Stewart C. Jamieson

PhD Student · Autonomous Robots & Machine Learning

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A roboticist working to develop autonomous systems that co-operate with humans in uncertain, unstructured, and unknown remote environments and accomplish their objectives safely and efficiently.

Research Interests & Skills

Artificial Intelligence	Active Learning, Unsupervised Learning, Robust Robot Vision, Spatiotemporal Topic Modelling, AI Ethics
Robotics	Goal-Directed Exploration, Human-Robot Interaction, Uncertainty Quantification, Informative Path Planning
Programming	C++17, Python, PyTorch, TensorFlow, ROS, OpenCV, Pandas, MATLAB, Bash, Java, Android

Education

Massachusetts Institute of Technology & Woods Hole Oceanographic Institution — *Cambridge, MA, USA*

Ph.D. in Applied Ocean Science and Engineering — Marine Robotics (5.0/5.0 CGPA) — *June 2020 - Present*

- Co-supervised by Dr. Yogesh Girdhar (WHOI) and Prof. Jonathan P. How (MIT)
- Developing multi-robot systems that collaboratively explore remote, unfamiliar environments with limited human guidance

S.M. in Aeronautics and Astronautics — Autonomous Systems (5.0/5.0 CGPA) — *June 2018 - May 2020*

- Thesis: *Enabling Human-Robot Cooperation in Scientific Exploration of Bandwidth-Limited Environments*
- Co-supervised by Dr. Yogesh Girdhar (WHOI) and Prof. Jonathan P. How (MIT)
- Relevant Coursework: Cognitive Robotics, Visual Navigation for Autonomous Vehicles, Bayesian Modelling and Inference

University of Toronto — *Toronto, ON, Canada*

B.A.Sc. in Engineering Science with Honours — Robotics Major (3.83/4.0 CGPA) — *Sept. 2013 - Apr. 2018*

- Thesis: *Deep Learning for Robust Vision in Realtime Autonomous Driving*, supervised by Prof. Angela Schoellig
- Applied state-of-the-art uncertainty quantification techniques to achieve safer autonomous driving performance

Work & Research Experience

WHOI's Autonomous Robotics and Perception Laboratory (WARPLab) — *Woods Hole, MA, USA*

Graduate Research Assistant — *June 2018 - Present*

- Developing autonomous exploration algorithms for multi-robot teams exploring the deep ocean and coral reefs
- Publications focus on enabling robot co-operation with humans over slow, bandwidth-limited communication channels
- Assisting with the deployment of these novel algorithms into WHOI's world-class deep sea exploration vehicles

aUToronto Self-Driving Car Team (SAE/GM AutoDrive Challenge) — *Toronto, ON, Canada*

Software Team Lead — *June 2017 - June 2018*

- Led a subteam of 12 graduate and undergraduate students working to develop an autonomous Chevrolet Bolt
- My team created the overall system software architecture, sensor drivers, vehicle control interface, and software services
- At the end of my term as lead, aUToronto won 1st place in Year One of the SAE/GM AutoDrive Challenge

Zebra Technologies Inc. — *Mississauga, ON, Canada*

Software Engineering Intern, Engineering Product Innovation Team — *May 2016 - Aug. 2017*

- Co-designed and co-developed the software of the first Zebra SmartSight™ prototype, a robot designed for retail operations
- Helped to research and present business applications for robotics, machine learning, and neural networks
- 16 months of C++14 development experience including networking, databases, and high performance computing

Wattpad Inc. — *Toronto, ON, Canada*

Android Software Developer, Reader Acquisition Team — *May 2015 - Sept. 2015*

- Wattpad is a worldwide storytelling platform with a community of over 80 million users
- Implemented features designed to attract new users; also implemented A/B tests to validate each features' success

QA Software Developer, Android Core Team — *May 2014 - Sept. 2014*

- Searched for, reported, and fixed software bugs in the Android mobile application with over 15 million users
- Designed and implemented a virtual doorman to greet company visitors and notify staff of their arrival

Publications

Peer-Reviewed Conference Papers

Jamieson, S., Fathian, K., Khosoussi, K., How, J. P., Girdhar, Y. (2021). *Multi-Robot Distributed Semantic Mapping in Unfamiliar Environments through Online Matching of Learned Representations.* In 2021 IEEE International Conference on Robotics and Automation (ICRA). Xi'an, China.

Jamieson, S., How, J. P., Girdhar, Y. (2020). *Active Reward Learning for Co-Robotic Vision Based Exploration in Bandwidth Limited Environments.* In 2020 IEEE International Conference on Robotics and Automation (ICRA). Paris, France. **Won Best Paper Award in Service Robotics.**

Girdhar, Y., Cai, L., **Jamieson, S.**, McGuire, N., Flaspohler, G., Suman, S., & Claus, B. (2019). *Enabling Co-Robotic Scientific Exploration of Unknown Environments over a Low Bandwidth Communication Channel.* In 2019 IEEE International Conference on Robotics and Automation (ICRA). Montréal, Canada.

Workshop Papers

Jamieson, S., Todd, J. E., How, J. P., Girdhar, Y. (2021). *Communicating Efficiently to Enable Human-Multi-Robot Collaboration in Space Exploration.* In "SpaceCHI: Human-Computer Interaction for Space Exploration" Workshop at CHI 2021. Yokohama, Japan.

Beaulieu, S., Alexander, H., **Jamieson, S.**, Longworth, B., McLean, C., Soenen, K., York, A., Krinos, A., Cai, L., Govostes, R. and Hernandez, C. (2020). *Building a data science curriculum and community for ocean scientists, engineers, and students using The Carpentries model.* In AGU Fall Meeting 2020.

Jamieson, S. (2019). *The Pervasiveness of Deep Learning in Robotics Research Does Not Impede Scientific Insights into Robotics Problems.* In "Debates on the Future of Robotics Research" Workshop at ICRA 2019. Montréal, Canada.

Theses

Jamieson, S. (2020). *Enabling Human-Robot Cooperation in Scientific Exploration of Bandwidth-Limited Environments.* Master's Thesis, Massachusetts Institute of Technology & Woods Hole Oceanographic Institution.

Jamieson, S. (2018). *Deep Learning for Robust Vision in Realtime Autonomous Driving.* B.A.Sc. Thesis, University of Toronto.

Honors & Awards

International

2020	**Best Paper Award in Service Robotics (out of 1483 Accepted Papers)**, ICRA 2020	*Paris, France*
2018	**1st Place Team**, SAE/GM AutoDrive Challenge	*Yuma, AZ, USA*

Domestic

2018	**Dean's Honour List**, University of Toronto	*Toronto, ON, Canada*
2014-16	**Dean's Honour List (x3)**, University of Toronto	*Toronto, ON, Canada*
2013	**Governor General's Bronze Medal for Academic Excellence**, High School Graduation	*Burlington, ON, Canada*
2013	**Regional Champion**, ECOO Programming Competition	*Halton, ON, Canada*
2010-13	**School Champion (x4)**, Waterloo CEMC Math Contest	*Burlington, ON, Canada*

Presentations

Videos and other materials used in some of the following presentations are available at www.stewartjamieson.com

Human-Robot Cooperation for Exploring Bandwidth-Limited Environments — *Woods Hole, MA, USA*
Invited Talk, WHOI AOPE Department Seminar Series — *July 2020*

Active Reward Learning for Co-Robotic Exploration in Bandwidth-Limited Environments — *Cambridge, MA, USA*
Invited Presenter & Panelist, ICRAxMIT — *June 2020*

Deep Learning Does Not Impede Scientific Insights into Robotics Problems — *Montréal, QC, Canada*
Invited Lightning Talk, Debates on the Future of Robotics Research, ICRA 2019 — *May 2019*

16.412 Lecture: Multi-Robot Adaptive Sampling — *Cambridge, MA, USA*
Co-Lecturer, Massachusetts Institute of Technology — *Apr. 2019*

An Introduction to Neural Networks and Machine Learning — *Mississauga, ON, Canada*
Lead Presenter for Zebra Technologies Inc. "Lunch & Learn" (200+ attendees) — *Jan. 2017*

Should Robots Have Rights? — *Toronto, ON, Canada*
Co-Presenter in Debate at the University of Toronto — *Dec. 2015*

A Customized Graphical Checklist for Efficient Ambulance Inventory — *Toronto, ON, Canada*
Co-Presenter in "Praxis II Showcase" at the University of Toronto — *Apr. 2014*

Teaching

Massachusetts Institute of Technology — *Worldwide*
Teaching Assistant — *Aug. 2020 - Dec. 2020*
- Fall 2020: 16.485 Visual Navigation for Autonomous Vehicles (Prof. Luca Carlone)

The Carpentries — *Worldwide*
Certified Software Carpentries Instructor — *Oct. 2020 - Present*
- Oct. 2020: Helper for WHOI Data Carpentry Workshop
- July 2020: Co-Instructor for WHOI Python Workshop Series
- Oct. 2019: Helper for WHOI Software Carpentry Workshop

Professional Service

MIT-WHOI Joint Program — *Woods Hole, MA, USA*
Elected At-Large Representative — *Oct. 2020 - Present*
- Co-hosted monthly online student events to maintain social cohesion during worldwide pandemic
- Developed and published the MIT-WHOI Joint Program online photoboard

Zebra Technologies Inc. — *Mississauga, ON, Canada*
Editor, EMC Innovation Newsletter — *May 2016 - Aug. 2017*
- Edited bi-monthly department newsletter and distributed it to over 1700 engineers
- Commissioned, reviewed, and published articles about recent trends and innovations in electronics, robotics, etc.

Graduate Student Member — *Worldwide*
IEEE (Institute of Electrical and Electronics Engineers) — *Nov. 2013 - Present*

Academic Service

- Reviewed Journal Submissions for:
  - Robotics and Automation Letters (RA-L)
  - Journal of Aerospace Information Systems (JAIS)
- Reviewed Conference Submissions for:
  - International Conference on Machine Learning (ICML)
  - International Conference on Robotics and Automation (ICRA)
  - International Conference on Intelligent Robots and Systems (IROS)

Personal Interests

Corpus Christi Jazz Horns and Concert Band — *Burlington, ON, Canada*
Saxophonist — *Sept. 2009 - June 2013*
- Performed in the Atlantic Music Festival (2013), Toronto Music Festival (2012)