



Varun Sreedhara Bhatt

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[Google Scholar Link](#)

Research Interests: Open-Ended Learning, Quality Diversity Optimization, Reinforcement Learning, Multi-Agent Systems, Human-Robot Collaboration

EDUCATION

Doctor of Philosophy (Computer Science) | University of Southern California | **GPA: 4/4** [2021-Present]

- Training generally capable intelligent agents by leveraging quality diversity optimization and scenario generation
- Applications to robotics, human-robot interaction, and evaluating large language models

Master of Science (Computing Science) | University of Alberta | **GPA: 3.9/4** [2018-2020]

- **Thesis:** Inference-Based Deterministic Messaging for Multi-Agent Communication (supervised by Prof. Michael Buro)

Bachelor of Technology (Electrical Engg) | Indian Institute of Technology Bombay | **GPA: 9.55/10** [2014-2018]

- Minor in Computer Science (GPA: 10/10)
- **Project:** Unsupervised Learning Using Sparse Coding in Spiking Convolutional Neural Networks (supervised by Prof. Udayan Ganguly)

RELEVANT PUBLICATIONS AND PRE-PRINTS

- Srikanth, S., Bhatt, V., Zhang, B., Hager, W., Lewis, C.M., Sycara, K.P., Tabrez, A., and Nikolaidis, S. "Algorithmic Prompt Generation for Diverse Human-like Teaming and Communication with Large Language Models," *arXiv preprint arXiv:2504.03991*. (under review). [Arxiv link](#).
- Qian, C., Zhang, Y., Bhatt, V., Fontaine, M. C., Nikolaidis, S., and Li, J. "QD-MAPPER: A Quality Diversity Framework to Automatically Evaluate Multi-Agent Path Finding Algorithms in Diverse Maps," *arXiv preprint arXiv:2409.06888*. (under review). [Arxiv link](#)
- Hedayatian, S.*, Bhatt, V.*, Tjanaka, B., Lewis, C.M., Sycara, K.P., and Nikolaidis, S. "Systematic Generation of Diverse Teams for Improved Multi-Agent Collaboration," (under review).
- Zhang, Y., Jiang, H., Bhatt, V., Nikolaidis, S., and Li, J. "Guidance Graph Optimization for Lifelong Multi-Agent Path Finding," in *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI)*, 2024. [Arxiv link](#)
- Zhang, Y., Fontaine, M. C., Bhatt, V., Nikolaidis, S., and Li, J. "Arbitrarily Scalable Environment Generators via Neural Cellular Automata," in *Advances in Neural Information Processing Systems (NeurIPS)*, 2023. [Arxiv link](#).
- Bhatt, V., Nemlekar, H., Fontaine, M.C., Tjanaka, B., Zhang, H., Hsu, Y. C., and Nikolaidis, S. "Surrogate Assisted Generation of Human-Robot Interaction Scenarios," in *Proceedings of the Conference on Robot Learning (CoRL)*, 2023. [Oral Presentation](#). [Arxiv link](#).
- Zhang, Y., Fontaine, M. C., Bhatt, V., Nikolaidis, S., and Li, J. "Multi-Robot Coordination and Layout Design for Automated Warehousing," in *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI)*, 2023. [Arxiv link](#).
- Bhatt, V.*, Tjanaka, B.*, Fontaine, M. C.*, and Nikolaidis, S. "Deep Surrogate Assisted Generation of Environments," in *Advances in Neural Information Processing Systems (NeurIPS)*, 2022. [Arxiv link](#).
- Bhatt, V. and Buro, M. "Inference-based Deterministic Messaging For Multi-Agent Communication," in *Proceedings of the 35th AAAI Conference on Artificial Intelligence*, 2021. (also accepted at the AAAI Workshop on Reinforcement Learning in Games, 2021). [Arxiv link](#).
- Kalyanakrishnan, S., Aravindan, S.*, Bagdawat, V.*, Bhatt, V.*, Goka, H.*, Gupta, A.*, Krishna, K.*, and Piratla, V.* "An Analysis of Frame-skip in Reinforcement Learning," *arXiv preprint arXiv:2102.03718*, 2021. [Arxiv link](#).

WORK EXPERIENCE

Research Assistant | *Prof. James Wright, University of Alberta, Canada*

[Sep 2020-Aug 2021]

- Worked on modeling human behavior in strategic games
- Collected human behaviour data using **Amazon Mechanical Turk** and analyzed it through **behavioural game theory** models

Internships

• **Samsung Electronics** | *South Korea*

[May-July 2017]

- Created a prototype for a **smart home monitoring system** using anomaly detection

• **Philips** | *India*

[May-July 2016]

- Developed a framework to **automatically generate lip-sync animations** and emotions in a 3D avatar given a text to speak, as a part of a virtual chatbot

Teaching Assistantship

• **Deep Learning and its Applications**, *University of Southern California*

[Spring 2024, Spring 2025]

• **Introduction to Robotics**, *University of Southern California*

[Fall 2023]

• **Intelligent Agents**, *University of Alberta*

[Winter 2020]

• **Reinforcement Learning Specialization**, *University of Alberta on Coursera*

[2019-2020]

• **Introduction to the Foundations of Computation**, *University of Alberta*

[Fall 2018, Winter 2019, Fall 2019]

• **Partial Differential Equations**, *Indian Institute of Technology Bombay*

[Autumn 2016]

OTHER TALKS

- Invited talk at IIT Bombay on “**Scenario Generation as a Tool for Robust Intelligent Agents**”, 2025.
- “**Generating Scenarios with Surrogate Models**” at USC Summer Robotics Seminar Series, 2024.
- “**Quality Diversity Scenario Generation for Robust Intelligent Agents**” at USC Theta Tau Professor Research Event, 2024, on behalf of the ICAROS Lab.
- Introduction to “**Environment Generation for Generalizable Robots**” at EGG workshop at RSS 2023.
- Talk on “**Training Multiple Intelligent Agents to Communicate**” at the Tea Time Talks 2019, Department of Computing Science, University of Alberta. (video available on [YouTube](#))
- Joint talk with Arta Seify on “**The StarCraft 2 ML Environment**” at the AIIDE-18 Workshop on Artificial Intelligence for Strategy Games.

OUTREACH

- Demonstrated the work on diverse collaborative LLM agents at RSS 2025.
- Demonstrated robot research on behalf of the ICAROS Lab at the USC Ginsburg Hall ribbon ceremony.
- Represented ICAROS Lab in the Robotics Open House 2024, showing robot demos to K-12 students.
- Led the organization of the first workshop on “**Environment Generation for Generalizable Robots (EGG)**” at RSS 2023.
- Conference/Journal reviews: GECCO 2023, EGG workshop at RSS 2023, ALOE workshop at NeurIPS 2023, HRI 2024, GECCO 2024, TEVC-IEEE, ISRR 2024, ICRA 2025, GECCO 2025, RSS Pioneers 2025, RA-L 2025, NeurIPS 2025.

TECHNICAL SKILLS

- **Programming Languages:** Python, C/C++
- **Libraries:** PyTorch, TensorFlow, NumPy, Pandas, Jax, ROS, Isaac Sim, Pygame