# Clark Teeple

Postdoctoral Fellow | Harvard Microrobotics Lab, Harvard University

cbteeple.com github.com/cbteeple @ cbteeple@gmail.com Based in Somerville, MA, USA

I am a roboticist with experience designing ”gentle” end effectors, and a passion for mechatronics and system integration. I am interested in applying my creative engineering mindset to solve impactful, real-world problems.

## Education

**Nov. 2021** PhD in Engineering Sciences (Robotics) – **Harvard University**, Cambridge, MA
- *Dissertation Title* - Design Principles for Improving Precision and Dexterity of Soft Robotic Hands
- NSF Graduate Research Fellow

**May 2018** MS in Engineering Sciences (Robotics) – **Harvard University**, Cambridge, MA

**May 2016** BSE in Mechanical Engineering – **University of Michigan**, Ann Arbor, MI
- 3.90 GPA, Summa Cum Laude

## Skills

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|---|---|
| Mechanical Design | **Fusion 360**, Solidworks, OnShape, Eagle CAD (Electronics), Basic Machining, **3D Printing**, **Laser Cutting**, Design for Manufacturing |
| Programming | **Python** (including NumPy, SciPy, and Pandas), **C++** (embedded), MATLAB, **Linux** |
| Robotics Frameworks | **Robot Operating System (ROS)**, MoveIt!, PyBullet Physics, **UR5e Robot Arm** |

## Experience

**2016–2021** | PhD Candidate

**Harvard Microrobotics Lab** – Harvard University, Cambridge, MA

*Advisor : Prof. Robert Wood*

- Led the development of a dexterous soft robotic hand platform capable of in-hand manipulation, and developed relevant performance metrics to quantify in-hand manipulation.
- Investigated several factors in the design of soft robotic hands (*friction, compliance, finger arrangement, etc.*) leading to enhanced capabilities in both grasping and in-hand manipulation.
- Improved the precision grasping capabilities of soft grippers by developing finger designs that fully-utilize passive compliance.
- Studied the role of gripper compliance in manipulating fabrics and other thin, flexible objects.
- Developed Ctrl-P, a modular, high-bandwidth, smooth pressure control system for soft robots. This consists of a custom PCB, firmware, and ROS package, and is actively supporting my own research projects along with and several others.
- Developed calibration protocols for building and controlling physically-accurate soft robots in simulation as part of the development team for the SoMo (Soft Motion) Simulation Framework.
- Built an integrated light intensity measurement system for soft optical sensors consisting of a custom PCB, firmware, and MATLAB control interface.
- Supervised two Masters theses, and three undergraduate projects.

Mechanical Design | Simulation | Embedded Programming | System Integration | ROS | Python | C++

**2015–2016** | Undergraduate Research Assisant

**Vibration and Acoustics Laboratory : Microsystems** – University of Michigan, Ann Arbor, MI

*Advisor : Prof. Kenn Oldham*

- Studied locomotion of small-scale legged robots with multiple sets of high-frequency elastic legs.
- Designed, built, and characterized several robot prototypes using 3D printing.
- Contributed to a design-invariant dynamic model of leg and body behavior.

Mechanical Design | 3D Printing | Dynamic Modeling

**Summer 2015** | Engineering Intern

**MIT Lincoln Laboratory** – Lexington, MA

- Developed control systems and a user interface to automate the operation of a mobile mass spectrometry platform. This platform was used to improve training of canines for explosives detection.

System Integration | UI/UX Design | LabVIEW

## Mentorship & Teaching

2021-2022 **Advisor/Supervisor** – Undergraduate Senior Thesis, *Harvard Microrobotics Lab*
2020-2021 **Advisor/Supervisor** – Two Undergraduate Research Projects, *Harvard Microrobotics Lab*
2019-2020 **Advisor/Supervisor** – Visiting Masters Student Thesis (EPFL), *Harvard Microrobotics Lab*
2018-2019 **Advisor/Supervisor** – Visiting Masters Student Thesis (ETH-Z), *Harvard Microrobotics Lab*
Fall 2018 **Teaching Fellow** – ES51 - Computer Aided Machine Design, *Harvard University*

## Selected Publications

**C.B. Teeple**, J. Werfel, and R.J. Wood, "**Multi-Dimensional Compliance of Soft Grippers Enables Gentle Interaction with Thin, Flexible Objects**", *IEEE International Conference on Robotics and Automation (ICRA)*, 2022 (In-Review)

**C.B. Teeple**, B. Aktaş, M.C. Yuen, G.R. Kim, R.D. Howe, and R.J. Wood, "**Controlling Palm-Object Interactions via Friction for Enhanced In-Hand Manipulation**", *IEEE Robotics and Automation Letters*, 2022

**C.B. Teeple**, R.C. St. Louis, M.A. Graule, and R.J. Wood, "**The Role of Digit Arrangement in Soft Robotic In-Hand Manipulation**", *IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2021

M.A. Graule, **C.B. Teeple**, T.P. McCarthy, G.R Kim, R.C. St. Louis, and R.J. Wood, "**SoMo : Fast and Accurate Simulations of Continuum Robots in Complex Environments**", *IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2021

**C.B. Teeple**, G.R. Kim, M.A. Graule, and R.J. Wood, "**An Active Palm Enhances Dexterity of Soft Robotic In-Hand Manipulation**", *IEEE International Conference on Robotics and Automation (ICRA)*, 2021

**C.B. Teeple**, S. Abondance, and R.J. Wood, "**A Dexterous Soft Robotic Hand for Delicate In-Hand Manipulation**", *IEEE Robotics and Automation Letters*, 2020

**C.B. Teeple**, T.N. Koutros, M.A. Graule, and R.J. Wood, "**Multi-Segment Soft Robotic Fingers Enable Robust Precision Grasping**", *International Journal of Robotics Research*, 2020