Carolyn Matl (Chen)

Contact

Phone: +1 (631) 833 8827
email: carolyn.matl@eecs.berkeley.edu

Education

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

Research Interests

My research focus is on developing and leveraging alternative or "unconventional" sensors for robotic manipulation of complicated objects and substances. 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

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) (*in review*)

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 (SIMPAR) (*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

2020 (ongoing) | Research Mentor for HARTLab Undergraduate at Univ of Cal, Berkeley
Currently mentoring an undergraduate to develope a soft sensor for deformable object perception and manipulation

Spring 2019 | Teaching Assistant for CS189 at Univ of Cal, Berkeley
Introduction to Machine Learning, 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
Feedback Control Systems, 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
Learning to Infer Local Soil Moisture Conditions from Aerial Agricultural Images fro Automating Precision Irrigation, 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
Car Lab, Prof. Andrew Houck and Prof. Antoine Kahn
Helped debug code and hardware.

Fall 2015
Fall 2014 | Head Teaching Assistant for ELE206 at Princeton University
Contemporary Logic Design, 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
Mathematics of Magic Tricks
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
Women in Math Colloquium
Gave a talk on Knot Theory and its applications in Magic under the supervision of Fields Medalist Prof. Manjul Bhargava

Honors & Awards

April 2018 | *NSFGRFP recipient*
Winner of the National Science Foundation Graduate Research Fellowship (2018-2021)

December 2016 | *Nominated Best Paper at SIMPAR 2016*
Paper was selected by the Program Co-chairs as one of seven of the best presented papers.

August 2016 | *Berkeley EECS Excellence Award*
Selected by faculty to be awarded the EECS Excellence Award for the academic year 2016-2017 based on "outstanding academic record"

May 2016 | *G. David Forney Jr. Prize*
Awarded annually to a senior in the Electrical Engineering Department having an outstanding record in the communication sciences, systems, and signals.

May 2016 | *Graduated Magna Cum Laude*
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

Fall 2019-Summer 2020- | NVIDIA AI Robotics Research Lab, Seattle, WA
Part-time Research Intern
Researched and submitted the paper *STReSSD: Sim-To-Real from Sound for Stochastic Dynamics*, which is currently in review for CORL.

Summer 2019 | NVIDIA AI Robotics Research Lab, Seattle, WA
Research Intern
Researched and produced the paper *Inferring the Material Properties of Granular Media for Robotic Tasks*, which was accepted for publication at the 2020 ICRA conference.

Summer 2015 | Sonos, Santa Barbara, CA
Wifi Engineering Intern
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
Cloud Dependability Research Intern
Built a model of a virtual data center to simulate virtual failures and their corresponding remedies.

Volunteer & Outreach

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

Foreign Languages: Spanish, Mandarin, and Taiwanese
Computer Languages: Python, C++, Matlab, Robot Operating System (ROS), LaTeX

Interests and Activities

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)