

Somjit Nath

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RESEARCH INTERESTS

Reinforcement Learning (RL), Representation Learning, Model Based RL, Real World RL

EDUCATION

McGill University & Mila

Ph.D. in Electrical and Computer Engineering

Advisors: Prof. Derek Nowrouzezahrai, Prof. Samira Ebrahimi Kahou

Transferred from École de technologie supérieure in Jan 2024.

Montréal, Canada

Mar 2022 – present

University of Alberta

Master of Science (Thesis) in Computing Science; GPA: 4.0/4.0

Advisor: Prof. Martha White

Thesis: Fixed Point Propagation: A New Way To Train Recurrent Neural Networks Using Auxiliary Variables

Edmonton, Canada

Sep 2017 – Sept 2019

Jadavpur University

Bachelor of Engineering in Electrical Engineering; GPA: 9.08/10.00

Kolkata, India

Aug 2013 – Jul 2017

RESEARCH & WORK EXPERIENCE

Microsoft Research

Research Intern; (Advisor: Sergio Valcarcel Macua)

Cambridge, United Kingdom

May 2025 – Aug 2025

- Improved representation learning approaches to achieve sampleefficient imitation learning for behavior imitation in video games.

4Division & Mila

Scientist in Residence

Montréal, Canada

June 2024 – Sep 2024

- Worked on developing a scalable Robotics Transformer model that leverages open-ended, task-agnostic training on diverse robotic data to achieve high performance in real-world tasks, demonstrating generalization capabilities critical for robotics.

RBC Borealis

Machine Learning Research Intern; (Advisors: Dr. Siqu Liu, Dr. Yik Chau Lui)

Montréal, Canada

May 2023 – Aug 2023

- Developed an Unsupervised Outlier Detection Framework in Continuous-Time Event Sequences using Reinforcement Learning.

Tata Consultancy Services, Research and Innovation

Researcher; Data and Decision Sciences Team (Advisor: Dr. Harshad Khadilkar)

Mumbai, India

Nov 2019 – Jan 2022

- Applied Reinforcement Learning techniques to solve multi-product, multi-node inventory management problem in Supply Chains, leading to ~20% improvement over current practices.
- Developed a generic Reinforcement Learning Framework for handling delayed actions and observations.

Indian Statistical Institute

Research Intern; Computer Vision and Pattern Recognition Department

Kolkata, India

May – Jul 2015

- Contributed to character segmentation methods for Bengali language using tesseract and cowboxer.
- Implemented an Optical Character Recognition for English Language with an accuracy of 95%.

TEACHING EXPERIENCE

University of Alberta

Edmonton, Canada

Teaching Assistant; CMPUT 275, Introduction to Tangible Computing-II

Jan – April 2018

- Instructed Lab Sessions & Graded Projects and Assignments for ~120 students

University of Alberta

Edmonton, Canada

Teaching Assistant; CMPUT 274, Introduction to Tangible Computing-I

Sept – Dec 2017

- Instructed Lab Sessions & Graded Projects and Assignments for ~150 students

PUBLICATIONS

1. **Behaviour discovery and attribution for explainable reinforcement learning**
Transactions on Machine Learning Research (TMLR), 2025
Rishav Rishav, **Somjit Nath**, Vincent Michalski, Samira Ebrahimi Kahou
2. **Unsupervised Event Outlier Detection in Continuous Time**
Self-Supervised Learning - Theory and Practice, NeurIPS Workshop, 2024
Somjit Nath, Kry Yik-Chau Lui, Siqi Liu
3. **Task-Oriented Slot-Based Cumulant Discovery in General Value Functions**
RLBrew Workshop (Spotlight), Reinforcement Learning Conference (RLC), 2024
Vincent Michalski, **Somjit Nath**, Derek Nowrouzezahrai, Doina Precup, Samira Ebrahimi Kahou
4. **Spectral Temporal Contrastive Learning**
Self-Supervised Learning - Theory and Practice, NeurIPS Workshop, 2023
Sacha Morin*, **Somjit Nath***, Samira Ebrahimi Kahou, Guy Wolf
5. **Prioritizing Samples in Reinforcement Learning with Reducible Loss**
Neural Information Processing Systems (NeurIPS) 2023
Shivakanth Sujit, **Somjit Nath**, Pedro H.M. Braga, Samira Ebrahimi Kahou
6. **Discovering Object-Centric Generalized Value Functions From Pixels**
International Conference on Machine Learning (ICML) 2023
Somjit Nath, Gopeshh Raaj Subbaraj, Khimya Khetarpal, Samira Ebrahimi Kahou
7. **Follow your Nose: Using General Value Functions for Directed Exploration in Reinforcement Learning**
International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2023
Durgesh Kalwar, Omkar Shelke, **Somjit Nath**, Hardik Meisheri, Harshad Khadilkar
8. **Locally Constrained Representations in Reinforcement Learning**
Deep RL Workshop, NeurIPS 2022
Somjit Nath, Samira Ebrahimi Kahou
9. **A Learning Based Framework for Handling Uncertain Lead Times in Multi-Product Inventory Management**
European Workshops on Reinforcement Learning (EWRL) 2022
Hardik Meisheri, **Somjit Nath**, Mayank Baranwal, Harshad Khadilkar
10. **Revisiting State Augmentation methods for Reinforcement Learning with Stochastic Delays**
Conference on Information and Knowledge Management (CIKM) 2021
Somjit Nath, Mayank Baranwal and Harshad Khadilkar

11. **Scalable Multi-Product Inventory Control with Lead Time Constraints using Reinforcement Learning**
Neural Computing and Applications Journal [Impact Factor = 5.102]
Hardik Meisheri, Nazneen N Sultana, Mayank Baranwal, Vinita Baniwal, **Somjit Nath**, Satyam Verma, Balaraman Ravindran, Harshad Khadilkar
12. **SIBRE: Self Improvement Based REwards for Adaptive Feedback in Reinforcement Learning**
International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2021
Somjit Nath, Richa Verma, Abhik Ray, Harshad Khadilkar
13. **Training Recurrent Neural Networks Online by Learning Explicit State Variables**
International Conference on Learning Representations (ICLR) 2020
Somjit Nath, Vincent Liu, Alan Chan, Xin Li, Adam White, Martha White
14. **Two-Timescale Networks for Nonlinear Value Function Approximation**
International Conference on Learning Representations (ICLR) 2019
Wesley Chung, **Somjit Nath**, Ajin Joseph, Martha White
15. **A Fixed-Point Formulation for Recurrent Neural Networks**
Continual Learning Workshop, NeurIPS 2018
Somjit Nath, Taher Jafferjee and Martha White
16. **Rejection Sampling for Off-Policy Learning**
Continual Learning Workshop, NeurIPS 2018
Wesley Chung, Sina Ghiassian, **Somjit Nath** and Martha White
17. **Smartphone Camera Based Analysis of ELISA using Artificial Neural Network**
IET Computer Vision Journal [Impact Factor = 1.95]
Somjit Nath, Subhannita Sarcar, Biswendu Chatterjee, Rhishita Chourashi, Nabendu Sekhar Chatterjee
18. **Arduino Based Door Unlocking System with Real Time Control**
IEEE International Conference on Contemporary Computing and Informatics (IC3I) 2016
Somjit Nath, Paramita Banerjee, Rathindra Nath Biswas, Swarup Kumar Mitra and Mrinal Kanti Naskar

AWARDS & ACHIEVEMENTS

Outstanding Reviewer: International Conference on Machine Learning (ICML) 2025, International Conference on Computer Vision (ICCV) 2023

McGill Engineering Doctoral Award: Received award worth \$153,000 for pursuing PhD at McGill University

TCS Citation Award: Received the award **twice** (Feb 2022 & Oct 2021) for research contributions and publications.

Scholarship for Academic Excellence, State Electrical Engineers' Association: Awarded to undergraduate students who have been ranked in the top 3 students of their batch.

Runner-up in KSHITIJ, the technology fair of IIT Kharagpur: Participated and reached the Final of the Autonomous Robotics Event, "Sherlock" contested by ~30 teams.

Summer Fellow, Indian Academy of Sciences: Only person from Jadavpur University, Electrical Engineering Department to be selected for the year 2015.

SKILLS

Programming: Python, C++, C

Tools: Tensorflow, Pytorch, Jax, MATLAB, Octave, Arduino, Processing

Languages: English (Professional), Bengali (Native), Hindi (Professional)

RELEVANT LEARNING

Training Programs: Trustworthy & Responsible AI Learning Certificate (TRAIL), Mila, 2022

Summer School: CIFAR Deep Learning & Reinforcement Learning Summer School, 2019

Coursework: Introduction to Machine Learning (*CMPUT 551, Prof. Martha White*), Reinforcement Learning & AI (*CMPUT 603, Prof. Rich Sutton*), Optimization Principles in Reinforcement Learning (*CMPUT 659, Prof. Martha White*), Theoretical principles for deep learning (*IFT 6169, Prof. Ioannis Mitliagkas*)

OTHER INTERESTS

Sports: Table Tennis (Rating: 377). Played in Edmonton Chinatown Open 2018 & CUSTTA Open 2018, Calgary