

PAYAM PARVIZI

Robotics & Reinforcement Learning Engineer

Ottawa, ON, Canada • payam.parvizi@gmail.com

linkedin.com/in/payamparvizi • github.com/payamparvizi • payamparvizi.github.io

Authorized to work in Canada • Open to relocation across Ontario

PROFESSIONAL SUMMARY

Robotics and reinforcement learning engineer with a PhD in Mechanical Engineering, focused on continuous control, policy regularization, physics-based simulation, and sim-to-real evaluation. Builds end-to-end research systems spanning custom Gymnasium/MuJoCo environments, PyTorch algorithms, reproducible multi-seed SLURM studies, and real-hardware Crazyflie control and evaluation. Published across adaptive optics and robotics, with open-source research tools supporting reproducible evaluation.

TECHNICAL SKILLS

Reinforcement Learning: PPO, SAC, DDPG, actor-critic methods, continuous control, policy regularization, reward design, sim-to-real evaluation

ML & Simulation: Python, PyTorch, Gymnasium, MuJoCo, Tianshou, NumPy, pandas, Matplotlib, Weights & Biases

Software & Computing: OOP, Linux/Ubuntu, Bash, HPC/SLURM, Git/GitHub repository management, MATLAB/Simulink, LaTeX

Robotics & Control: Crazyflie, cflib, Crazyradio, Flow Deck, hands-on hardware integration; classical control and system dynamics (teaching/theory)

PROJECTS

State-Adaptive Proportional Policy Smoothing (SAPPS) | github.com/payamparvizi/sapps-rl

- Created a trajectory-local loss-function regularization method for adaptive policy smoothing and validated it across MuJoCo, adaptive optics, and Crazyflie hardware.
- Led end-to-end implementation and evaluation, released public research code, and prepared a 2026 TechRxiv preprint; manuscript under revision following peer review.

Adaptive Optics Gym | github.com/payamparvizi/adaptive_optics_gym

- Authored and maintained a configurable Gymnasium research environment and optical simulation stack, including command-line workflows, training/evaluation utilities, logging, checkpointing, and from-scratch PPO, SAC, and DDPG implementations.

Crazyflie Reinforcement Learning | github.com/payamparvizi/Crazyflie_RL

- Built a sim-to-real PPO altitude-control workflow with safety constraints, automatic landing, and real-time telemetry; completed 100 real-hardware episodes.
- Achieved approximately 312-microsecond inference at a 10 Hz control rate for real-time continuous control.

Custom MuJoCo Truck-Packing Environment | github.com/payamparvizi/truck_packing_rl

- Developed a Gymnasium-compatible physics simulator for box geometry, contact validation, and density-based rewards in spatial packing problems.
- Customized a Tianshou PPO agent and neural-network architecture to optimize 3D volume utilization.

PROFESSIONAL EXPERIENCE

Research Associate (Postdoctoral Fellow)

Nov 2025 - Mar 2026

University of Ottawa | Ottawa, ON

- Developed and evaluated SAPPS, a trajectory-local policy-regularization method designed to balance action smoothness and responsiveness across MuJoCo, adaptive optics, and Crazyflie control.
- Built reproducible multi-environment, multi-seed CPU/GPU evaluation workflows using Linux, SLURM, and Weights & Biases.
- Led experimental design, maintained public research code, and prepared manuscript revisions following peer review.

Research Assistant

Sep 2022 - Aug 2025

University of Ottawa (NRC collaborative project) | Ottawa, ON

- Designed and released Adaptive Optics Gym, a configurable wavefront-sensorless RL environment spanning atmospheric turbulence, deformable-mirror control, and alternative observation formulations.
- Enabled rigorous baseline comparisons by implementing PPO, SAC, and DDPG from scratch in PyTorch, including actor-critic networks, replay buffers, and experiment checkpointing.
- Achieved higher optical coupling and lower action fluctuation than vanilla PPO and fixed-regularization baselines across multiple simulated atmospheric turbulence conditions.
- Led software development, data analysis, figure preparation, and primary writing for peer-reviewed reinforcement learning and adaptive optics studies.

Teaching Assistant

2019 - 2022

University of Ottawa | Ottawa, ON

- Supported Control Systems, System Dynamics, and Biomedical System Dynamics across seven course terms, covering feedback control, state-space modelling, and MATLAB/Simulink analysis.

Project Assistant

Nov 2015 - Nov 2017

Middle East Technical University (TÜBİTAK-funded project) | Ankara, Turkey

- Developed DMP-based robotic deburring skill models from haptic-device demonstrations and identified model parameters with particle swarm optimization for a hexapod platform.
- Built a MATLAB neural-network model relating process forces/load to depth of cut, spindle speed, and feed rate; thesis experiments achieved flat-surface form errors of 39 μm maximum and 27.9 μm mean.

EDUCATION

PhD in Mechanical Engineering

Sep 2018 - Dec 2025

University of Ottawa | Ottawa, ON

Thesis: Adaptive Policy Smoothing in Reinforcement Learning: Applications to Wavefront Sensorless Adaptive Optics and Robotics.

MSc in Mechanical Engineering

Feb 2015 - Feb 2018

Middle East Technical University

BSc in Aerospace Engineering

Sep 2008 - Jun 2014

Middle East Technical University

SELECTED PUBLICATIONS

- Parvizi, P., et al. "Action-Regularized Reinforcement Learning for Adaptive Optics in Optical Satellite Communication," *Journal of the Optical Society of America B*, 2026. doi:10.1364/JOSAB.578050
- Parvizi, P., et al. "Adaptive Policy Regularization for Smooth Control in Reinforcement Learning," *TechRxiv preprint*, 2026; manuscript under revision. doi.org/10.36227/techrxiv.177004949.91897305
- Parvizi, P., et al. "Reinforcement Learning Environment for Wavefront Sensorless Adaptive Optics in Single-Mode Fiber Coupled Optical Satellite Communications Downlinks," *Photonics*, 2023. doi: 10.3390/photonics10121371
- Parvizi, P., et al. "Parametrization of Robotic Deburring Process with Motor Skills from Motion Primitives of Human Skill Model," *MMAR*, 2017. doi:10.1109/MMAR.2017.8046856

RECOGNITION & LANGUAGES

Recognition: Nominated for the University of Ottawa Excellence Award for Teaching Assistants, 2022.

Languages: English (full professional), Turkish (full professional), Persian (native/bilingual), Azerbaijani (native spoken).