Undergraduate Student Research Award (USRA) – Summer 2023

**Safe Robotic Reinforcement Learning via Hamilton-Jacobi Reachability in the School of Computing Science**

During this internship, the undergraduate USRA researcher will join the Multi-Agent Robotic Systems Lab (MARS Lab), supervised by Dr. Mo Chen, and work with a multidisciplinary team of researchers. The student will gain hands-on experience with algorithm development and real-world implementation of robotic systems.

**Project Details:**

Safe reinforcement learning is a challenging area in robotics, and is essential for enabling robots to be deployed in the real world in uncontrolled environments such as stores, schools, and other public areas at a large scale. The MARS lab is investigating how robotic control algorithms can combine reachability analysis – a powerful robotic safety analysis tool – with reinforcement learning to allow robots to learn to perform complex tasks safely and perpetually, without endangering themselves and the environment. The USRA project involves helping develop safe RL algorithms, running simulated and real-world robotic experiments to explore how robots can learn to perform tasks effectively and safely, and documenting and presenting research results.

**Desired qualifications:**

- Interest in developing mathematical theory and learning algorithms.
- Interest in training neural network models using a combination of RL and control theory.
- Able to assist in performing simulated and real-world robotic experiments.
- Knowledge of or strong ability to learn mathematical foundations and software implementation of robotic navigation algorithms.
- Recommended courses: CMPT 310, CMPT 410/726, CMPT 419/720

For more information of the MARS lab, please visit [https://sfumars.com](https://sfumars.com).