

Edwin Meriaux

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Double Phd Student of McGill and University of Paris Saclay under Professor Gregory Dudek and Dr. Antonio Loria

EDUCATION

Phd, McGill and University of Paris Saclay Computer Science	September 2024 – Present	GPA: 4.0
MS, McGill Computer Engineering Thesis Track	September 2022 – August 2024	GPA: 3.8
BS, Computer Engineering: University of Massachusetts Lowell	September 2018 – May 2022	GPA: 3.96

Coding languages: Python, Matlab, Arduino C, Bash

Research interests: multi-agent systems, autonomous robotics, communication-aware planning, and distributed perception in constrained environments.

Selected Publications

- Meriaux, Edwin, and Aditya Mahajan. "Robust Shortest Path with Incremental Information Revelation." *2025 European Control Conference (ECC)*. IEEE, 2025.
- Meriaux, Edwin, et al. "On Mobile Ad Hoc Networks for Coverage of Partially Observable Worlds." *arXiv preprint arXiv:2512.09495* (2025).
- Meriaux, Edwin, and Jay Weitzen. "Robustness of Couzin Swarming to Packet Loss and Methods to Improve Robotic Swarm Communication." *2024 IEEE International Conference on Microwaves, Communications, Antennas, Biomedical Engineering and Electronic Systems (COMCAS)*. IEEE, 2024.
- Wen, Shuo, et al. "Stable Multi-Drone GNSS Tracking System for Marine Robots." *arXiv preprint arXiv:2511.18694* (2025).
- Meriaux, Edwin, et al. "How Does Trust in Simulations of Drone Failures Compare with Reality?." *2024 10th International Conference on Automation, Robotics and Applications (ICARA)*. IEEE, 2024.
- Meriaux, Edwin, Jay Weitzen, and Adam Norton. "Simulation of the effect of correlated packet loss for suas platforms operating in non-line-of-sight indoor environments." *Drones 7.7* (2023): 485.
- Meriaux, Edwin, and Kshitij Jerath. "Evaluation of navigation and trajectory-following capabilities of small unmanned aerial systems." *2022 IEEE International Symposium on Technologies for Homeland Security (HST)*. IEEE, 2022.
- Norton, Adam, et al. "Decisive test methods handbook: Test methods for evaluating suas in subterranean and constrained indoor environments, version 1.1." *arXiv preprint arXiv:2211.01801* (2022).
- Meriaux, Edwin, et al. "Performance comparison of machine learning methods in ddos attack detection in smart grids." *2022 IEEE MIT undergraduate research technology conference (URTC)*. IEEE, 2022.
- Norton, Adam, et al. "Decisive benchmarking data report: suas performance results from phase i." *arXiv preprint arXiv:2301.07853* (2023).

Awards:

McGill Nominated Candidate to Vanier Phd Scholarship 2024-2025 (ranked 91/190 nationally)

Recipient FRQNT Scholarship 2024-2025 for the years 2025-2028

McGill Grad Mobility Award

MITACS Global Link recipient:

McGill Graduate Excellence Award McGill

Umass Lowell Undergraduate Electrical and Computer Engineering Excellence Award

Work and Research Experience

Phd Research:

September 2024 – Present

- Development of multi-agent systems algorithms to control the creation of ad-hoc communication networks in uncertain spaces using mobile ground and flying robots.
- Presentation and development of the Partially Observable Cooperative Guard Art Gallery Problem (POCGAGP) to create the mathematical formulation for ad-hoc communication network deployments in constrained spaces.
- Bounded Decentralized and Centralized algorithms to solve the POCGAGP.
- Developed solution using Multi-Agent RL (MARL) and LLMs to control decentralized multi-agent systems.

Masters Research: September 2022 - September 2024

- Robust path coverage in multi-agent systems for search and rescue. Using Nash Equilibriums, graph theory, and game theory to develop worst case bounds coverage and traversal time assuming worst possible state space.
- World is modeled using Markov-Decision Process (MDP) model stochastic controls. The uncertainty in the world is captured by the agent(s) through creating a belief state in the MDP which turns it into a Partially Observable MDP (POMDP).

Aerial GNSS estimation with aerial drones: September 2024 - September 2025

- Development of a cooperative multi-agent aerial-marine system using multiple drones to estimate GNSS positions of multiple submerged and surface robots.
- Design of multi-drone tracking, cross-drone ID alignment, and multi-view estimation methods for robust localization under limited or unavailable GNSS conditions.
- Fusion of distributed aerial observations using triangulation and Extended Kalman Filtering for real-time multi-robot localization validated through field deployments.

Improving Couzin Swarming Relative to Packet Loss: Summer 2022 - Fall 2025

- Investigation of communication robustness in decentralized multi-agent swarms using the Couzin swarming model under packet loss and degraded communication conditions.
- Analysis of how communication failures affect swarm cohesion, collision avoidance, and collective behavior in large-scale multi-agent systems.
- Development and evaluation of distributed communication strategies, including packet redundancy and inter-agent packet passing, to improve swarm stability under limited connectivity.

LLM DRL Recommender Systems: September 2023 - September 2024

- Development of recommender systems combining Deep Q-Networks (DQN) and Deep Recurrent Q-Networks (DRQN) with affordance-based models for sequential product recommendation.
- Integration of large language model embeddings (LLaMA, FastText, BERT) to represent product semantics and guide reinforcement learning policies.
- Implementation of training strategies including warm-start and cold-start procedures, achieving performance comparable to state-of-the-art recommendation approaches.

Summer Machine Learning Research Engineer AppScan Division of HCL: 2023 – September 2023

- Development of deep learning models for detecting injection vulnerabilities by learning structural relationships within source code, with a focus on identifying data flow between sources and sinks.
- Integration of LLM-based representations to enable lightweight and efficient models capable of analyzing code semantics across multiple programming languages without extensive retraining.
- Construction of a labeled training dataset through automated data generation and annotation, including GPT-assisted labeling to scale vulnerability classification.
- Implementation of regex-based preprocessing methods for token and symbol localization to improve model understanding of code structure and data flow patterns.

EXALABs Research Group: September 2019 – Summer 2022

- Developed test methodologies to evaluate drones in underground environments for the US Army Research lab (DECISIVE project). Work concentrated on two aspects: Navigation and Obstacle Avoidance/Resilience. This was both in simulation in the Airsim drone simulator and in real-life tests.
- The project concentrated on testing the drones and developing replicable tests for future drones.