

# Jessica S. Lee

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## Passionate about Building Effective Robots - Enthusiastic about Designing Mechanisms

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**Engineering Expert:** UV Laser, IR Laser, 3D Printing, machine shop (lathing, milling...), surface mounting  
**Hardware Designer:** transmissions, packaging, cable routing, covers, mounts, mechanisms tied to kinematics  
**Technical Software Proficient:** Matlab, SolidWorks, AutoCad, Fusion, Illustrator, R, Python, CSS, JavaScript  
**Collaborative and Impactful Communicator:** Research writing, peer review, conference networking, public speaking, complex reporting, collaboration across ME, ECE, software, and integrative biology  
**Bio-Inspired Robotics Specialist:** Bio-inspired design, design and manufacturing robots of Smart Composite Microstructure (SCM) and Soft Pneumatic Actuators (SPA), rapid prototyping, experimental biology  
**Outdoors Enthusiast:** Scuba diving, skiing, Formation skydiving (ranked 2<sup>nd</sup> nationally), hiking, kayaking

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## Education – Mechanical Engineering

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### Ph.D. University of California, Berkeley

GPA: 3.92

Graduation May 2018

Advisor: Ronald Fearing, Alice Agogino, and Robert Full

National Science Foundation Graduate Research Fellowship Recipient

### M.S. University of California, Berkeley

GPA: 3.92

Graduation May 2015

### B.S. University of California, Santa Barbara

GPA: 3.80 (ranked 5<sup>th</sup> in class) Graduation June 2013

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## Experience

7/18 – 9/19

### Mechatronics Engineer

Carbon Robotics

Designed and implemented several elements for a 6 degree of freedom robot arm including:

- A multi-turn hardstop for the robot's base, integrating electronics
- New transmissions for the shoulder joint and wrist joint
- Tests for the transmissions, including tracking system, fixture making and programming
- The internal and external cable routing system for the robot arm
- Reliability and repeatability testing, including precision test fixtures and programming

Coordinated and collaborated with ECE and Software teams on multiple projects, making sure that the company timeline would progress as efficiently as possible

9/13 – 5/18

### Graduate Researcher

University of California, Berkeley

Ronald Fearing's Biomimetic Millisystems Lab

- Constructed palm-sized cockroach-inspired running robot through SCM with IR laser, polymer forming, transmission assembly, 3D printing and surface mounting
- Designed a clawed gripper to increase a jumping robot's traction and perching ability by kinematically coupling engagement/disengagement to robot's crouch/uncrouch
- Robot now able to jump off 60° inclines and hold 7.5 times the robot's weight from a ceiling
- Designed, built and tested over 6 different experiments using custom-made components including 3 types of robots, 5 specialized robot feet, and mounting for ATI force sensor
- Processed data from over 2000 data sets taken from experiments using MATLAB

9/17 – 12/17

### Visiting Researcher

NASA Ames Research Center

Kenneth Cheung's Coded Structures Lab

- Assisted in new lattice building-block design with high stiffness to weight ratios that can be assembled and disassembled to be reconfigured into any structure needed
- Designed and created a new spined end effector for robots to traverse and manipulate lattice

- 7/15 - 9/15 **Visiting Graduate Researcher** **Seoul National University, South Korea**  
 Kyu-jin Cho's BioRobotics Lab
- Designed and manufactured a bio-inspired compound foot with spines and foot pads
  - Manufactured 3cm flea-inspired jumping robot through Smart Memory Alloy (SMA) spring construction and Smart Composite Microstructure (SCM) with IR laser
  - Robot able to jump on more surface types, on some surfaces jumps farther and faster
- 6/14 - 7/14 **Visiting Graduate Researcher** **École polytechnique fédérale de Lausanne, Switzerland**  
 Jaime Paik's Reconfigurable Robotics Lab
- Designed and manufactured Soft Pneumatic Actuators (SPAs) for an earthworm-inspired soft, crawling robot to traverse a 3-D space
  - Implemented new manufacturing strategies, increasing number of usable SPAs by 40%

## Undergraduate Experience

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- 10/12 - 5/13 **Undergraduate Researcher**, Kim Turner's Mechanics of Microscale Systems (MEMS) Lab
- Used Micro-Electro-Mechanical Systems to fabricate gecko inspired dry adhesives
  - Designed and built a system to test the adhesives on a macro scale
- 6/12 - 9/12 **Structures Engineering Intern**, United Airlines
- Created maintenance plans to prevent cracks in the Airbus fuselages
- 8/11 - 6/12 **Engineering Intern**, Intouch Health
- Quality tested and built new prototypes of components for remote presence robots
  - Created and implemented new procedures to improve the efficiency of the manufacturing
- 8/10 - 4/11 **Engineering Intern**, Inogen
- Surface mounted and tested various electrical components for the product
- 2/08 - 6/08 **International Robogames Competitor**, initiated the robotics independent study program
- Designed and constructed a Sumobot using a PIC microcontroller, metal bending, milling, custom board, UV laser, proximity and line sensors - placed 4<sup>th</sup>

## Publications

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- 2018 Lee, J.S., Plecnik, M., Yang, J and Fearing, R.S. *Self-Engaging Spined Gripper with Dynamic Penetration and Release for Steep Jumps*. IEEE/RSJ International Conference on Robotics and Automation (**ICRA**)
- 2017 Lee, J.S., Fearing, R.S., Cho, K.J., and R. Full. *Crickets Jumping from Diverse Substrates Inspire Leg Design in a Millirobot*. Society for Integrative and Comparative Biology (**SICB**)
- 2016 Lee, J., Fearing, R. S., Cho, K. *Compound Foot for Increased Millirobot Jumping Ability*. Climbing and Walking Robots and Support Technologies for Mobile Machines (**CLAWAR**)
- 2015 Lee, J.S., and Fearing, R.S. *Anisotropic collapsible leg spines for increased millirobot traction*. (**ICRA**)
- 2015 Lee, J.S., Haldane, D., Fearing, R., and R. Full. *Biologically inspired collapsible spines increase performance in legged robot*. (**SICB**)
- 2015 Haldane, D.W., Lee, J. S., et al. *Integrated Manufacture of Exoskeletons and Sensing Structures for Folded Millirobots*. Journal of Mechanisms and Robotics (**JMR**)

## Fellowships and Honors

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- **NSF GRFP** - National Science Foundation Graduate Research Fellowship Program
- **NSF IGERT** - Integrative Graduate Education and Research Trainee
- **Division Winner of IET PATW** - Institution of Engineering and Technology Present Around the World (PATW) Competition 2014/2015
- College of Engineering **Dean's Honors Program** at UCSB, Member of NSCS

## Outreach and Leadership

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- **Networking Chair** for Graduate Women in Engineering (GWE)
- **Networking Chair** for Women in Computer Science and Engineering (WiCSE)
- **Co-President** of Science and Engineering Community Outreach (SECO)
- **Robotics Lead** for Electrical Engineering Outreach
- **Tutoring Chair** for Tau Beta Pi (Engineering Honor Society)