# SOPHIA WILLIAMS

**Haptics and Robotics PhD Candidate**

## EXPERIENCE

### PhD Candidate
**CHARM Lab**

📅 Expected Sep 2021   📍 Stanford, CA

- As a PhD Researcher in the Collaborative Haptics and Robotics in Medicine (CHARM) Lab, I develop wearable haptic technologies for social touch and communication.
- I design, create, model, and test the operation of haptic devices in an effort to increase information transfer through the haptic channel and optimize the human experience.
- In addition, I design and conduct user studies to understand and document user experience and performance.
- I focus on the design and control of distributed arrays of haptic actuators to synchronously provide realistic sensations. I also investigate origami/layered manufacturing techniques to perform that same task.

### Intern
**Honda Research Institute**

📅 Jan 2020 – April 2020   📍 San Jose, CA

- (Under NDA) I designed robotic systems for human-robot interaction using C++ and ROS.

### Fellow: Listening to those who know: How can we end poverty?
**Thomas J. Watson Fellowship**

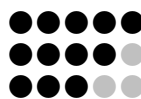📅 July 2015 - July 2016   📍 Claremont, CA

- As a recipient of the Watson Fellowship I pursued a year of independent exploration abroad. I planned and executed research on the efficacy of microloans and poverty alleviation methods in Jordan, India, Uganda, Greece, and Chile.

## SKILLS

**Matlab, C++, Python, ROS**
**Spanish**
**Tensorflow**

## EDUCATION / COURSES

### Ph.D. Candidate in Electrical Engineering
**Stanford University**

📅 Sep 2016 – Present

### Masters in Electrical Engineering
**Stanford University**

📅 June 2019

### Bachelor of Science in General Engineering
**Harvey Mudd College**

📅 May 2015

## HONORS & AWARDS

- National Science Foundation Graduate Research Fellow
- Harvey Mudd College President Scholar's Program Fellow
- Honors in Engineering
- Thomas J. Watson Fellow
- Stanford Robotics Center fellowship sponsored by FANUC

## PROJECTS

**Recurrent Neural Net for Question-Answer Joke Generation**

- Developed a sequence-to-sequence recurrent neural network model for the purpose of question-answer joke generation.

**Motion Tracking for Medical Imaging**

- Explored three methods of 3D motion tracking of patients using digital image processing to compensate for involuntary movement during medical imaging, ex. PET Scans, MRI.

**Closed-loop Control for a Flexible Soft Robot Based on a Markov Decision Process**

- Developed a motion planning algorithm for a non-holonomic robot that navigates using apical growth. Algorithm takes into account uncertainty in the robot's motion to compute the optimal policy using dynamic programming to maximize the probability of reaching a target destination given obstacles in the environment.

## PUBLICATIONS AND PATENTS

- Williams, S. R., Okamura, A. M. Display of Simultaneous Vibrotactile Rhythms on the Fingertips and Forearm. Article. Submitted 2020.
- Salvato, M., Williams, S. R., Nunez, C. M., Zhu X., Israr, A., Lau, F., Klumb, K., Abnousi, F., Okamura, A. M., Culbertson, H. Sparse Skin Stimulation Can Convey Diverse Social Touch Information to Humans. Submitted 2020.
- Nunez, C. M., Williams, S. R., Okamura, A. M., Culbertson, H. (2019). Understanding Continuous and Pleasant Linear Sensations on the Forearm from a Sequential Discrete Lateral Skin-Slip Haptic Device. IEEE Transactions on Haptics, 12(4), 414-427. 2019.
- Williams, S. R., Wong, J., Liu, M. M., Egerter, R. T., Chan, Kevin, Bassman, L. C. Artificial Urinary Sphincter Device (2016). US Provisional Patent Application. Ref No.: 48440-566001US.
- For additional publications, refer to Google Scholar