

Clark TEEPLE

PhD Candidate | Harvard Microrobotics Lab, Harvard University

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📍 Based in Somerville, MA, USA

I am a PhD Candidate in Mechanical Engineering seeking to build robotic hands and manipulation systems that are robust, gentle, and safe in the real world.

🎓 EDUCATION

- (expected) 2021 PhD Candidate in Engineering Sciences, **Harvard University**, Cambridge, MA
 > *Dissertation Topic : Design strategies for dexterous soft robotic hands*
 > *NSF Graduate Research Fellow*
- 2018 MS in Engineering Sciences, **Harvard University**, Cambridge, MA
- 2016 BS in Mechanical Engineering, **University of Michigan**, Ann Arbor, MI
 > *3.90 GPA, Summa Cum Laude*

📋 SKILLS









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

📁 EXPERIENCE

- 2016–Present** **HARVARD MICROROBOTICS LAB**, Harvard University, Cambridge, MA
PhD Candidate
Advisor : Prof. Robert Wood
- > Studying how several aspects of soft robotic hands (finger workspace, finger arrangement, palm morphology) affect their grasping and in-hand manipulation performance.
 - > Lead the development of a dexterous soft robotic hand platform capable of planar in-hand manipulation, as well as relevant performance metrics.
 - > Developed Ctrl-P 🐙, a modular, high-bandwidth, smooth pressure control system for soft robots. This system integrates with a robot arm via ROS, and is actively supporting several other research projects.
 - > Developed a two-segment soft finger design, and demonstrated its improved capability for precision grasping compared to simpler soft fingers.
 - > Helped develop the SoMo Simulation Framework 🐙 for fast and accurate simulations of soft robots interacting with complex environments.
 - > Developed soft optics-based sensors for measuring curvature and contact force of soft fingers during deep-sea biological sampling.
 - > Supervised two visiting Masters students, three undergraduate projects, will advise one undergraduate senior thesis project.
- Mechanical Design ROS Embedded Programming System Integration Python C++
- 2015–2016** **VIBRATION AND ACOUSTICS LABORATORY : MICROSYSTEMS**, University of Michigan, Ann Arbor, MI
Undergraduate Research Assisant
Advisor : Prof. Kenn Oldham
- > Studied locomotion of small-scale legged microrobots with multiple sets of high-frequency elastic legs.
 - > Designed, built, and characterized several robot prototypes with 3D printed bodies and piezoelectric bending actuators.
 - > Contributed to a design-invariant dynamic model of leg and body behavior.
 - > *This work resulted in a "Best Paper Award" at the Research, Innovation, Service and Entrepreneurship (RISE) symposium, University of Michigan.*
- Mechanical Design 3D Printing Dynamic Modeling


- 2015–2015 | **MIT LINCOLN LABORATORY**, Chemical, Microsystems, and Nanoscale Technology Group, Lexington, MA
Engineering Intern
 > 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.
 Systems Integration UI/UX Design LabVIEW
- 2013–2015 | **LAHANN LABORATORY**, University of Michigan, Ann Arbor, MI
Undergraduate Research Assistant
 > Developed a computer-aided design (CAD) interface to expand the capabilities of the lab's existing tissue engineering scaffold manufacturing process.
 > Used this new interface to design and manufacture interesting and novel scaffold architectures.
 Systems Integration LabVIEW MATLAB

MENTORSHIP, OUTREACH, + TEACHING



- 2020-2021  **Advisor/Supervisor**, Two Harvard undergraduate research projects, Harvard Microrobotics Lab
- 2020  **Guest Presenter**, Science on Screen Jr., Coolidge Corner Theatre, Brookline, MA
- 2019-2020  **Advisor/Supervisor**, EPFL masters student thesis, Harvard Microrobotics Lab
- 2018-2019  **Advisor/Supervisor**, ETH masters student thesis, Harvard Microrobotics Lab
- 2017-2019  **Judge**, FIRST Robotics Lego League (FLL), Newton, MA
- 2017-2019  **STEM Expo Exhibitor**, Cambridge Science Festival, Cambridge, MA
- 2017-2019  **STEM Expo Exhibitor**, Boston Public Schools Science Fair, Boston, MA
- Fall 2018  **Teaching Fellow**, ES51 - Computer Aided Machine Design, Harvard University

PUBLICATIONS



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 

S. Abondance, C.B. Teeple, 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  

N.R. Sinatra, C.B. Teeple, D.M. Vogt, K.K. Parker, D.F. Gruber, and R.J. Wood, “Ultragentle Manipulation of Delicate Structures using a Soft Robotic Gripper”, *Science Robotics*, 2019  

C.B. Teeple, K.P. Becker, and R.J. Wood, “ Soft Curvature and Contact Force Sensors for Deep-Sea Grasping via Soft Optical Waveguides”, *IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2018  

B.T. Phillips, K.P. Becker, S. Kurumaya, K.C. Galloway, G. Whittredge, D.M. Vogt, C.B. Teeple, M.H. Rosen, V.A. Pieribone, D.F. Gruber, and R.J. Wood, “A Dexterous, Glove-Based Teleoperable Low-Power Soft Robotic Arm for Delicate Deep-Sea Biological Exploration”, *Scientific Reports*, 2018  