

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. Siqi Liu, Dr. Yik Chau Lui)

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

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

Edmonton, Canada

Jan – April 2018

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

University of Alberta

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

Edmonton, Canada

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, Biswenden 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