

# MUKESH GHIMIRE

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## SUMMARY

Ph.D. candidate integrating game theory, reinforcement learning, and foundation models to enable robust, interpretable autonomous systems. Experienced in large-scale fine-tuning of Language Models.

## RELEVANT EXPERIENCE

### Mercedes-Benz R&D - San Jose, CA

Machine Learning Intern, 09/2025 - 01/2026

- Built a new VLA model family using Qwen as a backbone, replacing the standard discrete output generation with a continuous action policy.
- Pre-trained the model on nuScenes to predict future ego-trajectories using multimodal inputs (camera feeds and historical state).

### Amazon Web Services (AWS) - Santa Clara, CA

Applied Scientist II Intern, 05/2025 - 08/2025

- Designed a novel RL post-training framework for LLMs to enhance math and code reasoning in settings lacking ground-truth solutions [2].
- Improved accuracy on 3 different math benchmark tasks by an average of 34%, all while mitigating model collapse during training.

### Arizona State University - Tempe, AZ

Ph.D. Researcher, 06/2021 - today

- Developed a novel algorithm to solve one-sided incomplete-information differential games, emphasizing explainable strategies and safe interactions [1, 3].
- Modeled vehicle interaction as general-sum complete- and incomplete-information differential games to generate safe equilibrial policies for both autonomous vehicles and swarm systems [4].
- Proposed an RL-based controller to reduce the frequency of inference in incomplete-information interactions between a human driver and an autonomous agent, enhancing real-time performance.

## SKILLS

**AI & ML:** Reinforcement Learning (RL), Explainable AI (XAI), Model Predictive Control, Agentic AI, Large (and Vision) Language Models (LLMs), RLHF, RLVR, LLM Post-Training/Fine-Tuning.

**Mathematical & Theoretical:** Differential Games, Game Theory, Stochastic Processes, Numerical Methods for PDEs

**Technical:** Python (JAX, NumPy, PyTorch), Linux, Git

## EDUCATION

### Arizona State University

Tempe, AZ, USA

Ph.D. Robotics & AI

Research Focus: Incomplete Information Differential Games, Reinforcement Learning, Optimization

Advisors: Yi Ren, Zhe Xu

08/2021 - 05/2026 (Anticipated)

### University of Mississippi

Oxford, MS, USA

B.Sc. (Hons) Mechanical Engineering

Minors: Computer Science, Mathematics

Thesis: *A Study of Deep Reinforcement Learning in Autonomous Racing Using DeepRacer Car.*

08/2016 - 05/2021

## RELEVANT COURSEWORK

Game Theory, Causal Inference, Stochastic Processes, Convex Optimization, Advanced Modern Control, Numerical Methods for PDEs, Reinforcement Learning.

## SELECTED PUBLICATIONS

[1] M. Ghimire, L. Zhang, Z. Xu, Y. Ren. *Solving Football by Exploiting Equilibrium Structure of 2p0s Differential Games with One-Sided Information*. Accepted at ICLR'26.

[2] M. Ghimire, A. Feng, L. You, Y. Luo, F. Liu, X. Zhu. *PRISM: A Unified Framework for Post-Training LLMs Without Verifiable Rewards*. Under Review.

[3] M. Ghimire, L. Zhang, Z. Xu, Y. Ren. *State-Constrained Zero-Sum Differential Games with One-Sided Information*. ICML'24.

[4] M. Ghimire, L. Zhang, W. Zhang, Y. Ren, Z. Xu. *Solving Two-Player General-Sum Games Between Swarms*. ACC'24.

Full list on Google Scholar.

## SELECTED AWARDS & HONORS

Best Paper Award in MARW Workshop at AAAI 2025

Experiential Learning Grant 2023, 2024

GPSA Travel Grant Award 2023

ICRA Travel Grant 2023

SMBHC Research Fund Award 2020

## ACADEMIC ACTIVITIES

**TALKS:** Sparky's Cup Education - Lightning Talk on Game-Changing AI Applications in Sport.

**REVIEWING:** AAAI, ICLR, ICML, NeurIPS.