

# Carolyn MATL (CHEN)

## CONTACT

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## EDUCATION

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EXPECTED 2021    **Doctorate in ELECTRICAL ENGINEERING AND COMPUTER SCIENCE, University of California, Berkeley**  
Major: Robotics (Controls and Artificial Intelligence)  
Minors: Computer Graphics and Design  
Advisor: Prof. Ruzena BAJCSY  
GPA: 4.0/4.0

FALL 2019        **Master of Science in ENGINEERING, University of California, Berkeley**  
Major: Electrical Engineering  
Thesis: "Haptic Perception of Liquids Enclosed in Containers"  
Advisor: Prof. Ruzena BAJCSY

SPRING 2016     **Bachelor of Science in ENGINEERING, Princeton University**  
Major: Electrical Engineering  
Certificates: Robotics and Intelligent Systems; Applications of Computing  
Thesis Advisor: Prof. Peter RAMADGE  
GPA: 3.93/4.0 *Magna Cum Laude*

## ACADEMIC INTERESTS

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RESEARCH INTERESTS    My research focus is on developing and leveraging new sensors and techniques for interactive perception to enable the robotic manipulation of complicated materials. In particular, my research aims to extract key material parameters through interactive perception using signals such as force and sound. The estimated material parameters are then used to reason about the objects or substances for dynamic robotic manipulation tasks such as precision pouring.

RELATED COURSEWORK    **At UNIVERSITY OF CALIFORNIA, BERKELEY**  
**ROBOTICS AND CONTROLS**  
Linear Systems Theory; Nonlinear Systems Theory; Convex Optimization; Algorithmic Human Robot Interactions; Statistical Learning Theory  
**COMPUTER GRAPHICS**  
Computer Vision; Computational Geometry  
**DESIGN**  
Biomimetic Engineering; Critical Making  
**At PRINCETON UNIVERSITY**  
**HARDWARE**  
Building Real Systems; Electronic Circuit Design; Contemporary Logic Design  
**SOFTWARE**  
Computer Graphics; Computer and Electronic Music; Advanced Programming; Algorithms and Data Structures; Introduction to Programming Systems  
**THEORY**  
Designing Real Systems; Digital Signal Processing; Image Processing; Computer Vision; Physical Optics; Electronic and Photonic Devices; Information Signals  
**MATHEMATICS**  
Probability and Stochastic Systems; Differential Equations; Multivariable Calculus; Linear Algebra; Number Theory

## CONFERENCE PUBLICATIONS

- 2021 Deformable Elasto-Plastic Object Shaping using an Elastic Hand and Model-Based Reinforcement Learning  
Carolyn Matl, Ruzena Bajcsy  
IEEE International Conference on Intelligent Robots (IROS) (*in review*)
- 2021 StRETcH: a Soft to Resistive Elastic Tactile Hand  
Carolyn Matl, Josephine Koe, Ruzena Bajcsy  
IEEE International Conference on Robotics and Automation (ICRA) (*Finalist, Best Manipulation Paper Award*)
- 2020 STReSSD: Sim-To-Real from Sound for Stochastic Dynamics  
Carolyn Matl, Yashraj Narang, Dieter Fox, Ruzena Bajcsy, Fabio Ramos  
Conference on Robot Learning (CoRL)
- 2020 Inferring the Material Properties of Granular Media for Robotic Tasks  
Carolyn Matl, Yashraj Narang, Ruzena Bajcsy, Fabio Ramos, Dieter Fox  
IEEE International Conference on Robotics and Automation (ICRA)
- 2019 Haptic Perception of Liquids Enclosed in Containers  
Carolyn Matl, Robert Matthew, Ruzena Bajcsy  
IEEE International Conference on Intelligent Robots (IROS)
- 2018 Towards a Soft Fingertip with Integrated Sensing and Actuation  
Benjamin McInroe\*, Carolyn Chen\*, Ken Goldberg, Ruzena Bajcsy, Ronald Fearing  
\* These authors contributed equally to the work  
IEEE International Conference on Intelligent Robots (IROS)
- 2018 Towards Automating Precision Irrigation: Deep Learning to Infer Local Soil Moisture Conditions from Synthetic Aerial Agricultural Images  
David Tseng\*, David Wang\*, Carolyn Chen, Lauren Miller, William Song, Joshua Viers, Stavros Vougioukas, Stefano Carpin, Juan Aparicio Ojea, Ken Goldberg  
IEEE International Conference on Automation Science and Engineering (CASE)
- 2018 Using Intermittent Synchronization to Compensate for Rhythmic Body Motion During Autonomous Surgical Cutting and Debridement  
Vatsal Patel\*, Sanjay Krishnan\*, Aimee Goncalves, Carolyn Chen, Walter Doug Boyd, Ken Goldberg  
IEEE International Symposium on Medical Robotics (ISMR)
- 2017 An Algorithm and User Study for Teaching Bilateral Manipulation via Iterated Best Response Demonstrations  
Carolyn Chen, Sanjay Krishnan, Michael Laskey, Roy Fox, Ken Goldberg  
IEEE International Conference on Automation Science and Engineering (CASE)
- 2017 Multilateral Surgical Pattern Cutting in 2D Orthotropic Gauze with Deep Reinforcement Learning Policies for Tensioning  
Brijen Thananjeyan, Animesh Garg, Sanjay Krishnan, Carolyn Chen, Lauren Miller, Ken Goldberg  
IEEE International Conference on Robotics and Automation (ICRA)
- 2016 Learning to identify container contents through tactile vibration signatures  
Carolyn Chen, Jeffrey Snyder., and Peter Ramadge  
IEEE International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIM-PAR) (*Nominated Best Paper*)

## THESES

- 2019 Haptic Perception of Liquids Enclosed in Containers  
Readers: Prof. Ruzena Bajcsy and Prof. Hannah Stuart  
A dissertation submitted in partial satisfaction of the requirements for the degree of Master of Science in Engineering, University of California, Berkeley
- 2019 A Minimalistic Approach to Tactile Sensing  
Advisors: Prof. Peter Ramadge and Prof. Jeff Snyder  
A senior thesis submitted in partial satisfaction of the requirements for the degree of Bachelor of Science in Engineering, Princeton University

## TEACHING / MENTORING EXPERIENCE

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2020 (ONGOING)	Research Mentor for HARTLAB Undergraduate at UNIV OF CAL, BERKELEY Currently mentoring an undergraduate to develop a soft sensor for deformable object perception and manipulation
SPRING 2019	Teaching Assistant for CS189 at UNIV OF CAL, BERKELEY <b>Introduction to Machine Learning</b> , PROF. JONATHAN SHEWCHUK Taught weekly discussion sections, wrote a discussion section worksheet, graded exams, and held weekly office hours.
FALL 2018	Head Teaching Assistant for EECS128 at UNIV OF CAL, BERKELEY <b>Feedback Control Systems</b> , PROF. RON FEARING Taught weekly lab sections, graded exams, and held weekly office hours.
SUMMER 2017	Writing Mentor for AUTOLAB Undergraduates at UNIV OF CAL, BERKELEY <i>Learning to Infer Local Soil Moisture Conditions from Aerial Agricultural Images for Automating Precision Irrigation</i> , PROF. KEN GOLDBERG Mentored two undergraduate juniors weekly to help them write a conference paper (CASE 2018)
SPRING 2016	Teaching Assistant for ELE302 at PRINCETON UNIVERSITY <i>Car Lab</i> , PROF. ANDREW HOUCK AND PROF. ANTOINE KAHN Helped debug code and hardware.
FALL 2015 FALL 2014	Head Teaching Assistant for ELE206 at PRINCETON UNIVERSITY <i>Contemporary Logic Design</i> , PROF. SHARAD MALIK Helped teach and debug Verilog labs, helped with homework and conceptual understanding of material for the course. Was the Head undergraduate AI for Fall 2015.
SPRING 2015 SPRING 2013	Instructor for Princeton Splash at PRINCETON UNIVERSITY <i>Mathematics of Magic Tricks</i> Organized and co-taught a weekend class for regional high school students on discrete math and magic
MAY 2013	Guest Lecturer at the INSTITUTE FOR ADVANCED STUDIES, Princeton <i>Women in Math Colloquium</i> Gave a talk on Knot Theory and its applications in Magic under the supervision of Fields Medalist PROF. MANJUL BHARGAVA

## HONORS & AWARDS

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JUNE 2021	<b><i>Finalist for Best Manipulation Paper Award at ICRA 2021</i></b> Paper was selected by Program chairs as a finalist for the best manipulation paper.
APRIL 2018	<b><i>NSFGRFP recipient</i></b> Winner of the National Science Foundation Graduate Research Fellowship (2018-2021)
DECEMBER 2016	<b><i>Nominated Best Paper at SIMPAR 2016</i></b> Paper was selected by the Program Co-chairs as one of seven of the best presented papers.
AUGUST 2016	<b><i>Berkeley EECS Excellence Award</i></b> Selected by faculty to be awarded the EECS Excellence Award for the academic year 2016-2017 based on "outstanding academic record"
MAY 2016	<b><i>G. David Forney Jr. Prize</i></b> Awarded annually to a senior in the Electrical Engineering Department having an outstanding record in the communication sciences, systems, and signals.
MAY 2016	<b><i>Graduated Magna Cum Laude</i></b> from Princeton University, Electrical Engineering Department
2016-PRESENT	Phi Beta Kappa Academic Honor Society, Member
2016-PRESENT	Sigma Xi Scientific Research Honor Society, Member
2014-PRESENT	Tau Beta Pi Engineering Honor Society, Member

## WORK EXPERIENCE

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FALL 2019- SUMMER 2020-	NVIDIA AI ROBOTICS RESEARCH LAB, Seattle, WA <b><i>Part-time Research Intern</i></b> Researched and submitted the paper <i>STReSSD: Sim-To-Real from Sound for Stochastic Dynamics</i> , which was accepted for publication at the 2020 CORL conference.
SUMMER 2019	NVIDIA AI ROBOTICS RESEARCH LAB, Seattle, WA <b><i>Research Intern</i></b> Researched and produced the paper <i>Inferring the Material Properties of Granular Media for Robotic Tasks</i> , which was accepted for publication at the 2020 ICRA conference.
SUMMER 2015	SONOS, Santa Barbara, CA <b><i>Wifi Engineering Intern</i></b> Worked to solidify the integrity of data collected from Sonos devices. Helped with the efforts of reducing groupcast reception problems by building a prediction model.
SUMMER 2013	INFOSYS TECHNOLOGIES LTD, Bangalore, India <b><i>Cloud Dependability Research Intern</i></b> Built a model of a virtual data center to simulate virtual failures and their corresponding remedies.

## VOLUNTEER & OUTREACH

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- 2019-PRESENT    **BERKELEY ELECTRICAL EECS PEER MENTOR, Berkeley, CA**  
*Peer Mentor*  
Chats with peer graduate students and tries to help direct them to useful resources or give helpful advice about navigating graduate school.
- 2018-PRESENT    **BAY AREA SCIENTISTS IN SCHOOLS, Berkeley, CA**  
*Volunteer*  
Visits third-grade classrooms around the Bay Area to teach about robotics.
- 2017-2018       **BERKELEY WOMEN IN COMPUTER SCIENCE AND ENGINEERING, Berkeley, CA**  
*Co-chair for Outreach*  
Organized outreach and mentoring events to attract people of minority backgrounds to engineering and EECS.
- 2011 - 2013      **WESTPORT EMERGENCY MEDICAL SERVICES, Westport, CT**  
*Volunteer Emergency Medical Technician (EMT)*  
Responded to local emergency calls with local ambulance service. Provided patient care and Basic Life Support.
- 2009-2011       **WESTPORT EMERGENCY MEDICAL SERVICES, Westport, CT**  
*Volunteer Medical Response Technician (MRT)*

## SKILLS

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Foreign Languages:    Spanish, Mandarin, and Taiwanese  
Computer Languages:    Python, C++, MATLAB, Robot Operating System (ROS),  $\text{\LaTeX}$

## INTERESTS AND ACTIVITIES

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- FALL 2013-JUN 2016    **PRINCETON LAPTOP ORCHESTRA (PLORK), Instrumentalist and Engineer**  
2-3 concerts per year
- FALL 2012-JUN 2016    **PRINCETON UNIVERSITY ORCHESTRA, Violinist**  
4 concerts per year
- FALL 2009-MAY 2012    **New York Youth Orchestra, Violinist**  
6 concerts per year (3 in Carnegie Hall)