

# Scott M. Shaw

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## Education

**Northeastern University, Boston, MA**

***Khoury College of Computer Sciences***

**May 2023**

Bachelors of Science in Computer Science, AI Concentration | Mathematics Minor

GPA: 3.64/4.00, Dean's List

Related Coursework: Robotic Science and Systems, Artificial Intelligence, Machine Learning and Data Mining I/II, Algorithms and Data, Object-Oriented Design, Software Engineering, Numerical Analysis, Multivariable Calculus, Linear Algebra, Probability and Statistics

***Northeastern University London, London, UK***

**August - December 2019**

Northeastern University Study Abroad Program, Computer Science

**The Haverford School, Haverford, PA**

**June 2019**

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## Experience

**National University of Singapore: Multi-Agent Robotic Motion Laboratory (MARMoT Lab)**

***Student Researcher / Gait Generation and Leg Breakage***

**January - September 2022**

- First author on contribution published at CDC 2022, detailing methods and results from previous research
- Extended previous work on gait transitions to enable responses to leg breakages (i.e., transition to a stable gait when a leg fault is detected without losing stability and maximizing forward progression)
- Created an algorithm to inexpensively generate stable gaits to adapt to single or multi-leg breakages
- Enabled reactive transitions to generated gaits to respond to leg breaks online for continuous locomotion
- Currently working on expanding gait generation research to work towards another publication
  - Looking into more strict leg breakage constraints (e.g., joint specific breakages)
  - Adapting gait to produce adequate footfalls for the environment whenever not possible

***Student Researcher / Gait Design and Transitions***

**January - September 2021**

- Implemented online, real-time gait transitions on a hexapod robot while ensuring stable locomotion and forward progression using a central pattern generator (CPG)-based controller
- Leveraged robot's inertial measurement unit (IMU) feedback to guarantee stability during gait transitions
- Applied gait transitions to support versatile applications on the robot, such as mobile manipulation
- Learned about various mathematical representations of CPGs and their use as legged robot controllers
- Developed skills with Gazebo/ROS & PyBullet to simulate experiments on the robot
- Collaborated with students in the lab on research and to run on-robot experiments
- Participated in weekly lab meetings to share progress and collaborate with other students

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## Projects

**Path Planning for Pick-and-Place**

- Experimented with a 6-DoF robot arm in a simulated PyBullet environment
- Used OMPL to implement and compare the performance of RRT and RRT\* path planning algorithms
- Simulated suction gripper using PyBullet constraints
- Algorithms were tested by moving a group of boxes from one side of the robot to another

**Autonomous Q-Learning Agent**

- Created an autonomous agent using Epsilon-Greedy Q-Learning to play the game, Greed
- Compared the performance of Q-Learning agent to other agents with various static strategies

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## Skills

**Programming Languages:** C++, Python, JavaScript, Typescript, Java

**Language Libraries:** C++: Eigen | Python: Numpy, Scipy, Sklearn, Pytorch, Pybullet, OMPL, Pandas, Pinocchio

**OS/Software:** Linux, Git, ROS, Gazebo, Solidworks, Windows/macOS