

# Scott M. Shaw

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## Experience

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### National University of Singapore: Multi-Agent Robotic Motion Laboratory

#### *Student Researcher / Gait Generation and Leg Failure*

January - September 2022

- Extended previous work on gait transitions to enable responses to leg failures by performing gait transitions when leg faults are detected, preventing loss of stability and maximizing forward progression
- Created an algorithm to inexpensively generate stable gaits to adapt to single or multi-leg failures
- Enabled reactive transitions to generated gaits to respond to leg faults online for continuous locomotion
- 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

- Shaw, Scott, and Guillaume Sartoretti. "Keyframe-based CPG for Stable Gait Design and Online Transitions in Legged Robots." *2022 IEEE 61st Conference on Decision and Control (CDC)*. IEEE, 2022.
- 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 ROS/Gazebo and 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

## Skills

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**Robotics:** Kinematics, Transforms, Motion Planning (PRM, RRT), Controllers (CPGs)

**ML/RL:** Regression (Linear/Ridge/Logistic), Neural Networks (Perceptrons/Autoencoders/DNN/CNN), Generative Models (GDA/NB/EM), Boosting (Adaboost/Gradient Boosting), Active Learning, SVM, KNN, Q-Learning

**Language Libraries:** C++: Eigen

Python: Numpy, Scipy, Sklearn, Pytorch, Pybullet, OMPL, Pygame, Pinocchio, Pandas

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

**OS/Software:** Linux, Git, ROS/ROS2, Gazebo, Solidworks, Fusion 360

## Education

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### Northeastern University, Boston, MA

#### *Khoury College of Computer Sciences*

May 2023

Bachelors of Science in Computer Science, AI Concentration | Mathematics Minor (3.64/4.00)

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