# Curtis C. Johnson

curtiscjohnson.github.io
curtiscarljohnson@gmail.com
LinkedIn: curtiscjohnson1

## Education

**Brigham Young University**  Provo, Utah
Ph.D. in Mechanical Engineering  April 2020–Current

- Advisor: Dr. Marc Killpack
- Emphasis in Robotics and Controls

**Brigham Young University**  Provo, Utah
B.S. in Mechanical Engineering, GPA: 3.70/4.00  April 2020

## Experience

**Robotics and Dynamics Laboratory**  Provo, Utah
Graduate Student Researcher  Current

- Investigating model-based and data-driven optimal control methods for soft robots interacting with the environment.
- Funded by a grant from the NSF EFRI Program.

**BYU Mars Rover Team**  Provo, Utah
Mechanical Team Lead  2019-2020

- Led a team of 15 students for the University Rover Challenge (URC), an international competition challenging student teams to design and build the next generation of Mars rovers.
- Responsible for the mechanical design of a robotic manipulator and chassis.
- See https://www.youtube.com/watch?v=BoTr3ki3cUQ

**IM Flash Technologies (an Intel-Micron Joint Venture)**  Lehi, Utah
Automation Engineering Intern  Summer 2019

- Designed and implemented an automated cleaning system to clean toxic chemicals from semiconductor manufacturing equipment.

## Journal Papers

1. Hyatt P, **Johnson CC** and Killpack MD (2020) "Model Reference Predictive Adaptive Control for Large-Scale Soft Robots". *Front. Robot. AI 7:558027.* doi: 10.3389/frobt.2020.558027

2. **Johnson CC**, Quackenbush T, Sorensen T, Wingate D and Killpack MD (2021) "Using First Principles for Deep Learning and Model-Based Control of Soft Robots". *Front. Robot. AI 8:654398.* doi: 10.3389/frobt.2021.654398

## Papers Under Review

1. S. W. Jensen, **C. C. Johnson**, A. M. Lindberg, and M. D. Killpack, "Tractable and Intuitive Dynamic Model for Soft Robots via the Recursive Newton-Euler Algorithm," *2022 IEEE International Conference on Soft Robotics (RoboSoft)* p. 7.

2. V. Sherrod, **C. C. Johnson**, and M. D. Killpack, "Design Optimization for a Compliant, Continuum-Joint, Quadruped Robot," *Frontiers in Robotics and AI*, p. 31.

## Teaching and Mentoring

- **Research Mentor** at Brigham Young University           2021-Present
  *Soft Robot Design Project*

  - Lead group of 4-7 undergraduate students on a project to design a large scale soft robot.

- **Teaching Assistant** at Brigham Young University          2017-2019
  *Introduction to Mechatronics*

  - Instructed over 150 students in the design and control of small mobile robots for a class competition.
  - Oversaw weekly labs involving PCB design, embedded programming, and signal processing.

## Skills

- **Programming and Software:** Python, C++/C, MATLAB, LaTeX, ROS, PyTorch, MuJoCo, Autodesk Eagle
- **Technical:** Model Predictive Control, Linear/Nonlinear Optimization, Deep Learning, Dynamical System modeling, Adaptive Control, Force Control, Path Planning, Physics Simulation, Genetic Algorithms

## Selected Projects

See more projects and details on curtiscjohnson.github.io/projects.

- **Pressure Control System (2021)**: Created a low-level pressure control system for pneumatic robots in our lab, including a custom PCB design, embedded C++ programming, and a ROS interface.
- **Deep Learning with PyTorch (2021)**: Implemented several state-of-the-art deep learning algorithms in PyTorch (e.g. CNN, LSTM, GRU, RL, Variational Autoencoders, etc.).
- **UAV Simulator (2020)**: Implemented a fully controllable dynamic simulation in Python of a fixed-wing UAV.