

# Ali Baheri

## Curriculum Vitae

### Research Interests

Theory Reinforcement learning, machine learning, decision making under uncertainty  
Application Autonomous systems, robotics, energy systems  
areas

### Position

2023–onward **Assistant Professor (tenure-track)**, *Rochester Institute of Technology*  
2022–2023 **Visiting Scholar**, *Stanford University*  
2019–2022 **Assistant Professor (research-track)**, *West Virginia University*  
2018–2019 **Postdoctoral Fellow**, *University of Michigan Ann Arbor*

### Education

2015–2018 **Ph.D**, *University of North Carolina at Charlotte*  
Specialized in machine learning and control theory  
2012–2014 **M.S.**, *University of Louisiana at Lafayette*  
Specialized in Mechanical Engineering - systems, dynamics, and control  
2002–2006 **B.S.**, *Sharif University of Technology*  
Specialized in Mechanical Engineering - solid design

### Honors and Awards

2025 Nominee, Outstanding Teaching Award (Eisenhart Awards), Rochester Institute of Technology  
2023 AAAI-23 New Faculty Highlights  
2022 National Science Foundation EPSCoR Fellowship  
2018 Ford-Michigan Postdoctoral Fellowship

### Research Funding

2022-2024 **RII Track-4: NSF: Safety Validation of Autonomous Systems from Multiple Sources of Information**, *NSF-  $\approx$ \$200K*, Single PI  
2021-2026 **NRT-AI: AWARE-AI: AWAREness for Sensing Humans Responsibly with AI**, *NSF- 2.2M*, Senior Personnel  
2021-2023 **Safety Verification Framework for Learning-based Aviation Systems (SVF-LAS)**, *Federal Aviation Administration- \$400K*, Lead PI

- 2021-2022 **Fault Diagnosis for Safety-Critical Autonomous Systems using Reinforcement Learning**, *NASA- \$100K*, Lead PI
- 2021-2022 **Black-Box Verification of Autonomous Systems Using Modular Reinforcement Learning**, *NASA WV Space Grant Consortium- ≈\$30K*, Single PI
- 2021-2022 **Verification of Multi-Agent Autonomous Planning and Control**, *West Virginia University Research Office Program- ≈\$25K*, Single PI
- 2020–2021 **Robust Autonomy Through Experimentally Infused Decision Making with the Application to Planetary Mars Rover**, *NASA WV Space Grant Consortium- ≈\$23K*, Single PI

## Internal Funding

- 2025 **ConceptCrystal: AI-Powered Concept Visualization**, *Rochester Institute of Technology Provost’s Learning Innovations Grant- \$2K*, Single PI
- 2024 **HARMONY: Hierarchical Anchored Representation for Multidomain Operability in Next-gen Systems**, *Rochester Institute of Technology Research Office- \$5K*, Single PI
- 2024 **Provost’s Leadership Opportunity Grants**, *Rochester Institute of Technology- \$2K*
- 2021-2022 **Verification of Multi-Agent Autonomous Planning and Control**, *West Virginia University Research Office Program- ≈\$25K*, Single PI

## Publications

### Journal Publications

- [J20] Z. Shahrooei, **Ali Baheri**, Blending Optimism and Pessimism via Wasserstein Barycenters for Continuous Control. *IEEE Control Systems Letters*, 2026.
- [J19] C. Nau, K. McConky, C. Alm, R. Bailey, **Ali Baheri**, P. Sankaran, M. Sudit, Fairness Without Discrimination: Individually Fair Outcomes in the Kidney Exchange Problem. *Decision Analysis*, 2026.
- [J18] Z. Shahrooei, M. Kochenderfer, **Ali Baheri**, Efficient Counterexample Generation for Control Systems Using Multi-Fidelity Bayesian Optimization. *IEEE Access*, Vol. 14, pp. 61902–61922, 2026.
- [J17] M. Amiri Shahbazi, **Ali Baheri**, N. Azadeh-Fard, Hospital and Regional Effects on Length of Stay: A Multilevel Modeling Approach. *IJSE Transactions on Healthcare Systems Engineering*, 2026.
- [J16] M. Amiri Shahbazi, **Ali Baheri**, N. Azadeh-Fard, A Hierarchical Conformal Framework for Uncertainty-Aware Length of Stay Prediction in Multi-Hospital Settings. *Scientific Reports*, 2026.
- [J15] **Ali Baheri**, P. Wei, Multi-Fidelity Temporal Reasoning: A Stratified Logic for Cross-Scale System Specifications. *Logics*, Vol. 3, No. 2, 2025.
- [J14] **Ali Baheri**, M. Amiri Shahbazi, Conformal Prediction Across Scales: Finite-Sample Coverage with Hierarchical Efficiency. *Results in Applied Mathematics*, Vol. 26, 100589, 2025.

- [J13] **Ali Baheri**, Distributionally Robust Lyapunov-Barrier Networks for Safe and Stable Control Under Uncertainty. *Results in Control and Optimization*, Volume 19, 2025.
- [J12] **Ali Baheri**, Multilevel Constrained Bandits: A Hierarchical Upper Confidence Bound Approach with Safety Guarantees. *Mathematics*, 13(1), 149, 2025
- [J11] K. Hayes, M. Fouts, **Ali Baheri**, D. Mebane, Forward Variable Selection Enables Fast and Accurate Dynamic System Identification with Karhunen-Loève Decomposed Gaussian Processes. *PLOS ONE*, 2024.
- [J10] J. Yancosek, **Ali Baheri**, BEACON: A Bayesian Evolutionary Approach for Counterexample Generation of Control Systems. *IEEE ACCESS*, 2024.
- [J9] P. Razzaghi, A. Tabrizian, W. Guo, S. Chen, A. Taye, E. Thompson, A. Bregeon, **Ali Baheri**, P. Wei, A survey on reinforcement learning in aviation applications. *Engineering Applications of Artificial Intelligence*, Vol. 135, 2024.
- [J8] L. Yifru, **Ali Baheri**, Concurrent Learning of Control Policy and Unknown Safety Specifications in Reinforcement Learning. *IEEE Open Journal of Control Systems*, Vol. 3, pp. 266-281, 2024.
- [J7] **Ali Baheri**, Exploring the role of simulator fidelity in the safety validation of learning-enabled autonomous systems. *AI Magazine*, Vol. 44, pp. 453-459, 2023.
- [J6] **Ali Baheri**, Safe Reinforcement Learning with Mixture Density Network, with Application to Autonomous Driving. *Results in Control and Optimization*, Vol. 6, 2022.
- [J5] **Ali Baheri**, C. Vermillion, Combined Plant and Controller Design Using Batch Bayesian Optimization: A Case Study in Airborne Wind Energy Systems. *ASME Journal of Dynamics, Measurement, and Control*, Vol. 141, Issue 9, 2019.
- [J4] S. Bin-Karim, A. Bafandeh, **Ali Baheri**, and C. Vermillion, Spatiotemporal Optimization Through Gaussian Process Based Model Predictive Control: Case Study in Airborne Wind Energy. *IEEE Transactions on Control Systems Technology*, Vol. 27, Issue 2, pp. 798-805, 2019.
- [J3] **Ali Baheri**, P. Ramaprabhu, and C. Vermillion, Iterative 3D Layout Optimization and Parametric Trade Study for a Reconfigurable Ocean Current Turbine Array Using Bayesian Optimization. *Renewable Energy*, Vol. 127, pp. 1052-1063, 2018.
- [J2] A. Bafandeh, S. Bin-Karim, **Ali Baheri**, and C. Vermillion, A Comparative Assessment of Hierarchical Control Structures for Spatiotemporally Varying Systems, with Application to Airborne Wind Energy. *Control Engineering Practice*, Vol. 74, pp. 71-83, 2018.
- [J1] **Ali Baheri**, S. Bin-Karim, A. Bafandeh, and C. Vermillion, Real-Time Control Using Bayesian Optimization: A Case Study in Airborne Wind Energy Systems. *Control Engineering Practice*, Vol. 69, pp. 131-140, 2017.

#### Conference and Workshop Publications

- [C39] **Ali Baheri**, When Does Multi-Agent Language-Model Debate Converge? A Bifurcation on the Probability Simplex. *In Conference on Complex Systems (CCS)*, 2026.
- [C38] A. Naghdi, **Ali Baheri**, Flow-Corrected Thompson Sampling for Non-Stationary Contextual Bandits. *Continual RL workshop, RLC 2026. (Oral Presentation)*

- [C37] M. Amiri Shahbazi, **Ali Baheri**, Geometry-Aware Uncertainty Quantification via Conformal Prediction on Manifolds. *Epistemic Intelligence in Machine Learning (EIML)* workshop, ICML 2026. **(Spotlight Talk)**
- [C36] **Ali Baheri**, L. Lindemann, Metriplectic Conditional Flow Matching for Structure-Preserving Dynamics Learning. *In European Control Conference (ECC)*, 2026.
- [C35] S. Karpooora Sundara Pandian, **Ali Baheri**, Density-Ratio Weighted Behavioral Cloning: Learning Control Policies from Corrupted Datasets. *In American Control Conference (ACC)*, 2026.
- [C34] **Ali Baheri**, A. Vahid, Geometry-Aware Decentralized Sinkhorn for Wasserstein Barycenters. *In American Control Conference (ACC)*, 2026.
- [C33] D. Millard, **Ali Baheri**, Can Optimal Transport Improve Federated Inverse Reinforcement Learning? *In Learning for Dynamics & Control Conference (L4DC)*, 2026.
- [C32] **Ali Baheri**, Logic-Guided Vector Fields for Constrained Generative Modeling. *In 3rd International Conference on Neuro-Symbolic Systems (NeuS)*, 2026. **(Spotlight Talk)**
- [C31] **Ali Baheri**, Geometry-Grounded Flow Matching on Compact Manifolds. *Geometry-grounded Representation Learning and Generative Modeling (GRaM)* workshop, ICLR 2026.
- [C30] **Ali Baheri**, What Does a Neural PDE Solver Really Learn? A Residual-Spectrum Diagnostic. *AI and Partial Differential Equations (AI&PDE)* workshop, ICLR 2026.
- [C29] C. Salgarkar, **Ali Baheri**, When Distance Matters: Wasserstein Trust Regions for Multi-Agent Coordination. *Multi-Agent Path Finding* workshop, AAAI 2026. **(Oral Presentation)**
- [C28] M. Amiri Shahbazi, **Ali Baheri**, N. Azadeh-Fard, Adaptive Conformal Prediction via Bayesian Uncertainty Weighting for Hierarchical Healthcare Data. *Safe, Ethical, Certified, Uncertainty-aware, Robust, and Explainable AI for Health (SECURE-AI4H)* workshop, AAAI 2026.
- [C27] **Ali Baheri**, Geometry-Aware Backdoor Attacks: Leveraging Curvature in Hyperbolic Embeddings. *Non-Euclidean Foundation Models and Geometric Learning* workshop, NeurIPS 2025.
- [C26] **Ali Baheri**, L. Lindemann, Metriplectic Conditional Flow Matching for Dissipative Dynamics. *Dynamics at the Frontiers of Optimization, Sampling, and Games (DynaFront)* workshop, NeurIPS 2025.
- [C25] **Ali Baheri**, C. Alm, Hierarchical Neuro-Symbolic Decision Transformer. *In 19th International Conference on Neurosymbolic Learning and Reasoning (NeSy)*, 2025.
- [C24] **Ali Baheri**, Wasserstein-Barycenter Consensus for Cooperative Multi-Agent Reinforcement Learning. *Multi-Agent Systems in the Era of Foundation Models* workshop, ICML 2025.
- [C23] **Ali Baheri**, Implicit Constraint-Aware Off-Policy Correction for Offline Reinforcement Learning. *Out-of-Distribution Generalization in Robotics* workshop, RSS 2025.
- [C22] **Ali Baheri**, Z. Shahrooei, C. Salgarkar, WAVE: Wasserstein Adaptive Value Estimation for Actor-Critic Reinforcement Learning. *In Learning for Dynamics & Control Conference (L4DC)*, 2025.

- [C21] Z. Shahrooei, **Ali Baheri**, Optimal Transport-Assisted Risk-Sensitive Q-Learning. *Towards Safe Autonomy: Emerging Requirements, Definitions, and Methods* workshop, RSS 2024.
- [C20] **Ali Baheri**, C. Alm, LLMs-Augmented Contextual Bandit. *Optimal Transport and Machine Learning* workshop, NeurIPS 2023.
- [C19] **Ali Baheri**, Understanding Reward Ambiguity Through Optimal Transport Theory in Inverse Reinforcement Learning. *Optimal Transport and Machine Learning* workshop, NeurIPS 2023.
- [C18] **Ali Baheri**, Risk-Aware Reinforcement Learning Through Optimal Transport Theory. *3rd RL-CONFORM* workshop, IROS 2023.
- [C17] **Ali Baheri**, Safety validation of learning-based autonomous systems: a multi-fidelity approach. *Proceedings of the AAAI Conference on Artificial Intelligence*, Vol. 37, Issue 13, pp. 15432-15432, 2023.
- [C16] **Ali Baheri**, Policy Refinement with Human Feedback for Safe Reinforcement Learning. *RL Workshop Series Bridging the Gap Between AI Planning and Reinforcement Learning*, ICAPS 2023
- [C15] L. Yifru, **Ali Baheri**, Joint Learning of Policy with Unknown Temporal Constraints for Safe Reinforcement Learning. *PRL Workshop Series Bridging the Gap Between AI Planning and Reinforcement Learning*, ICAPS 2023.
- [C14] Z. Shahrooei, M. Kochenderfer, and **Ali Baheri**, Falsification of Learning-Based Controllers through Multi-Fidelity Bayesian Optimization. *In European Control Conference*, Bucharest, Romania, 2023.
- [C13] **Ali Baheri**, H. Ren, B. Johnson, P. Razzaghi, and P. Wei, A Verification Framework for Certifying Learning-based Safety-Critical Aviation Systems. *In AIAA*, Chicago, IL, 2022.
- [C12] **Ali Baheri**, Safe Reinforcement Learning with Mixture Density Network: A Case Study in Autonomous Highway Driving. *In Robotics: Science and Systems*, Corvallis, OR, 2020.
- [C11] **Ali Baheri**, S. Nagesh Rao, I. Kolmanovsky, A. Girard, E. Tseng, and D. Filev, Deep Reinforcement Learning with Enhanced Safety for Autonomous Highway Driving. *In 31st IEEE Intelligent Vehicles Symposium*, Las Vegas, NV, 2020.
- [C10] **Ali Baheri**, I. Kolmanovsky, A. Girard, E. Tseng, and D. Filev, Vision-Based Autonomous Driving: A Model Learning Approach. *In American Control Conference*, Denver, CO, 2020.
- [C9] **Ali Baheri**, C. Vermillion, Waypoint Optimization Using Bayesian Optimization: A Case Study in Airborne Wind Energy Systems. *In American Control Conference*, Denver, CO, 2020.
- [C8] **Ali Baheri**, S. Nagesh Rao, I. Kolmanovsky, A. Girard, E. Tseng, and D. Filev, Deep Q-Learning with Dynamically-Learned Safety Module: A Case Study in Autonomous Driving. *In Neural Information Processing Systems*, Vancouver, Canada, 2019.

- [C7] **Ali Baheri**, C. Vermillion, Context-Dependent Bayesian Optimization in Real-Time Optimal Control: A Case Study in Airborne Wind Energy Systems. *In Neural Information Processing System, NIPS Workshop on Bayesian Optimization*, Long Beach, CA, 2017.
- [C6] **Ali Baheri**, J. Deese, and C. Vermillion, Combined Plant and Controller Design Using Bayesian Optimization: A Case Study in Airborne Wind Energy Systems. *In ASME Dynamic Systems and Control Conference*, Tysons Corner, VA, 2017.
- [C5] **Ali Baheri**, P. Ramaprabhu, and C. Vermillion, Iterative In-Situ 3D Layout Optimization of a Reconfigurable Ocean Current Turbine Array Using Bayesian Optimization. *In ASME Dynamic Systems and Control Conference*, Tysons Corner, VA, 2017.
- [C4] **Ali Baheri**, C. Vermillion, Altitude Optimization of Airborne Wind Energy Systems: A Bayesian Optimization Approach. *In American Control Conference*, Seattle, WA, 2017.
- [C3] **Ali Baheri**, J. Vaughan, Concurrent Design of Unity-Magnitude Input Shapers and Proportional-Derivative Feedback Controllers. *In American Control Conference*, Chicago, IL, 2015.
- [C2] **Ali Baheri**, J. Vaughan, Robust Concurrent Design of Input and Proportional-Derivative Feedback Controllers. *In International Symposium on Flexible Automation*, Awaji-Island, Japan, 2014.
- [C1] **Ali Baheri**, J. Vaughan, Concurrent Command and Mechanical System Design to Limit Transient and Residual Vibration. *In International Conference on Motion and Vibration Control*, Sapporo, Japan, 2014.

#### Non-Peer-Reviewed Publications

- [NPR4] D. Millard, C. Alm, R. Ali, P. Shi, **Ali Baheri**, Federated Distributional Reinforcement Learning with Distributional Critic Regularization, 2026. <https://arxiv.org/abs/2603.17820>
- [NPR3] **Ali Baheri**, M. Kochenderfer, The Synergy Between Optimal Transport Theory and Multi-Agent Reinforcement Learning, 2024. <https://arxiv.org/abs/2401.10949>
- [NPR2] **Ali Baheri**, M.Kochenderfer, Joint Falsification and Fidelity Settings Optimization for Validation of Safety-Critical Systems: A Theoretical Analysis, 2023. <https://arxiv.org/abs/2305.06111>
- [NPR1] S. Jacobs, R. Butts, **Ali Baheri**, Y. Gu, and G. Pereira, A Framework for Controlling Multi-Robot Systems Using Bayesian Optimization and Linear Combination of Vectors, 2022. <https://arxiv.org/abs/2203.12416>

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#### Invited Talk and Presentations

- Mar 2024 Evolving AI Decision-Making: From Safe Reinforcement Learning to Intelligent Systems with Language Models, RIT Center for Human-aware AI (CHAI) Seminar
- Feb 2023 On the Role of Fidelity in the Safety Evaluation of Learning-Based Autonomous Systems, RIT Graduate Seminar
- Feb 2023 On the Role of Fidelity in the Safety Evaluation of Learning-Based Autonomous Systems, AAI-23 New Faculty Highlights Program

- May 2022 Safety Verification of Autonomous Systems: a Multi-Fidelity Reinforcement Learning Approach, ICRA 2022 Workshop on the Verification of Autonomous Systems (VAS)
- Apr 2022 Safe Decision Making in Evolving Environments for Safety-Critical Autonomous Systems, The University of North Texas
- Mar 2022 Lessons from Safe Learning and Safety Validation Research for Autonomous Systems in the Wild, Rochester Institute of Technology
- Aug 2020 Safety Learning in Autonomous Driving, Ford Motor Company
- Feb 2020 Safe and Human-like Decision Making for Autonomous Systems, University of New Mexico
- Nov 2018 Guest Invited Lecture, Deep Reinforcement Learning, University of North Carolina at Charlotte
- Oct 2017 ASME Dynamic Systems and Control Conference
- May 2017 American Control Conference
- July 2015 American Control Conference

### Teaching Experience

- [T4] Developed new graduate level course entitled **Understanding Reinforcement Learning**, Fall 2024, Fall 2025 (class size: 15, SEI: 4.4/5.0)
- [T3] MECE: **System Dynamics** (RIT), Fall 2023, Spring 2024
- [T2] Developed and taught new graduate level course entitled **Reinforcement Learning and Control** (WVU), Spring 2021 (class size: 18, SEI: 4.6/5.0)
- [T1] MAE 460: **Automatic Control** (WVU), Summer 2021, 2022 (class size: 45, SEI: 4.7/5.0)

### Professional Services

- Panel National Science Foundation: DCSD, 2021, 2023, 2024 ( $\times 3$ )
- Panel National Science Foundation: CPS, 2022
- Panel National Science Foundation: SLES, 2023 (twice)
- Panel National Science Foundation: FMitF, 2024
- Panel National Science Foundation: SBIR/STTR, 2024
- Program Committee, AAAI Conference on Artificial Intelligence (AAAI), 2027
- Program Committee “Foundation Models for Decision Making workshop at NeurIPS” 2023, 2024
- Session Chair, American Control Conference (ACC) 2026
- Session Chair, European Control Conference (ECC) 2026
- 2023-present Senior Personnel “NSF AWARE-AI NRT” at RIT (Co-lead the Software track)
- Served as a mentor for NSF REU Site at WVU Summer 2021, Summer 2022
- Co-organize “Machine Learning for Autonomous Driving (ML4AD) workshop at NeurIPS” 2021, 2022

Co-organize “Fault Diagnosis for Safety-Critical Autonomous Spacecraft Systems” workshop, 1<sup>st</sup> Meeting of the Mid-Atlantic Space Grant Data Science Consortium funded by NASA

Co-organize “Robotics Seminar Series” at West Virginia University

### Reviewer Services

Conference on Neural Information Processing Systems (NeurIPS)

International Conference on Learning Representations (ICLR)

IEEE Transactions on Intelligent Vehicles

IEEE Transactions on Vehicular Technology

Sustainable Energy Technologies and Assessments

IEEE Aerospace and Electronic Systems

Journal of Aerospace Information Systems

IEEE Robotics and Automation Letters

Energies

International Conference on Intelligent Robots and Systems (IROS)

Robotics: Science and Systems (RSS)

Conference on Decision and Control (CDC)

American Control Conference (ACC)

European Control Conference (ECC)

ASME Dynamic Systems and Control Conference

IEEE Intelligent Vehicles Symposium (IV)

IEEE International Conference on Intelligent Transportation Systems

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### Advising Experience

- 2024-present Chirayu Salgarkar, Ph.D. Student
- 2021-2024 Lunet Yifru, M.S. Student
- 2021-2024 Joshua Yancosek, M.S. Student
- 2023-2024 Aniket Narendra Patil, M.S. Student (Co-advised with Prof. Cecilia Alm)
- 2023-2024 Kaustubh Gaikwad, M.S. Student (Co-advised with Prof. Cecilia Alm)

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### Ph.D. Thesis Committe Member

- 2023 Rogerio Rodrigues Lima, West Virginia University
- 2022 Robert Tempke, West Virginia University
- 2021 Jared Strader, West Virginia University

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### Memberships

- 2024-present ASME Member
- 2023-present IEEE Member