**AuE-8930**

**Computing & Simulation for Autonomy**

**Capstone Project**

**Project Title:**

A Modular and Parallelizable Multi-Agent Reinforcement Learning Framework for Cooperative and Competitive Autonomous Vehicles

**Team Members:**

1. Chinmay Samak
2. Tanmay Samak

**Objectives & Responsibilities:**

* Set up high-fidelity 3D simulation platform based on real-world vehicle/environment representations (real2sim transfer) [Tanmay]
* Set up intelligent agent/environment parallelization framework for accelerating RL training [Tanmay]
* Formulate multi-agent reinforcement learning (MARL) problems for: [Tanmay]
  + Cooperative MARL (e.g., safe intersection traversal)
  + Competitive MARL (e.g., head-to-head autonomous racing)
* Implement the formulated deep reinforcement learning (DRL) pipeline and conduct parallelized training using local/cloud high-performance computing (HPC) resources [Chinmay]
* Deploy and analyze the trained policies and procedures to comment on the aspects of “computing and simulation for autonomy” [Chinmay]
* Potentially (if time permits) demonstrate simulation to reality (sim2real) transition of the trained policies in a digital-twin framework [Chinmay]

***Note:*** *The name in square bracket indicates primary responsibility and NOT contribution. Both members will work together and contribute equally to this project.*