

EDUCATION

Brigham Young University
Ph.D. in Mechanical Engineering

Provo, Utah
April 2020–Current

- Advisor: Dr. Marc Killpack
- Emphasis in Robotics, AI, and Controls
- Dissertation Topic: Modeling, Planning, and Control for Whole-Body Manipulation of Unknown Objects with Large-Scale Soft Robots

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EXPERIENCE

Robotics and Dynamics Laboratory
PhD Candidate

Provo, Utah
Current

- Dissertation topic: “Modeling, Planning, and Control for Whole-Body Manipulation of Unknown Objects with Large-Scale Soft Robots”
- Funded by a grant from the NSF EFRI Program.

Brain Inspired Robotics Laboratory, BioRobotics Institute
Visiting Researcher

Pisa, Italy
May 2023-Aug 2023

- Worked on reinforcement learning for whole body manipulation of large objects with a soft robot torso.

BYU Mars Rover Team
Mechanical Team Lead

Provo, Utah
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 dexterous robotic manipulator capable of pushing buttons, opening doors, and typing.
- See <https://www.youtube.com/watch?v=BoTr3ki3cUQ>

IM Flash Technologies (an Intel-Micron Joint Venture)
Automation Engineering Intern

Lehi, Utah
Summer 2019

- Designed and implemented an automated cleaning system to clean toxic chemicals from semiconductor manufacturing equipment, saving thousands of dollars of cleaning fees a day.

National University of Singapore
International Product Design

Singapore
May 2017

- Worked within international team to understand and solve local sanitation challenges by designing a custom trash collection system.

PUBLICATIONS

1. Hyatt P., **Johnson C. C.** 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 C. C.**, 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
3. 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.
4. 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.
5. **C. C. Johnson**, Daniel G. Cheney, Dallin L. Cordon, and M. D. Killpack, “PneuDrive: An Embedded Pressure Control System and Modeling Toolkit for Large-Scale Soft Robots”

PAPERS UNDER REVIEW

1. **C. C. Johnson**, Andrew Clawson, and M. D. Killpack, “Baloo: A Large-Scale Soft Robotic Torso for Whole Arm Manipulation”, Submitted to IEEE Transactions on Robotics
2. H. Sanders, **C. C. Johnson** “Adaptive Control and Optimal Trajectory Generation for Highly Dynamic Tasks on a Soft Robot”, Submitted to Soft Robotics

TEACHING AND MENTORING

- **Research Mentor** at Brigham Young University 2021-Present
Soft Robot Design Project
 - Lead several groups undergraduate students (20-30 in total) on a project to design a large scale soft robot torso with tactile sensing.
- **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, Drake
- **Technical:** Model Predictive Control, Linear/Nonlinear Optimization, Deep Learning, Dynamical System modeling, Adaptive Control, Force Control, Path Planning, Physics Simulation, Genetic Algorithms, Reinforcement Learning, PCB Design
- Fluent Spanish Speaker

PROJECTS

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