Chak Lam Shek

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⌨ https://stone315.github.io/MAR-Lucas/ | 📍 Maryland, USA

SUMMARY

I am a fifth-year Ph.D. student in Electrical and Computer Engineering at the University of Maryland, specializing in reinforcement learning, LLM for planning, and decision-making for multi-agent systems. My research develops algorithms for sequential decision-making under uncertainty, with applications spanning large-scale interactive environments and adaptive AI agents that learn from user and system feedback. I have extensive experience developing and evaluating learning-based agents in simulation and data-driven settings, focusing on generalization, scalability, and human-in-the-loop adaptation. My work, published in venues such as RAL, IROS and ACC, emphasizes robust and scalable solutions that bridge theory and practice. I am particularly motivated by the challenges of safe and generalizable decision-making in open-ended and dynamic user environments, and I am eager to contribute my expertise in reinforcement learning, hierarchical planning, and large-scale evaluation to advance AI agent intelligence.

SKILLS AND EXPERTISE

Python, C/C++, Git, Docker, Pytorch, Tensorflow, scikit-learn, LLM Prompt Design, Linux, MongoDB, SQL, MuJoCo Matlab, Simulink

Diffusion Models, Motion Planning, Temporal logic System, Multi-Agent Reinforcement Learning, Hierarchical Reinforcement Learning, Planning Algorithms (e.g., A*, Tree-based methods, RRT), PDDL, Game Theory, Control System Design, Multi-Robot Coordination and Navigation, Safe/Constrained MDPs, LLM for Contextual Learning and Long-Horizon Reasoning

PUBLICATIONS

Multi-Agent Trust Region Policy Optimisation: A Joint Constraint Approach
Authors: Shek, C. L., Tokekar, P.

- Submitted to Association for the Advancement of Artificial Intelligence (AAAI) 2026

LANCAR: Leveraging Language for Context-Aware Robot Locomotion in Unstructured Environments
Authors: Shek, C. L. , Wu, X., Manocha, D., Tokekar, P., Bedi, A.

- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024

Where to Drop Sensors from Aerial Robots to Monitor a Surface-Level Phenomenon?
Authors: Shek, C. L. , Shi, G., Asghar, A. B., Tokekar, P., Bedi, A.

- American Control Conference 2024

When to Localize? A Risk-Constrained Reinforcement Learning Approach
Authors: Chak Lam Shek, Kasra Torshizi*, Troi Williams, and Pratap Tokekar*

- American Control Conference 2025

Loc-FACMAC: Locality Based Factorized Multi-Agent Actor- Critic Algorithm for Cooperative Tasks
Authors: Shek, C. L. , Bedi, A., Novoseller ,E., Basak, A., Nick, W., Narayan, P., Manocha, D., Tokekar, P.

- Accepted by Robotics and Automation Letters (RA-L)

University of Maryland, College Park
Advisor: Professor Pratap Tokekar
*Doctor of Philosophy in Electrical Engineering; **GPA: 3.78/4.0**   Aug 2021 − Dec 2026 (Expected)*

Wichita State University
*Master of Science in Electrical Engineering; **GPA: 4.0/4.0**   Jan 2018 − May 2020*

Wichita State University
*Bachelor of Science in Electrical Engineering ; **GPA: 3.8/4.0**   Aug 2013 − May 2017*
Bachelor of Science in Mathematics

PROJECT

Domain-Independent and HTN/HGN Planners Design

* Developed domain-independent, hierarchical task network (HTN), and hierarchical goal network (HGN) planner for both the Blocks World and Satellite Observation Scheduling problems.
* Created a planner to move objects from an initial state to match a defined goal state for the Blocks World problem
* Addressed the Satellite Observation Scheduling problem, modeling satellite observations, data collection, and downlink processes.
* Conducted in-depth analysis, evaluating project complexities, CPU running time, and the number of expanded nodes, providing valuable insights for optimization.

Convolution Neural Network Design

* Developed Convolutional Neural Networks (CNNs) with back-propagation function from scratch to solve three distinct 2-class classification problems.
* Designed dedicated kernels for image classification, adept at handling images with Gaussian noise, images with different noise distributions, and fragmented images with random shapes.

Vision Guided Grasping

* Designed human-like grasping gestures and computed the inverse kinematics to pick up different objects by finding the proper spots on the object.
* Simulated the result using power grasp and precision grasp with the Pybullet.

Neural Network Controller for Boat

* Provided data analysis, data mining, and mathematical proof for feature selection for boat trajectory control problem
* Performed training and testing on pseudo-inverse controller.

WORK EXPERIENCE

Honda Research Institute USA (HRI-US)   Mountain View, California
Research Intern   Sep 2025 − Dec 2025 (Expected)
* Investigated task planning strategies for heterogeneous multi-robot teams using Large Language Models (LLMs) and Vision-Language Models (VLMs) under dynamic environmental conditions.
* Surveyed state-of-the-art literature in multi-agent coordination, symbolic reasoning (PDDL), and multimodal foundation models to inform system design.
* Designed a context-aware framework that integrates transformer-based perception modules (e.g., CLIP, BLIP) with task decomposition and symbolic planners.

University of Maryland
Research Assistant
College Park, Maryland
May 2023 – Sep 2025
  * Conducted pioneering research in algorithm development and collaborated with the Arm Research Lab (ARL).
  * Developed a MARL framework for enhanced multi-agent coordination, tested in complex environments, such as Starcraft and TightClaw.
  * Designed a Greedy Algorithm to optimize the deployment of sensor networks and simulated heatmaps for measurement reception.
  * Integrated Large Language Models (LLM) with Reinforcement Learning to improve robot locomotion by extracting environmental state information from human descriptions.

Electronic Sensors Inc.
Engineer Internship
Wichita, Kansas
Aug 2015 – Dec 2015
  * Modeled and analyzed different types of antenna using Network Analyzer.
  * Designed dual band inverted F antenna.