

Mehrdad Moghimi

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SUMMARY

I am broadly interested in reinforcement learning as a framework for building agents that make reliable decisions under uncertainty and over long horizons. Within that broader goal, my early work focused on theory, where I studied the time-inconsistency issue in risk-sensitive RL and developed principled algorithms to address it (published at ICML). Building on that foundation, I shifted toward scaling these ideas to larger problems, developing actor-critic methods for online and offline learning and implementing them in JAX and PyTorch. More recently, I have been exploring more human-aligned decision making, specifically studying time preference alongside risk and investigating constrained RL to address safety challenges that risk sensitivity alone cannot handle.

EDUCATION

- Ph.D. in Applied Mathematics, York University, Toronto, Canada** 09/2021 – 12/2026 (Expected)
– Supervisor: Prof. Hyejin Ku
– Research focus: Safe and Risk-sensitive Reinforcement Learning, Machine Learning, Quantitative Finance
- MBA in Finance, Sharif University of Technology, Tehran, Iran** 09/2018 – 09/2021
– GPA: 18.62/20
– Supervisor: Prof. Hamid Arian
– Research focus: Machine Learning, Quantitative Finance
- BSc in Computer Science, Sharif University of Technology, Tehran, Iran** 09/2014 – 09/2018
– GPA: 18.71/20 (Ranked 1st in Class)

ACADEMIC RESEARCH EXPERIENCE

- Research Collaborator, with Bernardo Ávila Pires (Google DeepMind)** 09/2025 – Present
– Developing reinforcement learning algorithms for constrained MDPs using the distributional RL framework
– Implemented prototype agents in PyTorch and conducted evaluations on Safety Gymnasium benchmarks to assess risk-constraint satisfaction.
- Research Assistant, York University, Toronto, ON, Canada** 09/2021 – Present
– Theoretical Foundations of Risk-Sensitive Reinforcement Learning with Spectral Risk Measures | ICML 2025
 - * Studied the time-inconsistency phenomena in risk-sensitive reinforcement learning and developed a novel theory to characterize the behavior of risk-sensitive policies.
 - * Designed a time-consistent risk-sensitive RL algorithm and established convergence guarantees.
 - * Validated theoretical findings through empirical evaluation on various RL environments.
- Scalable Risk-Sensitive Actor-Critic for Online and Offline RL | Under Review
 - * Expanded the risk-sensitive framework with Spectral risk measures to high-dimensional problems by formulating Actor-Critic architectures suitable for both online and offline learning.
 - * Established convergence guarantees for the policy gradient updates in the tabular setting.
 - * Extended a risk-neutral JAX codebase to incorporate risk-sensitive objectives, and conducted extensive empirical evaluations demonstrating the algorithm's performance in both online and offline settings.
- Joint Analysis of Time and Risk Preferences in Reinforcement Learning | Work in Progress
 - * Investigated the interplay between agent time-preferences (via general discount functions) and risk-sensitivity to create more human-aligned agents.
 - * Demonstrated that existing frameworks for hyperbolic discounting can induce time-inconsistent behavior, leading to sub-optimal policies.
 - * Developed a time-consistent formulation, resulting in significant performance improvements over standard hyperbolic baselines in various environments, including Atari.

Research Assistant, RiskLab, Tehran, Iran

09/2019 – 08/2021

- Developed “Encoded Value-at-Risk,” a novel machine learning framework utilizing Variational Auto-Encoders (VAEs) to model non-linear dependencies in high-dimensional financial data.

Research Assistant, Sharif Image Processing Lab, Tehran, Iran

01/2018 – 08/2018

- Bachelor’s Thesis: Designed a computer vision pipeline for dynamic advertisement replacement in broadcast soccer footage under Prof. Shohreh Kasaei.
- Implemented homography estimation to localize field banners, enabling realistic content substitution that accounts for camera perspective.

ONGOING RESEARCH

- **M. Moghimi**, B. A. Pires, “Stock-augmented Policy Optimization for Safe Reinforcement Learning”, Work in Progress

PUBLICATIONS

- **M. Moghimi**, A. Coache, H. Ku, “Decoupling Time and Risk: Risk-Sensitive Reinforcement Learning with General Discounting”, Under review ([arXiv Link](#))
- **M. Moghimi**, H. Ku, “Risk-sensitive Actor-Critic with Static Spectral Risk Measures for Online and Offline Reinforcement Learning”, Under review at *Expert Systems with Applications* ([arXiv Link](#))
- **M. Moghimi**, H. Ku, “Beyond CVaR: Leveraging Static Spectral Risk Measures for Enhanced Decision-Making in Distributional Reinforcement Learning”, Published at *ICML 2025* ([Link](#))
- H. Arian, **M. Moghimi**, E. Tabatabaei, and S. Zamani, “Encoded Value-at-Risk: A machine learning approach for portfolio risk measurement”, Published at *Mathematics and Computers in Simulation, 2022* ([Link](#))

PROFESSIONAL EXPERIENCE

Model Validation Intern, Sun Life Financial, Toronto, Canada

09/2022 – 12/2022

- Audited quantitative risk models, ensuring alignment with regulatory standards.
- Performed stress-testing to assess model robustness under extreme scenarios.
- Conducted numerical verification and sensitivity analysis on actuarial valuations, identifying discrepancies in risk metric calculations.

HONOURS AND AWARDS

- **York University Graduate Scholarship**, Fall 2021
- **Exceptional Talents Scholarship**, Direct admission to graduate studies (waived National Entrance Exam) due to top academic performance.

TECHNICAL SKILLS

- **Languages (Proficient):** Python
- **Languages (Intermediate):** R, MATLAB, Java
- **Frameworks:** PyTorch, JAX (Flax, Optax), Pandas