

# Gautham Vasan

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## Research Interests

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I'm interested in building machines with animal-like intelligence. To this end, I aim to understand computational principles that could enable agents such as robots to continually learn, adapt, develop, and improve throughout their lives.

## Education

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**Ph.D. in Computing Science**, University of Alberta, Canada 2020 - Present

- Committee: Dr. Rupam Mahmood (advisor), Dr. Richard Sutton, Dr. Matthew Taylor
- Dissertation (proposed): [Real-Time Reinforcement Learning For Robots](#)

**M.Sc. in Computing Science (Thesis)**, University of Alberta, Canada 2017

- Advisor: Dr. Patrick Pilarski
- Dissertation: [Teaching a Powered Prosthetic Arm with an Intact Arm Using Reinforcement Learning](#)

**B.Tech. in Instrumentation and Control Engineering**, National Institute of Technology, Tiruchirappalli, India 2015

- Advisors: Dr. G. Saravana Ilango, Dr. V. Sankaranarayanan
- Capstone Project: [Autonomous Visual Tracking and Landing of a Quadrotor on a Moving Platform](#)

## Employment

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**University of Freiburg, Germany**, Visiting Researcher, DAAD Scholar 03/2023 - 06/2023

- Hosted by Dr. Joschka Boedecker as a part of a DAAD-Stiftung Unicore Fellowship
- Deep reinforcement learning research for integrating noisy electroencephalogram (EEG) signals decoded from a patient's brain, which includes preference and failure information, into a framework for skill learning on assistive robots.

**Ocado Technology (Formerly Kindred AI)**, Machine Learning Researcher, Toronto, Canada 2017 - 2020

- Devised deep reinforcement learning (RL) techniques for SORT, a piece-picking robot that grasps, scans and stows items in warehouses for clothing stores like GAP and American Eagle.
- Supported the development of [SenseAct](#), an open-source computational framework for physical robot learning tasks
- Deployed [RLScan](#) to production. It uses deep RL to learn a vision-based control policy to scan barcodes on clothing with a Fanuc arm. It was trained end-to-end in production, learning from a fleet of robots across multiple warehouses.

## Publications

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### Peer-Reviewed Publications

16. [Gautham Vasan](#), Mohamed Elsayed, Alireza Azimi, Jiamin He, Fahim Shahriar, Colin Bellinger, Martha White, A. Rupam Mahmood, [Deep Policy Gradient Methods Without Batch Updates, Target Networks, or Replay Buffers](#). *NeurIPS 2024* ([Video/Code](#))
15. Mohamed Elsayed, [Gautham Vasan](#), A. Rupam Mahmood, [Streaming Deep Reinforcement Learning Finally Works](#). *NeurIPS FITML Workshop 2024*, ([Code](#))
14. [Gautham Vasan](#), Yan Wang, Fahim Shahriar, James S. Bergstra, Martin Jagersand, A. Rupam Mahmood, [Revisiting Sparse Rewards for Goal-Reaching Reinforcement Learning](#). *RLC 2024* ([Video/Code](#))
13. Huiyi Wang, Fahim Shahriar, Alireza Azimi, [Gautham Vasan](#), A. Rupam Mahmood, Colin Bellinger, [Versatile and Generalizable Manipulation via Goal-Conditioned Reinforcement Learning with Grounded Object Detection](#). *CoRL MRM-D Workshop 2024*
12. [Gautham Vasan](#). [Autonomous Skill Acquisition for Robots Using Graduated Learning](#). *AAMAS 2024*
11. Bram Grooten, Tristan Tomilin, [Gautham Vasan](#), Matthew E. Taylor, Rupam Mahmood, Meng Fang, Decibal Mocanu, [MaDi: Learning to Mask Distractions for Generalization in Visual Deep Reinforcement Learning](#). *AAMAS 2024* ([Video/Code](#))
10. [Gautham Vasan\\*](#), Yan Wang\*, Fahim Shahriar, James S. Bergstra, A. Rupam Mahmood, [Learning Sparse Reward Tasks on Real Robots From Scratch](#), *RAP4 Robotics Workshop, ICRA 2023*
9. Fengdi Che, [Gautham Vasan](#), A. Rupam Mahmood, [Correcting discount-factor mismatch in on-policy policy gradient methods](#), *ICML 2023*
8. Yan Wang\*, [Gautham Vasan\\*](#), A. Rupam Mahmood, [Real-Time Reinforcement Learning for Vision-Based Robotics Utilizing Local and Remote Computers](#), *ICRA 2023* ([Video/Code](#))

7. Dmytro Korenkevych, A. Rupam Mahmood, [Gautham Vasan](#), James Bergstra, [Autoregressive policies for continuous control deep reinforcement learning](#), *IJCAI 2019* ([Video/Website](#))
6. A. Rupam Mahmood, Dmytro Korenkevych, [Gautham Vasan](#), William Ma, James Bergstra, [Benchmarking reinforcement learning algorithms on real-world robots](#), *CoRL 2018* ([Video/Code/Website](#))
5. [Gautham Vasan](#), Patrick M. Pilarski, [Context-Aware Learning from Demonstration: Using Camera Data to Support the Synergistic Control of a Multi-Joint Prosthetic Arm](#), *IEEE BioRob 2018*
4. [Gautham Vasan](#), Patrick M. Pilarski, [Learning from Demonstration: Teaching a Myoelectric Prosthesis with an Intact Limb via Reinforcement Learning](#), *IEEE ICORR 2017* ([Video](#))  
Top 10% of submissions. Selected for oral presentation.
3. Kenny Young, [Gautham Vasan](#), Ryan Hayward, [NeuroHex: A Deep Q-learning Hex Agent](#), *Computer Games Workshop at IJCAI 2016*
2. Juhi Ajmera, Siddharthan P. R., Ramaravind K. M., [Gautham Vasan](#), Naresh Balaji R. and V. Sankaranarayanan, [Autonomous visual tracking and landing of a quadrotor on a moving platform](#), *IEEE ICIIP 2015* ([Video](#))
1. [Gautham Vasan](#), Naresh Balaji Ravichandran, Gowtham Kumar T.S.B, Aravind Govindan, G Saravana Ilango, [A Control Strategy for an Autonomous Robotic Vacuum Cleaner for Solar Panels](#), *Texas Instruments Educators Conference 2014* ([Video](#))

### Peer-reviewed Abstracts

- [Gautham Vasan](#), Patrick M. Pilarski, [Mirrored Bilateral Training of a Myoelectric Prosthesis with a Non-Amputated Arm via Actor-Critic Reinforcement Learning](#), *Reinforcement Learning and Decision Making (RLDM) 2017*.  
Top 8% of submissions. Selected for oral presentation.
- Craig Sherstan, Marlos C. Machado, Jaden Travník, Adam White, [Gautham Vasan](#), Patrick M. Pilarski, [Confident Decision Making with General Value Functions](#), *Reinforcement Learning and Decision Making (RLDM) 2017*.

### Thesis

- [Gautham Vasan](#), Examining Committee: Patrick M. Pilarski, Martha White and K Ming Chan, [Teaching a Powered Prosthetic Arm with an Intact Arm Using Reinforcement Learning](#), M.Sc Thesis, University of Alberta, Edmonton, Canada, 2017.  
Won the M.Sc Outstanding Thesis Award in Computing Science.

### Awards & Achievements

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- *AAMAS Scholarship* to present at the Doctoral Consortium (2024)
- *DAAD-Stiftung UNICORE Scholarship* for a three-month research visit to the University of Freiburg (2023)
- *DAAD AINet Postdoctoral Networking Fellowship* (2022) to visit and foster collaborations with German research labs
- *University of Alberta Doctoral Recruitment Scholarship* Fall 2020/21
- Winner of the *M.Sc Outstanding Thesis Award* in Computing Science at the University of Alberta (2017)
- *Phase-1 Winners and Finalist* at the *Texas Instruments Innovation Challenge India Design Contest* (2014)

### Teaching Experience

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- CMPUT 340: Introduction to Numerical Methods (Winter 2024)
- CMPUT 653: Real-Time Policy Learning (Fall 2023)
- CMPUT 365: An Introduction to Reinforcement Learning (Winter 2021, Winter 2022, Fall 2022)
- CMPUT 174: Introduction to the Foundations of Computation I (Fall 2015, Winter 2016, Fall 2020)

### Technical Skills

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- Programming: Python, C++
- Tools: MuJoCo, PyTorch, Jax, ROS, Docker
- Research Areas: Reinforcement Learning, Deep Learning, Robotics, Real-Time Systems

## Selected Talks

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- *Streaming Deep Reinforcement Learning*, Cohere For AI, 28 Jan 2025 (Invited)
- *Deep Policy Gradient Methods Without Batch Updates, Target Networks, or Replay Buffers*, ML Collective, 7 Feb 2025. Also presented earlier at Mila, McGill University, Brown University and IIT Madras (Invited)
- *From Q-learning to Dreamer*, Amii Tea Time Talks, University of Alberta, 27 Aug 2024
- *Two Issues of Autonomous Robot Learning*, Amii AI Seminar, University of Alberta, 27 Oct 2023
- *Reward (Mis-)Specification in Reinforcement Learning*, Amii Tea Time Talks, 23 Aug 2023
- *Reinforcement Learning for Robots*, natChat @NeurAlbertaTech, 16 Feb 2023 (Invited)
- *Learning from Demonstration: Teaching a Myoelectric Prosthesis using an intact Limb via Reinforcement Learning*, Cognition Seminar, Dept. of Psychology, University of Alberta, 3 Feb 2017 (Invited)

## Community Service

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- *Reviewer*: ICML 2025 | RLC 2025 | Collas 2025 | ICLR 2025 | NeurIPS 2023, 2024 | IEEE BioRob 2024, 2018 | IEEE ICDL 2024 | IROS 2023, 2020
- Candidate selection for the CIFAR Deep Learning and Reinforcement Learning Summer School 2023 & 2024
- *Mentoring*: Six students at the University of Alberta (undergraduate and masters level) on robot learning research
- *Volunteer*: DiscoverE Summer Camp 2023, to showcase and explain robotics research and its real-world applications to Grade 4-6 students.
- Research Volunteer, The Hospital for Sick Children (SickKids, 2019)

## Relevant Coursework

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**Graduate**: Deep Policy Gradient Methods | Theoretical Foundations of Reinforcement Learning | Statistical Computing | Machine Learning and The Brain | Introduction to Reinforcement Learning | Introduction to Machine Learning | Convolutional Neural Nets for Image Processing | Actor-Critic Algorithms | Medical Robotics and Computer Assisted Surgery

**Undergraduate**: Linear Algebra and Probability Theory | Digital Signal Processing | Numerical Methods | Data Structures and Algorithms | Signals and Systems | Sensors and Transducers | Control Systems | Neural Networks and Fuzzy Logic

## Personal

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- **Citizenship**: Canada
- **Languages**: English, Tamil, Hindi

## References

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Available upon request.