

# Bibek Poudel

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## Skills

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- **Machine Learning:** PyTorch, TensorFlow, HuggingFace, W&B, LLM Fine-tuning, Self-supervised and Adversarial learning
- **Programming:** C/C++ (Embedded Systems), Python (Data Science), Ruby on Rails (Web Dev), Git, Docker, Linux
- **Simulation/Robotics:** Gymnasium, MuJoCo, IsaacLab, Sensor integration, Motor Control
- **Reinforcement Learning:** Deep RL algorithms for Real-time Control, Human-in-the-Loop, and Multi-Agent Systems

## Research Experience

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**Fluidic City Lab & Center for Transportation Research, University of Tennessee** 2023 – Present  
*Graduate Research Assistant – Reinforcement Learning (RL) and Robotics*

- Designed a deep RL framework for joint optimization of pedestrian and vehicle traffic across eight real-world intersections and crosswalks, reducing wait times up to 67% for pedestrians and 52% for vehicles.
- Engineered a robotic wheelchair with human-in-the-loop RL that adjusts assistance based on real-time heart rate, enabling users to maintain moderate activity for 72% longer while reducing muscle contractions by 42%.

**Department of Computer Science, University of Memphis** 2019 – 2023  
*Graduate Research Assistant – Real-time Control and Adversarial Machine Learning*

- Applied sample-efficient RL on DC motor steering control of a golf cart, achieving policy learning in under two minutes in simulation and 10.5 minutes on hardware without any prior system knowledge.
- Developed a black-box adversarial attack framework for traffic flow prediction systems that degraded state-of-the-art neural network models by up to 54%.

## Education

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**Ph.D. in Computer Science** 2023 - May 2026 (expected)  
*University of Tennessee, Knoxville* GPA: 3.83/4.0

**M.S. in Computer Science** 2019 - 2023  
*University of Memphis* GPA: 4.0/4.0

## Selected Publications

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- **B. Poudel**, X. Wang, W. Li, L. Zhu, K. Heaslip “Joint Pedestrian and Vehicle Traffic Optimization in Urban Environments using Reinforcement Learning.” *In Submission*.
- A. Zahid, **B. Poudel**, D. Scott, J. Scott, S. Crouter, W. Li, S. Swaminathan, “PulseRide: A Robotic Wheelchair for Personalized Exertion Control with Human-in-the-Loop Reinforcement Learning.” *IEEE/ACM CHASE 2025*.
- **B. Poudel**, W. Li, K. Heaslip, “EnduRL: Enhancing Safety, Stability, and Efficiency of Mixed Traffic Under Real-World Perturbations Via Reinforcement Learning.” *IEEE IROS 2024*.
- M. Villarreal, **B. Poudel**, R. Wickman, Y. Shen, W. Li, “AutoJoin: Efficient Adversarial Training against Gradient-Free Perturbations for Robust Maneuvering via Joint Learning.” *IEEE IROS 2024*.
- **B. Poudel\***, T. Watson\*, W. Li, “Learning to Control DC Motor for Micromobility in Real Time with Reinforcement Learning.” *IEEE ITSC 2022*. \*equal contribution.

[See more in Google Scholar](#)

## Projects

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- **DocuMint:** Created a 100K Python (function, docstring) dataset, benchmarked various Small Language Models, and fine-tuned Google’s CodeGemma to achieve up to 35% improvement over baseline. [HuggingFace](#) · [arXiv](#) · [GitHub](#)
- **Robustness in Autonomous Steering:** Used self-supervised learning to enhance robustness of computer vision models in steering angle prediction, under camera disturbances such as rain, snow, fog, frost, and blur. [PDF](#) · [Video](#)
- **Defending RL Policies against attacks:** Developed input feature squeezing as a defense against RL agents under adversarial attacks, restoring average reward from -21 to +21, winning all games that would otherwise be lost. [PDF](#)
- **Delta 3D Printer:** Engineered a 3D printer from scratch using Arduino Mega, achieving 0.2 mm precision at 40% lower cost than commercial alternatives. [PDF](#)

## Honors & Awards

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- Best paper award finalist: “Congestion-Aware Reinforcement Learning” paper in *IEEE CYBER 2024* Conference
- Won Best project in the class award: [BarterBaron](#) in COMP 7012 Software Engineering, U of M, 2021