Ekaterina Tolstaya

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contact

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(240) 449 5602

programming

Python, C++, Java

coursework

Machine Learning, Advanced Robotics, Learning in Robotics, Convex Optimization, Probability Theory

languages

English fluency
Russian fluency

education

2016– **Ph.D.** in Electrical and Systems Engineering — University of Pennsylvania

2016–2017 **M.Sc.** in Robotics — University of Pennsylvania

2012–2016 **B.Sc.** in Electrical Engineering, Magna Cum Laude — University of Maryland

2012–2016 **B.Sc.** in Computer Science — University of Maryland

research

2016– **GRASP Laboratory,** Dr. Alejandro Ribeiro, Dr. Vijay Kumar — University of Pennsylvania
Research Assistant
- Developed an algorithm for decentralized control of robot teams using graph neural networks with PyTorch
- Tested and developed an algorithm for composable learning for obstacle avoidance in teams of ground robots
- Implemented Q function approximation algorithms for reinforcement learning in continuous spaces using kernel methods
- Integrated OpenAI Gym with the ROS, Gazebo and MAVROS-based OpenUAV simulation stack for modular reinforcement learning experiments

2015–2016 **Intelligent Servosystems Laboratory,** Dr. P.S. Krishnaprasad — University of Maryland
Women in Engineering Research Fellow
Mobile robot navigation using sound source localization and human body tracking

2013–2015 **MEMS, Sensors and Actuators Laboratory,** Dr. Reza Ghodssi — University of Maryland
Women in Engineering Research Fellow, RISE Honors Program Fellow
Real-time biofilm sensing using electrochemical methods

industry

2019 **DeepMind** — London, UK
Intern, Robotics
- Implemented population-based training for a dynamic robotics task in simulation and on a robotic platform
- Collaborated across multiple teams to formulate a research problem and develop a solution

2018 **Microsoft Research** — Redmond, WA
Research Intern, Adaptive Systems and Interaction Group
- Implemented an inverse optimal control algorithm to learn from air traffic data
- Developed motion planning applications for the AirSim autonomous vehicle simulator and worked to enable Linux support

2016 **Microsoft** — Mountain View, CA
Electrical Engineering Intern, Hololens Hardware
- Designed test tools for signal integrity and DC resistance measurements
- Implemented a software-defined power supply, including a DC/DC converter, embedded system design, and C-based software

2015 **Microsoft** — Redmond, WA
Electrical Engineering Intern, New Product Introduction
- Conducted failure analysis on next-generation hardware
- Performed statistical analysis of data from the hardware assembly line to enable a factory process change and increase the return on investment

2014 **Texas Instruments** — Richardson, TX
Semiconductor Engineering Intern, Process Integration and Parametric Test
- Developed a tool for notifying engineers about trends in electrical test results
- Analyzed data from passive and active experiments to enable a test process change and reduce factory costs

publications

2019 **E. Tolstaya**, F. Gama, J. Paulos, G. Pappas, V. Kumar, A. Ribeiro, "Learning Decentralized Controllers for Robot Swarms with Graph Neural Networks,", Conference or Robot Learning (CoRL), Oct. 29-31, 2019.

2019 A. Khan, **E. Tolstaya**, A. Ribeiro, V. Kumar, "Graph Policy Gradients for Large Scale Robot Control,", Conference or Robot Learning (CoRL), Oct. 29-31, 2019.

2019 **E. Tolstaya**, A. Ribeiro, V. Kumar, and A. Kapoor, Inverse Optimal Planning for Air Traffic Control,", International Conference on Intelligent Robots and Systems (IROS), Nov. 4-8, 2019.

2018 **E. Tolstaya**, E. Stump, A. Koppel, and A. Ribeiro, "Composable Learning with Sparse Kernel Representations,", International Conference on Intelligent Robots and Systems (IROS), Oct. 1-5, 2018.

2018 **E. Tolstaya**, A. Koppel, E. Stump, and A. Ribeiro, "Nonparametric Stochastic Compositional Gradient Descent for Q-Learning in Continuous Markov Decision Problems,", American Control Conference, June 27-29, 2018.

2017 S. Subramanian, **E. Tolstaya**, T. Winkler, W. E. Bentley, and R. Ghodssi, "An Integrated Microsystem for Real-Time Detection and Threshold-Activated Treatment of Bacterial Biofilms," ACS Appl. Mater. Interfaces, 2017, 9 (37), pp 31362–31371.

2016 S. Subramanian, **E. Tolstaya**, W. E. Bentley, and R. Ghodssi, "Real-time impedimetric sensing of bacterial biofilms in microfluidics," 26th Anniversary World Congress on Biosensors, May 25-27, 2016.

2014 **E. Tolstaya**, Y. Kim, S. Chu, K. Gerasopoulos, W. E. Bentley, and R. Ghodssi, "An Inductive-Capacitive Sensor for Real-time Biofilm Growth Monitoring," American Vacuum Society 61st International Symposium, November 9-14, 2014.

2014 M. Gnerlich, **E. Tolstaya**, J. N. Culver, D. Ketchum, and R. Ghodssi, "Solid Microsupercapacitor using Directed Self-Assembly of Tobacco Mosaic Virus and RuO2," American Vacuum Society 61st International Symposium, November 9-14, 2014.

teaching

2019 **Reinforcement Learning** — University of Pennsylvania
Graduate Teaching Assistant

2018 **Signal and Information Processing** — University of Pennsylvania
Graduate Teaching Assistant

2017 **Stochastic Systems Analysis and Simulation** — University of Pennsylvania
Graduate Teaching Assistant

2016 **Introduction to Electrical and Computer Engineering** — University of Maryland
Undergraduate Teaching Fellow

2015 **Introduction to Electrical and Computer Engineering** — University of Maryland
Undergraduate Teaching Fellow

2014 **Introduction to Engineering Design** — University of Maryland
Laboratory Teaching Fellow

awards

2018 **ESE Best Doctoral Citizen Award** — University of Pennsylvania

2016 **National Science Foundation Graduate Research Fellowship** — University of Pennsylvania

2016 **Omicron Delta Kappa Leadership Honor Society** — University of Maryland

interests

professional: aerial robotics, reinforcement learning, planning, simulation, sensing
personal: weightlifting, snowboarding, travel