto Sept 2017 - Dec 2017
Co-Head TA and Co-Lecturer

- Created and delivered Lectures and tutorials and organized logistics for a probability course aimed at 3rd/4th year undergraduate students.

REPRESENTATIVE PUBLICATIONS

* denotes equal contribution, † denotes equal advising.

1. **A. J. Bose***, T. Akhound-Sadegh*, K. Fatras, G. Huguet, J. Rector-Brooks, C.H. Liu, A.C. Nica, M. Korablyov, M. Bronstein, A. Tong, "SE(3) Stochastic Flow Matching for Protein For Protein Backbone Generation", International Conference on Learning Representations (ICLR 2024) **Spotlight**. **arXiv link**

2. **A. J. Bose**, A. Smofsky, R. Liao, P. Panangaden, W. L. Hamilton. (2019) "Latent Variable Modeling with Hyperbolic Normalizing Flows" International Conference of Machine Learning (ICML 2020). **arXiv link**

3. T. Akhound-Sadegh*, J. Rector-Brooks*, **A.J. Bose***, S. Mittal, P. Lemos, C.H. Liu, M. Sendera, S. Ravanbaksh, G. Gidel, Y. Bengio, N. Malkin, A. Tong "Iterated Denoising Energy Matching for Sampling from Boltzmann Densities" International Conference on Machine Learning (ICML 2024). **arXiv link**

4. **A. J. Bose***, G. Gidel*, H. Berard*, A. Cianflone, P. Vincenct, S.L. Julien, W. L. Hamilton. (2020) "Adversarial Example Games" Neural Information Processing Systems (NeurIPS 2020) **arXiv link**.

5. Q. Bertrand, **A. J. Bose**, A. Duplessis, M. Jiralerspong, G. Gidel, "On the Stability of Iterative Retraining of Generative Models on their own Data", International Conference on Learning Representations (ICLR 2024) **Spotlight**. **arXiv link**

JOURNAL AND CONFERENCE PUBLICATIONS

1. T. Akhound-Sadegh*, J. Lee*, **A. J. Bose**, V. De Bortoli, A. Doucet, M. Bronstein, D. Beaini, S. Ravanbakhsh, K. Neklyudov†, A. Tong† "Progressive Inference-Time Annealing of Diffusion Models for Sampling from Boltzmann Densities" (NeurIPS 2025) **NeurIPS 2025 Spotlight arXiv link**

2. R. Yadav, Q. Yan, G. Wolf, **A. J. Bose**, R. Liao "RETRO SYNFLOW: Discrete Flow-Matching for Accurate and Diverse Single-Step Retrosynthesis" (NeurIPS 2025) **arXiv link**

3. K Petrović, L. Atanackovic, V. Morro, K. Kapusniak, M. Bronstein, **A. J. Bose**†, A. Tong † "Curly Flow Matching For Learning Non-Gradient Field Dynamics" (NeurIPS 2025)

4. C. B. Tan*, L. **A. J. Bose***, C. Lin, L. Klein , M. Bronstein, A. Tong. "Scalable Equilibrium Sampling with Sequential Boltzmann Generators" International Conference of Machine Learning (ICML 2025) **arXiv link**

5. M. Skerta*, L. Atanackovic*, **A. J. Bose**, A. Tong, K. Neklyudov. "The Superposition of Diffusion Models Using the It Density Estimator" International Conference on Learning Representations (ICLR 2025) **Openreview link**

6. J. Rector-Brooks, M. Hasan, Z. Peng, Z. Quinn, C.H. Liu, S. Mittal, N. Dziri, M. Bronstein, Y. Bengio, P. Chatterjee, A. Tong†, **A. J. Bose**†. "Steering Masked Discrete Diffusion Models via Discrete Denoising Posterior Prediction" International Conference on Learning Representations (ICLR 2025) arXiv link

7. D. Ferbach, Q. Bertrand, **A.J. Bose**, G. Gidel, "Self-Consuming Generative Models with Curated Data Provably Optimize Human Preferences" Neural Information Processing Systems (NeurIPS 2024) **Spotlight**. **arXiv link**

8. G. Huguet*, J. Vuckovic*, K. Fatras, E Thibodeau-Laufer, P. Lemos, R. Islam, C.H. Liu, J. Rector-Brooks, T. Akhound-Sadegh, M. Bronstein, A. Tong,† **A.J. Bose**†, "Sequence-Augmented SE(3)-Flow Matching for Conditional Protein Backbone Generation" Neural Information Processing Systems (NeurIPS 2024). **arXiv link**

9. K. Kapusniak, P. Potaptchik, T. Reu, L. Zhang, A. Tong, M. Bronstein, **A.J. Bose**, F. Di Giovanni, "Metric Flow Matching for Smooth Interpolations on the Data Manifold" Neural Information Processing Systems (NeurIPS 2024). **arXiv link**

10. O. Davis, S. Kessler, M. Petrache, I.I. Ceylan, M. Bronstein, **A.J. Bose**, "Fisher Flow Matching for Generative Modeling over Discrete Data" Neural Information Processing Systems (NeurIPS 2024). **arXiv link**

11. J. Bremer*, **A.J. Bose***, P. de Haan, T. Cohen, "EDGI: Equivariant diffusion for planning with embodied agents" Neural Information Processing Systems (NeurIPS 2023) **arXiv link**.

12. M. Jiralerspong, **A.J. Bose**, G. Gidel, "Feature Likelihood Divergence: Evaluating Generalization of Generative Models Using Samples" Neural Information Processing Systems (NeurIPS 2023). **arXiv link**

13. D. Ferbach*, C. Tsirigotis*, G. Gidel, **A.J. Bose**, "A General Framework For Proving The Equivariant Strong Lottery Ticket Hypothesis" International Conference on Learning Representations (ICLR) 2023 **OpenReview link**

14. **A.J. Bose**, R. P. Monti, A. Grover "Controllable Generative Modelling via Causal Reasoning" Transactions on Machine Learning Research 2022 (TMLR 2022) **OpenReview link**

15. C. Huang*, M. Aghajohari*, **A.J. Bose**, P. Panangaden, A. Courville "Riemannian Diffusion Models" Neural Information Processing Systems (NeurIPS 2022) **arXiv link**

16. H. Ben-Hamu, S. Cohen, **A.J. Bose**, B. Amos, M. Nickel, A. Grover, R. Chen, Y. Lipman "Matching Normalizing Flows and Probability Paths on Manifolds" International Conference on Machine Learning (ICML) 2022 **arXiv link**.

17. A. Mladenović*, **A.J. Bose***, H. Berard*, W.L. Hamilton, S. Lacoste-Julien, P. Vincent, G.Gidel "Online Adversarial Attacks" International Conference on Learning Representations (ICLR) 2022. **arXiv link**

18. N. Dziri, A. Madotto, O. Zaiane, **A. J. Bose** "Neural Path Hunter: Reducing Hallucination in Dialogue Systems via Path Grounding" Empirical Methods in Natural Language Processing 2021 **arXiv link**

19. K. Ahrabian*, A. Feizi*, Y. Salehi*, W. L. Hamilton, **A. J. Bose** "Structure Aware Negative Sampling in Knowledge Graphs" Empirical Methods in Natural Language Processing 2020 (EMNLP). **arXiv link**

20. X. Peng, H. Saghir, J. Kang, T. Long, **A. J. Bose**, Y. Cao, J. Cheung (2019) "A Cross-Domain Transferable Neural Coherence Model." In Proceedings of Association for Computational Linguistics 2019 (ACL). **arXiv link**

21. **A. J. Bose**, W. L. Hamilton. (2019) "Compositional Invariance Constraints for Graph Embeddings" International Conference of Machine Learning 2019 (ICML). **arXiv link**

22. A. Cianflone, Z. Ahmed, R. Islam, **A. J. Bose**, W.L. Hamilton. (2019) "Discrete off-policy policy gradient using continuous relaxations" Reinforcement Learning and Decision Making

2019 (RLDM). **paper link**

23. **A. J. Bose**, P. Aarabi (2018) " Adversarial Attacks on Face Detectors using Neural Net based Constrained Optimization.", IEEE MMSP 2018. **Best Paper Nominee arXiv link**

24. **A. J. Bose***, Y. Cao*, H. Ling* (2018) " Adversarial Contrastive Estimation." **ORAL** In Proceedings of Association for Computational Linguistics (ACL 2018). **arXiv link**

25. R. Janzen, S. N. Yasrebi, **A. J. Bose**, A. Subramanian, S. Mann, " Walking through sight: Seeing the ability to see in a 3-D augmediated reality environment", Proc. IEEE Gaming Entertainment Media, pp. 313-4, 2014. **paper link**

PREPRINTS AND PATENTS

1. E. Jin, A. Nica, K. Lee, **A. J. Bose**, M. Galkin, S. Miret, J. Rector-Brooks, A. Tong, M. Bronstein, F. H. Arnold, C.H. Liu "OXtal: An All-Atom Diffusion Model for Organic Crystal Structure Prediction" (Preprint 2025)

2. O. Davis, M. Albergo, N. Boffi, M. Bronstein, **A. J. Bose**, "Generalised Flow Maps for Few-Step Generative Modelling on Riemannian Manifolds" (Preprint 2025)

3. F. Z. Peng*, Z. Bezemek *, J. Rector-Brooks, S. Zhang, Anru R. Zhang, J, M. Bronstein, **A. J. Bose** †, A. Tong †, "Planner Aware Path Learning In Diffusion Language Models Training" (Preprint 2025)

4. F. Z. Peng*, Z. Bezemek *, S. Patel, J. Rector-Brooks, **A. J. Bose**, A. Tong †, P Chatterjee† "Path Planning for Masked Diffusion Models with Applications to Biological Sequence Generation" (Preprint 2025) **arXiv link**

5. D. Rehman, O. Davis, J. Lu, J. Tang, M. Bronstein, Y. Bengio, A. Tong †, **A. J. Bose** †"FORT: Forward-Only Regression Training of Normalizing Flows" (Preprint 2025) **Best Paper ICML 2025 GenBio workshop arXiv link**

6. **A.J. Bose**, M. Brubaker, I. Kobyzev "Equivariant Finite Normalizing Flows" (Preprint 2022). **arXiv link**

7. **A. J. Bose**, and P. Aarabi. "Disruption of Face Detection" U.S. Patent No. P7847US00. 13 Sept. 2018.

WORKSHOPS AND TUTORIALS ORGANIZED

1. **A.J. Bose**, E. Mathieu, C. LeLan, I. Chami, F. Sala, M. Nickel, C. De Sa, C. Ré, "Differential Geometry meets Deep Learning @ NeurIPS 2020" **DiffGeo4DL Website**

2. T. Akhound-Sadegh, M. Skreta, Y. Du, S. Mittal, **A.J. Bose**, A. Tong, K. Nekyludov, M. Bronstein, M. Welling, A. Doucet, A. Hyvrinen, "Frontiers in Probabilistic Inference: Sampling Meets Learning" @ ICLR 2025 **FPI Website**

3. T. Akhound-Sadegh, M. Albergo, **A.J. Bose**, M. Gabrié, L. Grenioux, G. Liu, K. Nekyludov, G. Rotskoff, E. Smorodina, A. Tong"2nd workshop on the Frontiers in Probabilistic Inference: Sampling Meets Learning" @ NeurIPS 2025 **FPI Website**

4. Geometric Generative Models at Learning on Graphs conference, **A.J. Bose**, H. Ben-Hamu, A.Tong Learning on Graphs Conference (LoG 2024)

ACADEMIC ACHIEVEMENTS

GenBio workshop at ICML 2025 Best Paper July 2025
NSERC Post-Doctoral Fellowship ($140,000) Sept 2023
ICML 2024 Top Reviewer Award July 2024

NeurIPS 2022 Top Reviewer Award Oct 2022
ICML 2020 Top Reviewer Award Sept 2020
IVADO Ph.D. Fellowship ($100,000) June 2019
IEEE MMSP Best Paper Honorable Mention Aug 2018
Gordon Slemon Design Award ($1000) Oct 2017

- Awarded for the best 4th year design project as judged by the department.

Centennial Thesis Award $500 May 2017

- Awarded to the 4th-year student who receives the highest grade in the Design Project.

Uoft TrackOne Scholarship ($1000) April 2012

INVITED TALKS AND PANELS

Easter European ML Summer School 2025 July 2025
OAW AI Winter School 2025 January 2025
Mediterranean ML Summer School September 2024
ICML Geometric Representation Learning and Generative Modeling July 2024
University College London May 2020
Facebook AI Research (FAIR) February 2020
University of Toronto & Vector Institute October 2019
Mila Graph Representation Learning Group February 2019
McGill Computational Linguistics Group November 2018
Facebook AI Research (FAIR) November 2018
GeekPwn at DefCon: AI/Robotics and Cybersecurity June 2018

PRESS COVERAGE

University of Toronto News "Meet five impressive graduating students who got the most of their U of T experience" **link**

University of Toronto News "U of T Engineering AI researchers design privacy filter for your photos that disables facial recognition systems" **link**

Forbes "AI Researchers Create 'Privacy Filter' That Disrupts Facial Recognition Technology" **link**

CBC "U of T researchers developing a tool to jam facial recognition software" **link**

VentureBeat "University of Toronto researchers develop AI that can defeat facial recognition systems" **link**

Toronto Star "U of T researchers design algorithm that dupes facial recognition detectors" **link**

Science Daily "AI researchers design 'privacy filter' for your photos" **link**

New York Times "When A.I.s Output Is a Threat to A.I. Itself" **link**

SERVICE

Reviewing

Member of the Program Committee for **ICML 2020,2021,2023**, **NeurIPS 2020,2021,2022, 2023, 2024**, **AAAI 2021**, **ICLR 2022,2023,2025**, **AISTATS 2022**, Transactions of Machine Learning Research **TMLR**, and reviewer for Transactions in Pattern Analysis and Machine Intelligence (**TPAMI**).

Area Chair

NeurIPS 2025LoG 2025