Kaicheng Guo

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EDUCATION

Brown University, Providence, RI　　　　　　　　　　　　　　　Sept 2022 - May 2026
B.S. in Computer Science and Applied Mathematics (Honors), Overall GPA: **3.92**/4.00
Selected Courses: Robust Algorithms for Machine Learning, Deep Learning, Computer Vision, Optimization, Learning & Seq Decision Making, Systems for Machine Learning, Probabilistic Methods in CS, Functional analysis, PDE, Honors Statistical Inference, Graph Theory, Abstract Algebra

PUBLICATION

Conference Papers

- (Under review) Naicheng He*, **Kaicheng Guo***, Arjun Prakash*, Saket Tiwari, Tyrone Serapio, Ruo Yu Tao, Amy Greenwald, and George Konidaris (2025). *Spectral Collapse Drives Loss of Plasticity in Deep Continual Learning.* Under review at ICLR 2026. [Paper]
- (Accepted) Ruo Yu Tao*, **Kaicheng Guo***, Cameron Allen, and George Konidaris. *Benchmarking Partial Observability in Reinforcement Learning with a Suite of Memory-Improvable Domains.* In Proceedings of the Reinforcement Learning Conference (RLC 2025). [OpenReview]

Workshop Papers

- (Accepted) Naicheng He*, **Kaicheng Guo***, Arjun Prakash*, Saket Tiwari, Tyrone Serapio, Ruo Yu Tao, Amy Greenwald, and George Konidaris (2025). *Mitigating Loss of Plasticity by Preventing Hessian Spectral Collapse.* NeurIPS 2025 Workshop on ARLET. [OpenReview]

RESEARCH EXPERIENCES & INTERNSHIP

Exploration in POMDPs (In Progress)　　　　　　　　　　　　　Providence, RI
Advisor: Professor George Konidaris, Collaborators: Ruo Yu (David) Tao, Computer Science, Brown University　　　　　　　　　　　　　　　　　　　　　　　　Apr 2025 - Present

- Investigating exploration strategies in partially observable domains using memory traces.
- Developing methods to handle unobserved states, emphasizing trajectory-level exploration instead of single-state heuristics.

Research Intern: RL for Manipulation in Unknown Environments　　　Pittsburgh, PA
PI: Professor Maxim Likhachev, Collaborator: Muhammad Suhail Saleem, Robotics Institute, Carnegie Mellon University　　　　　　　　　　　　　　　　　　May 2025 - July 2025

- Designed a framework for robotic manipulation under complete visual occlusion, enabling action based solely on tactile and proprioceptive signals.
- Addressed the challenge of manipulating target objects without visual input, contributing toward robust real-world robotic systems.

RNNs as Superior Function Approximators　　　　　　　　　　　　Providence, RI
Advisor: Professor George Konidaris, Computer Science, Brown University　　　May 2024 - Present

- Demonstrated that RNNs outperform standard MLPs in fully observable environments by achieving lower approximation error.
- Showed that memory mechanisms improve performance by reducing variance and preserving Markov properties.

- Proposed RNN-Skip, a novel architecture that removes recurrence while maintaining the advantages of RNN representations.

Benchmarking Partial Observability in Reinforcement Learning with a Suite of Memory- Improvable Domains <div style="text-align:right">Providence, RI</div>
Advisor: Professor George Konidaris, Collaborators: Ruo Yu (David) Tao, Computer Science, Brown University <div style="text-align:right">Dec 2024 - Feb 2025</div>

- Addressed the challenge of mitigating partial observability in general reinforcement learning algorithms.
- Introduced best-practice guidelines for empirically benchmarking RL under partial observability.
- Developed POBAX (Partially Observable Benchmarks in JAX), an open-source library for standardized evaluation.
- Characterized partial observability types and curated representative benchmark tasks.

UNDERGRADUATE TEACHING ASSISTANT

- CS2951F: Learning and Sequential Decision Making, Supervisor: Professor Michael Littman (Graduate-level, 2025Fall)
- APMA1200: Operational Research, Supervisor: Professor Hui Wang (2025Spring)

SKILLS

Computer Skills: Python, MATLAB, Java, Jax, React Native, TensorFlow
Hobbies: Sailing, Long-distance Swimming, Basketball