

# Stephanie Lace Chang

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## Education

### Northwestern University

Master of Science, Robotics | GPA **3.96/4.0**

Dec 2017

### University of California, San Diego

Bachelor of Science, Bioengineering: Biotechnology | Major GPA **3.74/4.0**

June 2015

## Skills

**Software** Python, ROS, C, C++, MATLAB, Mathematica, Linux, Git, V-REP, Gazebo, OpenCV, and Android Studio  
**Prototyping** SolidWorks, NX, Mechatronics (electromechanical design, microcontroller programming), 3D Printing (Polyjet, Fused deposition modeling, Powder bed and inkjet), Laser Cutting, Laser Scanning, and CNC Milling  
**Knowledge of** Rigid-body Dynamics (Lagrangian, Newton-Euler), Linear and Nonlinear Optimal Control, Machine Learning, PCB Design, Biomaterials, Genetic Engineering (transformation, transfection, subcloning, NA purification) and Statistics

## Prototyping Projects

### 3D-Printed Smartphone Case

Sept 2017 – Dec 2017

Fabricated a flexible protective case for the Samsung Galaxy S3 out of hybrid plastics via PolyJet printing. Modeled the case in SolidWorks around a laser scan of the phone rendered using Geomagic Design X. Refined the fit, usability and durability of the design after subjecting each iteration to stress testing and gathering peer feedback.

### Burrowing Robot

Mar 2017 – Dec 2017

Designed a novel modular robot which uses helical motion to travel horizontally within granular media. Derived a theoretical model that describes how the parameters of a mounted auger and granular material characteristics can affect the amount of propulsive force generated. Verified the model by testing numerous 3D-printed iterations of the robot in a bed of poppy seeds.

### Android Controlled Path-Following Robot

June 2017

Created a differential drive robot that can steer itself around a racetrack. Programmed a PIC32 microcontroller to modulate the velocity of two wheels. Implemented an Android application which locates a path by parsing images scanned by a smartphone camera in real-time, and issues commands to the PIC32 via USB CDC communication to keep the robot centered. Built a housing unit out of laser cut acrylic and 3D-printed PLA to secure and protect custom-made circuitry.

### Bilateral Teleoperation of a Robotic Arm

Jan 2017 – May 2017

Developed a ROS package which allows users to manipulate the trajectory of a 7-DOF robot arm using a Geomagic Touch. Implemented a joint velocity controller with selective least-squares damping for accurate task space control. Estimation of end effector wrenches used to integrate haptic feedback to let users feel forces applied to the robot arm in real-time.

### Baxter Plays Checkers

Dec 2016

Built a ROS package which grants Rethink Robotics' Baxter the ability to play checkers. Developed a node network which computes valid moves, performs inverse kinematics to move a 7-DOF arm towards a target position, distinguishes the robot's pieces using OpenCV, and employs visual servoing to correct the end effector's movements.

### Cost-Effective HIV Viral Load Monitoring Device

Oct 2011 – Oct 2015

Designed a semi-automated anti-retroviral drug resistance screening system for the Eduardo Mondlane University Hospital in Mozambique for less than \$500 (\$7 per test). Lead the manufacturing process for an Arduino-controlled, pneumatic, RNA extraction device. Authored a paper on the benefits of using blood pooling to lower the cost of HIV diagnostic tests ([PMC4607635](#)).

## Work Experience

### Life Science Research Professional I, Stanford University School of Medicine (Palo Alto, CA)

Jan 2016 – Aug 2016

- Fabricated epicardial collagen patches, which facilitate heart muscle repair following myocardial infarction, for clinical studies using mice and swine
- Conducted quality control tests to ensure patches were suitable for transplantation into mammals via catheters

### Lab Technician I, Sanford Burnham Prebys Medical Discovery Institute (La Jolla, CA)

Aug 2015 – Dec 2015

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- Modulated the composition of fluorescent biosensors, developed during a previous internship, to improve their sensitivity to endogenous microRNA fluctuations in healthy and stressed rat neonatal ventricular cardiomyocytes

**Intern**, Sanford Burnham Medical Research Institute (La Jolla, CA)

Oct 2014 – June 2015

- Identified microRNA species which are differentially regulated in healthy and hypertrophic cardiomyocytes
- Synthesized a set of novel mRNA biosensors that, when transfected into cells, fluorescently detect for mechanical and norepinephrine-induced stretch in cardiomyocytes