

Boris Ivanovic

PHD CANDIDATE IN AERONAUTICS AND ASTRONAUTICS · DEEP LEARNING AND ROBOTICS

Stanford, California, USA

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Education

Stanford University

Doctor of Philosophy (PhD) - Aeronautics and Astronautics

September 2018 - Present

Stanford, CA - USA

- Conducting research at the intersection of robotics and deep learning under Prof. Marco Pavone.
- Head Course Assistant for AA 274A: *Principles of Robot Autonomy I*.

Stanford University

Master of Science (MS) - Computer Science

September 2016 - June 2018

Stanford, CA - USA

- Conducted research in machine learning, computer vision, robotics, and data science.
- Course Assistant for CS231A: *Computer Vision From 3D Reconstruction to Recognition*.

University of Toronto

Bachelor of Applied Science (BASc) with High Honours - Engineering Science - GPA: 3.93

September 2012 - June 2016

Toronto, ON - Canada

- Undergraduate thesis with Professors Raquel Urtasun and Sanja Fidler in Visual SLAM and 3D Scene Segmentation.
- Award-winning TA for CSC411: *Introduction to Machine Learning*.
- Won the final AER201: *Engineering Design* competition.
- Ranked in the top 10% of Engineering Science students.

Publications

Preprints

Trajectron++: Multi-Agent Generative Trajectory Forecasting With Heterogeneous Data for Control

T. Salzmann*, **B. Ivanovic***, P. Chakravarty, M. Pavone (* denotes equal contribution)

arXiv:2001.03093, 2020

Evidential Disambiguation of Latent Multimodality in Conditional Variational Autoencoders

M. Itkina, **B. Ivanovic**, R. Senanayake, M. J. Kochenderfer, M. Pavone

Workshop on Bayesian Deep Learning, Advances in Neural Information Processing Systems (NeurIPS), 2019, Vancouver, Canada

International Peer-Reviewed Conference Proceedings

Map-Predictive Motion Planning in Unknown Environments

A. Elhafs, **B. Ivanovic**, L. Janson, M. Pavone

IEEE International Conference on Robotics and Automation (ICRA), 2020, Paris, France

The Trajectron: Probabilistic Multi-Agent Trajectory Modeling with Dynamic Spatiotemporal Graphs

B. Ivanovic, M. Pavone

IEEE/CVF International Conference on Computer Vision (ICCV), 2019, Seoul, South Korea

BaRC: Backward Reachability Curriculum for Robotic Reinforcement Learning

B. Ivanovic, J. Harrison, A. Sharma, M. Chen, M. Pavone

IEEE International Conference on Robotics and Automation (ICRA), 2019, Montreal, Canada

Generative Modeling of Multimodal Multi-Human Behavior

B. Ivanovic, E. Schmerling, K. Leung, M. Pavone

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018, Madrid, Spain

ADAPT: Zero-Shot Adaptive Policy Transfer for Stochastic Dynamical Systems

J. Harrison, A. Garg, **B. Ivanovic**, Y. Zhu, S. Savarese, L. Fei-Fei, M. Pavone

International Symposium on Robotics Research (ISRR), 2017, Puerto Varas, Chile

Blog Posts

How to Deploy Deep Learning Models with AWS Lambda and TensorFlow

B. Ivanovic, Z. Ivanovic

5th most viewed blog post in all of AWS in 2018

Amazon Web Services (AWS) AI Blog, 2017

Experience

Amazon.com

June 2017 - September 2017

Prime Air SDE Intern

Seattle, WA - USA

- Worked with Principal Research Scientist Ishay Kamon in the Autonomy team.
- Designed and implemented a novel state-of-the-art deep learning approach for a specific computer vision task within the team, outperforming existing models by 10x. The project was completed successfully and a full-time Research Scientist return offer was extended.

Stanford University

January 2017 - June 2017

Independent Research Project

Stanford, CA - USA

- Worked in the Computer Vision and Geometry Lab (CVGL) and Autonomous Systems Lab (ASL) with Professors Silvio Savarese and Marco Pavone on making reinforcement learning more robust with control theory.
- Tackled the problem of policy transfer in reinforcement learning, applying model-predictive control to provide safety guarantees when transferring a learned policy from one environment to another with different dynamics.

Stanford University

September 2016 - June 2017

Research Assistant

Stanford, CA - USA

- Worked in the Stanford Network Analysis Project (SNAP) Lab with Professor Jure Leskovec on analyzing large-scale physical activity data with modern data science methods.
- Efficiently cleaned, preprocessed, and distilled 3 TB of user physical activity data from over 2 million users of a mobile fitness app. Obtained scientific results with data visualization, statistical analyses, and computational methods (including hierarchical bootstrapping).

Amazon.com

May 2016 - August 2016

Prime Air SDE Intern

Seattle, WA - USA

- Worked with former NASA Astronaut Neil Woodward in the Flight Test team.
- Designed and built fault-tolerant, scalable software and hardware to autonomously collect and process relevant flight test data from numerous locations for internal consumption.

ETH Zurich

May 2015 - August 2015

Summer Research Intern

Zurich - Switzerland

- Worked with Professor Raffaello D'Andrea in the Institute for Dynamic Systems and Control, specifically the Flying Machine Arena.
- Removed superfluous code from an open source motor controller and implemented new features such as motor calibration, emergency safety states, and a better motor startup routine in C. Simulated dynamic motor and propeller system responses in Python.

Amazon.com

May 2014 - July 2014

SDE Intern

Seattle, WA - USA

- Worked in the Demand Forecasting team creating a real-time demand forecasting simulation tool. Used the Hadoop MapReduce framework to process large amounts of simulation data generated by a machine learning module. The project was completed successfully and a return offer was extended.

Awards

University of Toronto

May 2016

Engineering Science Award of Excellence

Toronto, ON - Canada

Received for maintaining a CGPA greater than 3.90.

University of Toronto

May 2016

Computer Science TA Award

Toronto, ON - Canada

Received for being the best Computer Science TA in the Winter 2016 semester.

National Sciences and Engineering Research Council (NSERC)

April 2016

NSERC Master's Postgraduate Scholarship (CGS-M) (Declined)

Canada

The CGS-M Program provides financial support to high-calibre scholars who are engaged in eligible master's programs in Canada.

University of Toronto

September 2012 - June 2016

Dean's Honour List

Toronto, ON - Canada

Placed on the Dean's Honour List for all undergraduate semesters.

University of Toronto

September 2012

University of Toronto Scholarship

Toronto, ON - Canada

Received for being one of the top 300 entrants to the University of Toronto in 2012.

Skills

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| Programming | Python, Java, C/C++, MATLAB, R, Scala, Verilog, Assembly, Web (HTML5/CSS3/JavaScript) |
| Learning & Robotics | PyTorch, TensorFlow, MXNet, Theano, MuJoCo, Box2D, MazeBase, ROS |
| Data Science | NumPy, Pandas, Seaborn, Matplotlib, StatsModels |
| Libraries/SDKs | Amazon Web Services SDK, Hadoop, Spark, Node.js, Google Web Tools, Android SDK |