




# Maxim Egorov

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## Experience

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- 2017-Present **Staff Software Engineer - Autonomy**, A<sup>3</sup> by Airbus
- Leading the design, product development, and implementation of autonomy software for robotic vehicles, such as drones and urban taxis within the next generation of air traffic management
  - Developing novel certification pathways for safety-critical software that includes automatic failure mode discovery, improving logic correctness and reliability of autonomy software
  - Responsible for rapid prototyping and integration of trajectory planning, autonomous coordination, deconfliction, and collision avoidance services in the air traffic management ecosystem
  - Owner of academic R&D activities managing strategy, coordination, and execution
  - Supporting standards and advanced technology demonstrations with NASA and FAA
- 2017 **Machine Learning Consultant**, CureSeq Inc.
- Using deep learning to accelerate cancer drug discovery
- 2014-2017 **Research Assistant**, Stanford Intelligent Systems Lab
- Research in scalable algorithms for learning and decision making in multi-robot systems
  - Mentored high-school and undergraduate students on machine learning projects
  - Led lab-wide standardization of decision-making research tools, resulting in one of the most widely used software libraries for solving Markov decision processes (POMDPs.jl)
- 2014 **Engineering Intern**, Exa Corp.
- Built automation and modeling tools for computational fluid dynamic analysis
- 2011-2013 **Research Assistant**, Lawrence Berkeley National Lab
- Led the design, calibration and data analysis efforts for the NEXT neutrino detector

## Education

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- 2017 **Stanford University**, M.S., Aeronautics and Astronautics GPA: 3.84/4.00  
Focus on Artificial Intelligence and Machine Learning
- 2013 **University of California, Berkeley**, B.S. Physics GPA: 3.86/4.00  
Highest Honors in Physics

## Selected Projects

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- Geopolitical Forecasting**: ML inference algorithms for a team competition administered by IARPA [Github](#)
- Team lead for the design, and development of Brier score based expert forecasting algorithms
- POMDPs.jl**: Algorithms for decision making under uncertainty in Julia [Github](#)
- Creator and primary maintainer, issue tracking, algorithm design and development
- MADRL**: Multi-agent deep reinforcement learning in Python [Github](#)
- Developed multi-agent extensions of popular deep reinforcement learning algorithms (DQN, TRPO, DDPG)
- Chimp**: Flexible deep reinforcement learning in Python [Github](#)
- Developed a deep reinforcement learning framework that works with partially observable environments

## Skills

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**Languages**: Python, C++, Julia.    **Tools**: Docker, Kubernetes,  $\LaTeX$ .    **Tech**: PyTorch, Scikit-learn, ROS.

## Selected Publications

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- » X. Yang, **M. Egorov**, A. Evans, et al., "Stress Testing of Unmanned Traffic Management Decision Making Systems", in *AIAA Aviation*, 2020.
- » S. Li, **M. Egorov**, M. Kochenderfer, "Analysis of Fleet Management and Network Design for On-Demand Urban Air Mobility Operations", in *AIAA Aviation*, 2020.
- » C. Chin, K. Gopalakrishnan, **M. Egorov**, et al., "Tradeoffs between Efficiency and Fairness in Unmanned Aircraft Systems Traffic Management", in *9th International Conference on Research in Air Transportation*, 2020.
- » A. Evans, **M. Egorov**, and S. Munn, "Fairness in Decentralized Strategic Deconfliction in UTM", in *AIAA Scitech Forum*, 2020.
- » **M. Egorov**, V. Kuroda, and P. Sachs, "Encounter Aware Flight Planning in the Unmanned Airspace", in *Integrated Communications, Navigation and Surveillance Conference (ICNS)*, 2019.
- » S. Li, **M. Egorov**, and M. Kochenderfer, "Optimizing Collision Avoidance in Dense Airspace using Deep Reinforcement Learning", in *USA/Europe Air Traffic Management Research and Development Seminar*, 2019.
- » J. Gupta, **M. Egorov**, and M. Kochenderfer, "Cooperative Multi-Agent Control Using Deep Reinforcement Learning", in *AAMAS Workshop on Adaptive Learning Agents*, 2017.
- » **M. Egorov**, Z. Sunberg, E. Balaban, T. Wheeler, J. Gupta, and M. Kochenderfer, "POMDPs.jl: A framework for sequential decision making under uncertainty", *Journal of Machine Learning Research*, 2017.
- » **M. Egorov**, M. Kochenderfer, and J. Uudmae, "Target Surveillance in Adversarial Environments Using POMDPs", in *AAAI Conference on Artificial Intelligence (AAAI)*, 2016.

## Awards

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ICRAT Best Paper Award, 2020

Adaptive Learning Agents Best Paper Award, 2017

AHPCRC Best Student Project, 2016

UC Berkeley Laslett Scholarship, 2013

UC Berkeley William Glenn Homan Scholarship, 2013