

KARUSH SURI

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EDUCATION

University of Toronto <i>PhD, Electrical & Computer Engineering</i> Thesis: TBD GPA: TBD	2025 - 2029 (Expected) Toronto, Canada
University of Toronto <i>MASc, Electrical & Computer Engineering</i> Thesis: Deep Hierarchical Reinforcement Learning GPA: 4/4	2019 - 2021 Toronto, Canada
Amity University <i>BTech, Electrical & Computer Engineering</i> Thesis: Sign Language Translation from Wearable Sensors (demo) GPA: 8.78/10 (rank: 1/142)	2015 - 2019 Delhi, India

AWARDS

Academic	
University of Toronto Doctoral Scholarship	2025 - 2029
Laura Bassi Scholarship (declined)	2025
Electrical & Computer Engineering Fellowship, University of Toronto	2020 - 2021
Edward S. Rogers Graduate Scholarship, University of Toronto	2019 - 2020
Best in Technical Innovation Award (Class of 2015-2019), Amity University	2019
Most Frugal Innovation Award, Amity University	2018
100% Curriculum Merit Scholarship, Amity University	2015
Young Achievers in Mathematics Award	2015
Industrial	
Outstanding Reviewer, NeurIPS	2023
Outstanding Intern Buddy, Google X	2022

EMPLOYMENT

Valence Labs (Mila) <i>Research Engineer</i> Advisors: Dr. Emmanuel Bengio Projects: (1) Multi-Modal Phenomic Foundational Models, (2) Amortized Inference with GFlowNets	2023 - 2025 Montreal, Canada
Google X <i>AI Resident</i> Advisors: Grace Brentano & Dr. Lam Nguyen Project: Undisclosed	2021 - 2023 Mountain View, USA

INTERNSHIPS

Borealis AI <i>Student Researcher</i> Advisors: Xiao Qi Shi Projects: Deep Hierarchical Reinforcement Learning for Trade Execution	2020 - 2021 Toronto, Canada
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PUBLICATIONS

* = equal contribution

“A Cross Modal Knowledge Distillation & Data Augmentation Recipe for Improving Transcriptomics Representations through Morphological Features”	ICML 2025
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Ihab Bendidi, Yassir El Mesbahi, Alisandra Kaye Denton, Karush Suri , Kian Kenyon-Dean, Auguste Genovesio, Emmanuel Noutahi	
<i>"Understanding Conditional Computation in Contrastive Phenomic Retrieval"</i> Karush Suri , Puria Moghadam, Frederik Wenkel, Maciej Sypetkowski, Emmanuel Bengio, Emmanuel Noutahi, Dominique Beaini	Technical Report 2025
<i>"How Molecules Impact Cells: Unlocking Contrastive PhenoMolecular Retrieval"</i> Philip Fradkin*, Puria Moghadam*, Karush Suri , Frederik Wenkel, Ali Bashashati, Maciej Sypetkowski, Dominique Beaini	NeurIPS 2024 FM4S @ NeurIPS 2024 (oral) (best paper award)
<i>"On the Scalability of GNNs for Molecular Graphs"</i> Maciej Sypetkowski, Frederik Wenkel, Farimah Poursafaei, Nia Dickson, Karush Suri , Philip Fradkin, Dominique Beaini	NeurIPS 2024
<i>"Surprise Minimizing Multi-Agent Learning with Energy-based Models"</i> Karush Suri , Xiao Qi Shi, Konstantinos Plataniotis, Yuri Lawryshyn	NeurIPS 2022
<i>"Off-Policy Evolutionary Reinforcement Learning with Maximum Mutations"</i> Karush Suri	AAMAS 2022 (oral)
<i>"Continuous Sign Language Recognition from Wearable IMUs using Deep CapsNet and Game Theory"</i> Karush Suri , Rinki Gupta	CEE, Elsevier, 2019
<i>"Transfer Learning for sEMG-based Hand Gestures using Deep Learning in a Master- Slave Architecture"</i> Karush Suri , Rinki Gupta	IEEE IC3I 2018

PENDING PATENTS

<i>"Generating Actions for a Supply Chain Network"</i> Lam Nguyen, Grace Brentano, Sze Lee, Karush Suri , Anikait Singh, Salil Pradhan, David Andre Google X, Application Number: 52862.	2024
<i>"Large Language Model Derived Environment State Changes In Supply Chain Logistics"</i> Lam Nguyen, Grace Brentano, Salil Pradhan, David Andre, Gearoid Murphy, Sze Lee, Karush Suri , Raja Panjwani, Anikait Singh, Klara Kaleb Google X, Application Number: 52750.	2023
<i>"Large Language Model Interface for Supply Chain Networks"</i> Lam Nguyen, Grace Brentano, David Andre, Salil Pradhan, Anikait Singh, Karush Suri Google X, Application Number: 52503.	2023
<i>"Generating Network Alignment Information"</i> Raja Panjwani, Anikait Singh, Ashish Chona, Sze Lee, Grace Brentano, Karush Suri , Lam Nguyen, Salil Pradhan Google X, Application Number: 52766.	2022

SERVICES

Reviewer, <i>ICML</i>	2024 - Present
Reviewer, <i>ICLR</i>	2024 - Present
Reviewer, <i>NeurIPS</i>	2024 - Present
Teaching Assistant, <i>Digital Image Processing</i> , University of Toronto	2021
Teaching Assistant, <i>Computational Thinking</i> , University of Toronto	2021
Teaching Assistant, <i>Computer Networks</i> , University of Toronto	2020
Teaching Assistant, <i>Computer Organization</i> , University of Toronto	2020

Autodidactic Learning

1. Reading

I shortlist and read 3-5 conference papers every week. Papers are shortlisted based on how different they are from my current research or engineering topic. I also revisited old mathematics and machine learning textbooks. Some of the material I have read and solved over the years is listed below-

- Topology, James Munkres, all chapters
- Optimization Algorithms on Matrix Manifolds, P. Absil, R. Mahony, R. Sepulchre, all chapters
- Convex Optimization, Stephen Boyd, chapters 6-11
- Neuro-dynamic Programming, Dimitri Bertsekas and John Tsitsiklis, chapters 1-6
- Abstract Dynamic Programming, Dimitri Bertsekas, chapters 1-2
- Machine Learning: A Probabilistic Perspective, Kevin Murphy, chapters 20-24
- Pattern Recognition and Machine Learning, Christopher Bishop, chapters 8-12

2. Writing

I write my ideas in a document once every week. I tend to summarize my idea in 0.5-1 page. In addition to my ideas, I used to summarize important papers. Length of the summary was kept 1 page. The list of paper summaries can be found [here](#).

3. Code Implementations

I previously implemented large codebases as open-source projects once every two months. Below is the list of polished as well as unpolished codebases-

- Toy Examples (JAX and PyTorch) ([here](#))
 - Hierarchical DQN (JAX) ([here](#))
 - Proximal Policy Optimization (JAX) ([here](#))
 - Conservative Q Learning (JAX) ([here](#))
 - Discrete Gumbel Samplers (JAX) ([here](#))
 - Eligibility Traces with Neural Networks (PyTorch) ([here](#))
 - Evolution Strategies (PyTorch) ([here](#))
 - Lagrangian Algorithms and Vector Products (Autograd) ([here](#))
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