# Amirhossein Roknilamouki

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## Education

2022–present **Ph.D. in Electrical and Computer Engineering**
The Ohio State University, Columbus, OH
*Expected graduation: May 2028*

2019–2022 **M.S. in Electrical and Computer Engineering**
University of Tehran, Tehran, Iran
**Thesis:** Distributed control of autonomous surface vessels using Model Predictive Control (MPC).

2015–2019 **B.S. in Electrical and Computer Engineering**
University of Tehran, Tehran, Iran

## Professional Experience

**Crash Avoidance Engineering Intern** Jun.–Aug. 2026
*Transportation Research Center (TRC)* *East Liberty, OH*

- Conducted research on **autonomous driving safety** using Autoware; investigated Vision-Language-Action (VLA) models and world models as learning-based approaches to safe and reliable autonomous driving.

## Publications

- **Roknilamouki, A.**, et al. *Selective Forgetting in Tool-Augmented Language-Model Agents.*
**NeurIPS 2026** Workshop on Towards Test-Time Continual Learning Agents. Accepted. [paper]
- **Roknilamouki, A.**, Ghosh, A., Ekici, E., and Shroff, N. *Escaping Offline Pessimism: Vector-Field Reward Shaping for Safe Frontier Exploration.*
Reinforcement Learning Conference (**RLC**), 2026. [paper]
- **Roknilamouki, A.**, Ghosh, A., Shi, M., Nourzad, F., Ekici, E., and Shroff, N. *Provably Efficient RL for Linear MDPs under Instantaneous Safety Constraints in Non-Convex Feature Spaces.*
International Conference on Machine Learning (**ICML**), 2025. [paper]
- **Roknilamouki, A.**, Dagefu, F. T., Shroff, N. B., et al. *Safe and Reliable Deep Reinforcement Learning for Covert Routing.*
IEEE International Conference on Mobile Ad-Hoc and Smart Systems (**MASS**), 2025. Invited paper.

### Manuscripts Under Review

- **Roknilamouki, A.**, et al. *Thinking Beyond Tools: How Tool-Use RL Reshapes Deliberation.*
Submitted to a top-tier AI conference, 2026.
- Nourzad, F., **Roknilamouki, A.**, Ekici, E., Liu, J., and Shroff, N. *FIRM: Federated In-client Regularized Multi-objective Alignment for Large Language Models.*
Under review at a top-tier AI conference, 2026. [arXiv]

## Research Experience

**Graduate Research Assistant**
*The Ohio State University* — *Columbus, OH*

- **Tool-augmented LLM agents:** Investigated how tool-use RL reshapes reasoning in Qwen and Gemma thinking models, revealing consistently shorter deliberation despite task-dependent accuracy changes. Through behavioral and representation-level analyses, found evidence of reasoning-policy shifts rather than uniform capability loss. Developed reasoning-replay and training-time interventions demonstrating that reasoning performance can recover through distinct deliberation styles, including shorter reasoning trajectories, while revealing trade-offs with tool-use reliability.
- **Offline-to-online RL and safe exploration:** Developed a novel vector-field reward-shaping framework enabling offline-trained policies to continuously explore informative regions without online adaptation. Combined gradient-based attraction and rotational flow to induce sustained exploration along uncertainty boundaries, overcoming the exploration collapse of conventional intrinsic rewards. Established theoretical guarantees on stationary exploration behavior and validated the approach using SAC with normalizing-flow policies.
- **Provably safe reinforcement learning:** Developed a two-phase safe RL algorithm (NCS-LSVI) for linear MDPs with instantaneous hard constraints, extending provably efficient learning to non-star-convex feature spaces. Established sublinear regret with zero safety violations (with high probability), and introduced Objective–Constraint Decomposition to resolve a gap in prior theoretical analysis. Validated the approach through autonomous-driving simulations.
- **Federated LLM alignment:** Developed FIRM, a communication-efficient federated RLHF framework for multiple alignment objectives. Used in-client regularization to mitigate client drift, reduced per-round communication to $1/M$ of standard baselines for $M$ objectives, and established finite-time convergence guarantees.
- **Deep RL for covert routing:** Developed a two-phase training framework combining pre-training on the back-pressure algorithm with conservative fine-tuning to address training instability, support throughput optimization, and stabilize queue dynamics.

## Skills

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|---|---|
| **Languages** | Python, C++, C, R, MATLAB |
| **ML/LLM Stack** | JAX, PyTorch, Flax, Optax, TRL, Hugging Face, scikit-learn, NumPy, pandas |
| **Methods** | Safe and deep RL; RLHF and LLM alignment; federated learning; imitation learning; pre-training |
| **Models & Architectures** | Diffusion transformers, sequence models, action chunking, Llama |
| **Systems & Tools** | Linux, SLURM, CUDA, Docker, Git, GitHub, Jupyter, Google Colab |

## Academic Activities & Service

**Main Reviewer**, NeurIPS 2026

**Reviewer**, IEEE MILCOM; AISTATS

**Oral Presenter**, IEEE MASS 2025

**Poster Presenter**, 8th US–Japan Digital Innovation Hub Workshop 2024

**Poster Presenter**, AIMACCS Workshop 2024

**Teaching Assistant**, University of Tehran
Courses: Machine Learning, Modern Control, Nonlinear Systems, Linear Algebra

## Honors & Awards

**Top Reviewer**, NeurIPS 2026 2026

Ranked **1st** in the Electrical Engineering graduate class, University of Tehran 2019–2022

M.S. admission through the exceptional talent program, ECE, University of Tehran 2019

Ranked **11th of 129** Electrical Engineering undergraduate students, University of Tehran 2018

Ranked **89th of 181,846 (top 0.05%)** in the national B.S. entrance examination 2015