

LILLIAN CHIN

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EDUCATION

Massachusetts Institute of Technology (MIT) **2017 - 2022 (expected)**
PhD in Electrical Engineering and Computer Science *Cambridge, MA*

Massachusetts Institute of Technology (MIT) **June 2017**
B.S. in Electrical Engineering and Computer Science *Cambridge, MA*
Minors in Mechanical Engineering, Comparative Media Studies *GPA: 4.9/5.0*

HONORS

Hertz Foundation Graduate Fellowship Finalist **2017**
Paul and Daisy Soros Fellowship for New Americans Finalist **2017**
Phi Beta Kappa Honors Society, Xi Chapter **2017**
Kleiner Perkins Caulfield Byers (KPCB) Engineering Fellow **2014**
Intel Science Talent Search Finalist **2013**

RESEARCH EXPERIENCE

MIT Computer Science & Artificial Intelligence Lab., Distributed Robotics Group **Sept. 2016 – present**
Researcher with Dr. Daniela Rus *Cambridge, MA*

- Designed electrically-powered soft robotic actuator based on chiral shear auxetic patterns.
- Mechanically characterized force output and compliance of new actuator, creating biomimetic fingers
- Created biomimetic soft robotic systems, such as octopus suckers and mobile jellyfish

Toyota Research Institute **June – Aug. 2017**
Robotics Intern *Cambridge, MA*

- Designed automated mechanical testing rigs to evaluate performance of new soft tactile sensor against simulation
- Created new silicone-based tactile skin and performed experiments on mechanical adhesion and accuracy
- Explored current tactile sensing solutions - contacting manufacturers and recreating academic prototypes

Massachusetts Institute of Technology, Department of Mechanical Engineering **2014 – 2017**
Undergraduate Researcher with Dr. John Hart *Cambridge, MA*

- Created machine vision algorithms in C++ for dynamic photolithography system, increasing speed of tracking, detection and encapsulation by 300% with multithreading, Kalman filters and bit plane splicing.
- Performed encapsulation experiments on liver hepatocytes in photopolymers for tissue engineering applications.
- Adapted photolithographic system to a robot arm, enabling accurate micropatterning on macro-scale objects. Improved scanning system's accuracy and designed mechanical enclosures for electronic / optical systems.
- Designed and printed NFC circuits to test capabilities of photolithography system for flexible circuits
- Analyzed performance of various particle detection and tracking algorithms in simulated and actual conditions.

MIT Media Lab, Biomechatronics Group **2015**
Undergraduate Researcher with Dr. Hugh Herr *Cambridge, MA*

- Created thin-wire electrodes and Matlab script to stimulate rat sciatic nerve and measure response
- Wrote automated particle analysis in ImageJ to measure neuron size, count and g-ratio to quantify nerve regrowth

Georgia Institute of Technology, Department of Mechanical Engineering **2011 – 2013**
Researcher with Dr. Michael Leamy *Atlanta, GA*

- Constructed an agent-based model in NetLogo to study collective cell movement during wound healing.
- Innovatively applied engineering principles to create model based on biological time-lapse videos of wound healing.

WORK EXPERIENCE

Apple **2016**
iPad Hardware Systems Integration, Electrical Engineering Intern *Cupertino, CA*

- Designed schematic and PCB in Cadence for internal project board involving high-speed signals.
- Wrote TCL scripts to validate functionality of SoCs. Deployed this test suite on SMT, FATP and REL lines in China.
- Performed power validation and signal integrity measurements on low and high speed signals, including I2C and SPI.
- Wrote scripts in Lua, C++ and Python for internal eye diagram measurements & thermal experiments on battery life.

Square

Electrical Engineering Intern

2015

San Francisco, CA

- Wrote C code for NFC card proximity detection that interfaced with 2 microcontrollers, an FPGA, ADC/DACs, and a voltage regulator. Key part of firmware needed to pass contactless payment certification
- Tuned NFC antennas with VNA and SMT rework skills, enabling proposal of new antenna design directions
- Wrote Python script to send HCI commands to Bluetooth chip, validating results with spectrum analyzer
- Supported EVT build in China, conducting failure analysis for SMT and FATP factory lines and providing translation
- Created preliminary schematics and PCB layout for new NFC board in Altium

PUBLICATIONS

1. **Chin, L.**, Lipton, J., MacCurdy, R., Romanishin, J., Sharma, C., & Rus, D. (2018). Compliant Electric Actuators Based on Handed Shearing Auxetics. In *Soft Robotics (Robosoft), 2018 IEEE International Conference on*. IEEE, 2018. Manuscript Under Review.
2. Lipton, J., MacCurdy, R., Manchester, Z., **Chin, L.**, Celluci, D., & Rus, D. Handedness in Shearing Auxetics Creates Rigid and Compliant Structures. Revise and Resubmit at *Science*.
3. Beaudoin J, **Chin L**, Zlotnick H, Cervantes T, Lassey S, Robinson J, Slocum A. Obstetrical Forceps with Passive Rotation and Sensor Feedback. ASME. *Frontiers in Biomedical Devices, 2018 Design of Medical Devices Conference*. Accepted for Publication.
4. Stevens, A., Oliver, R., Kirchmeyer, M., Wu, J., **Chin, L.**, Polsen E., Archer, C., Boyle, C., Garber, J., and Hart, J. (2016). Conformal robotic stereolithography. *3D Printing and Additive Manufacturing*, 3(4): 226-235.
5. Harrow, C. and **Chin, L.** (2014). Technology-Enhanced Discovery. *Mathematics Teacher*, **107**: 660 - 665.

TEACHING EXPERIENCE

Mentor, MIT Mobile Autonomous Systems Laboratory

2017

Provided mechanical, electrical and programming guidance to 30 undergraduates to design an autonomous robot with computer vision in a month.

Mentor and Library Machine Master, MIT MakerWorkshop

2017 – present

Served as peer mentor for student-run machine shop, teaching and supporting the mechanical engineering community. Expanded the library tool-check out program with how-to-build classes and maintaining existing toolkits

Teacher, MIT Educational Studies Program

2013 – present

Taught several 1-day & 7-week long classes on math, games, literature, and linguistics for 6th - 12th grade students

Head Lab Assistant, 6.002 - Circuits and Electronics

2015 – 2017

Guided students to a better understanding of circuits by helping them debug their lab circuits, from basic ADCs to audio amplifiers. Organized and scheduled 8 different Lab Assistants, helping them with their duties by giving weekly lab tips

Tutor, InstaEDU / Chegg Tutors

2014 – 2017

Tutored online with 97% positive reviews in many subjects, including math, AP US History, Physics, Computer Science

Lab Assistant, 6.004 - Computation Structures

2016

Guided students to a better understanding of digital circuits from the transistor level to creating their own basic CPU

Mentor, Girls Who Code

2015

Led workshop on hardware and robotics to 20 high school girls and provided one-on-one mentorship

PROJECTS

2.72 - Elements of Machine Design

2016

Desktop lathe that maintained 50 micron precision even after being dropped. Won first place for highest accuracy

MIT Mobile Autonomous Systems Laboratory

2016

Cube-stacking autonomous robot. Won first place, best software, best wiki and "most likely to be staff" award

MakeMIT

2014

Guitar-playing robot that uses solenoids to strum and a rack-and-pinion setup to fret. Won first place.

PROFESSIONAL ACTIVITIES

Reviewer, IEEE International Conference on Soft Robotics

2018