Michael Andrés Lin

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Professional Experience

Graduate Research Assistant
2019 - Present

Stanford University - Biomimetics & Dexterous Manipulation Lab
Advisor: Mark Cutkosky

- ▶ Investigating robot designs optimized for dynamic contact interactions. Developing perception methods to leverage these designs for sensing unstructured environments through contact and multi-modal sensing.
- ▶ Developed a low-impedance robot gripper that enables contacts with selective sensing or action on the environment. Demonstrated a Particle Filtering algorithm to localize objects to sub-mm accuracy through multiple contacts.
- ▶ Developed reactive controllers that integrate whole-arm tactile sensing to safely reach into constrained spaces.

Robotics System Engineer
2017 - 2019

Flexiv Robotics (Santa Clara, CA)

- ▶ Architected system design that integrates robot sensors and actuators to enable robust, efficient, and ISO safety-compliant control of a 7-DOF torque-controlled manipulator.
- ▶ Developed high performance position and torque controller for smooth motion tracking.

Graduate Research Assistant
2015 - 2017

Stanford University - Biomimetics & Dexterous Manipulation Lab
Advisors: Dr. Bruce Daniel, Dr. Mark Cutkosky

- ▶ Developed surgical navigation system for needle insertion.
- ▶ Implemented computer vision tracking integrated with shape-sensing needles to provide physicians with real-time visualizations which resulted in improved procedure accuracy.

Undergraduate Research Assistant
Summer 2014

Stanford University - CHARM Lab - Advisor: Allison Okamura

- ▶ Designed a hand-held haptic gripper for robotic teleoperation control during surgery to reduce tissue damage.

Relevant Publications

- ▶ **Leveraging Safe Contact to Facilitate Manipulation in Cluttered Spaces** (IEEE Robotics & Automation Letters 2021)
  M A Lin, R Thomasson, G Uribe, H Choi, M R Cutkosky
- ▶ **A Stretchable Tactile Sleeve for Reaching into Cluttered Spaces** (IEEE Robotics & Automation Letters 2021)
  A M Gruebele, **M A Lin**, D Brouwer, S Yuan, A Zerbe, M R Cutkosky

Honors & Awards

NSF GRFP, Stanford School of Engineering Fellowship, Best Poster Award (of 113 posters) at Stanford Bio-X IIP Symposium, 1st place NATCAR Competition (autonomous race-car)

Education

Stanford University
PhD Mechanical Engineering
Robotics & State Estimation
2019 - Present

Stanford University
MS Mechanical Engineering
Dynamics, Robotics, Mechatronics
2015 - 2017

University of California Berkeley
Electrical Engineering & Computer Science *(GPA: 3.79 Honors Program)*
Embedded Systems & Signals
2011 - 2015

Technical Skills

Coding	C++, Python, C (Low level), MATLAB, C#
Libraries & Toolkits	PyBullet, PyTorch, OpenCV, Qt-5, ROS, MoveIt!, Gazebo, RBDL, Unity 3D
Embedded Systems	State machines, SPI, I2C, UART, EtherCAT, BLE, PSOC
Hardware	Motor control, circuit design & testing, CAD modeling, rapid prototyping

Project Highlights

Tactile-visuo Search in Clutter

- ▶ Scene state estimation using combining visual depth and tactile sensor data using Gaussian Process Implicit Surface (GPIS).

Path Planning Under Uncertainty for Steerable Needles

- ▶ Path planning for biopsy needle insertion using Partially Observable Monte Carlo Planning (POMCP).

Summarization with Pointer-Generator Networks

- ▶ Better abstractive text summaries by penalizing word copying.