Ryan Poon

CONTACT

Cell: (510) 912-4399
Email: rjmpoon@gmail.com
linkedin.com/in/ryan-poon/
ryanp543.github.io**/portfolio/**

SKILLS

Software
SolidWorks
Autodesk Inventor
Autodesk Fusion 360
Autodesk Eagle
Python
C++
MATLAB
Mathematica
Arduino/Teensy
FEA (SolidWorks, COMSOL)
HSM Works (CAM)
MasterCAM
ROS 1 and 2
Inkscape

Manufacturing
Milling, Lathework, Drilling
Plastic Mold Casting
Thermoforming
Laser Cutting
Waterjetting
Sheet Bending
CNC (3- and 5-Axis)
3D Printing (FDM, SLA)
Soldering
PCB Design/Reflow Oven
1000+ Hours of Machining Experience

RESEARCH

Graduate Research Assistant Sept 2019-present
Bioinstrumentation Laboratory | MIT
- Developed a climbing robot that uniquely combines a wheeled drive with modular underactuated tendon-driven grasping arms to maximize adaptability to different column sizes.
- Developed a novel twisted-winching string actuator offering both high force and high displacement modes for tendon-driven robotic applications.
- Developed a miniaturized modular tool changer and custom robotic arm on a rover for agricultural monitoring and maintenance.
- Developed an impedance analyzer, pH probe, thermal camera, and spectroscopy tool for agricultural measurement purposes.
- Developed a universal Lyapunov-based Python library to rapidly generate stable PID gains for flexible base manipulators.

Undergraduate Researcher Feb 2016-June 2019
Biomechatronics Laboratory | UCLA
- Developed a motor bank and wrist adapter to expand the lab's tendon-driven robotic hand from one to three fingers and merge it with Barrett Technology's WAM robotic arm infrastructure.
- Designed and 3D printed pressure-sensitive instrumented objects for a haptic search-and-retrieval Office of Naval Research project.

Undergraduate Researcher Sept 2017-June 2019
Robotics and Mechanisms Laboratory | UCLA
- Designed, machined, and assembled the legs of a large mobile hexapod robot made to carry equipment for ordnance retrieval and disposal.
- Fabricated parts for the four-legged ALPHRED and non-anthropomorphic biped robots as the go-to undergraduate lab machinist.

Undergraduate Researcher June 2018-June 2019
Flexible Research Group | UCLA
- Developed an actively controlled metamaterial that utilized phase changes to achieve programmable stiffness properties.

EDUCATION

Ph.D. Candidate in Mechanical Engineering June 2021-present
Massachusetts Institute of Technology
- GPA: 4.8 out of 5.0
- Qualifying Exams: Robotics, Product Design, Manufacturing
- Courses: Underactuated Robotics, New Enterprises (Sloan), Manufacturing Processes and Systems, Product Design and Development

M.S. in Mechanical Engineering Sept 2019-May 2021
Massachusetts Institute of Technology
- Courses: Bioinspired Robotics, Advanced Instrumentation, Machine Design, Advanced System Dynamics/Control, Intro to Robotics

B.S. in Mechanical Engineering Sept 2015-June 2019
University of California, Los Angeles
- GPA: 3.871 out of 4.0, GRE: 168 Q/159 V/6.0 AWA
- Courses: Dynamics, Statics, Materials, Electrical Circuits, Modeling of Dynamic Systems, Compliant Mechanisms, Feedback and Control Systems

PUBLICATIONS/PATENTS

A Multimodal Twisted-Winching String Actuator with a Passive Automatic Transmission: Design and Validation
R Poon, V Padia, I Hunter | 2025
International Conference on Control, Automation, and Robotics (ICCAR)

Control and Analysis of a Multimodal Twisted-Winching String Actuator with Embodied Sensing
R Poon, V Padia, I Hunter | 2025
IEEE-RAS International Conference on Soft Robotics (RoboSoft)

A Novel Twisted-Winching String Actuator for Robotic Applications: Design and Validation
R Poon, V Padia, I Hunter | 2025
IEEE International Conference on Robotics and Automation (ICRA)

Hybrid Twisted String Actuator-Winch System
V Padia, R Poon, I Hunter | 2023
U.S. Patent Application No. 63/694,401

Streamlined Tuning Procedure for Stable PID Control of Flexible-Base Manipulators
MA Begin, R Poon, I Hunter | 2021
IEEE Robotics and Automation Letters 6 (4), 7413-7420

Phase-Changing Metamaterial Capable of Variable Stiffness and Shape Morphing
R Poon, JB Hopkins | 2019
Advanced Engineering Materials 21 (12), 1900802

STUDENT ORGANIZATIONS

Mentor Sept 2019-present
Makerworkshop | MIT
- Supervise graduate student-run makerspace on campus ensuring safe operation of all machines and tools.
- Instruct new members and mentors on usage and safety of the tools in the shop, including mill, lathe, waterjet, laser cutter, and 3D printer.

President Sept 2015-June 2019
3D For Everyone (3D4E) | UCLA
- Founded a 9-week CAD and 3D printing workshop for 45 new members.
- Landed three 3D printer sponsorships and ~$5000 of funding.
- Designed and printed the "Spock" basketball prosthetic hand with the UCLA women's basketball team for children with limb differences.
- Directed and participated in the Angel City Sports adaptive sports equipment, musical instruments outreach, and wind turbine projects.

Technical Vice President Sept 2015-June 2019
American Society of Mechanical Engineers | UCLA
- Led developments of the 60 lb 2016 and 2017 flagship battlebots.
- Manufactured a 3 lb battlebot featuring dual horizontal spinners.
- Managed overall club operations for 80 engineering student members, training them in CAD, machining, robotics, and professional development.

AWARDS

- 2021 Wunsch Foundation Silent - Hoist and Crane Award
- Magna Cum Laude -
- Jack Waldron Scholarship -
- Harley L. Wood Scholarship -
- Arconic Scholarship -
- Dean's Honor List -
- Outstanding B.S. in MechE Award -

WORK EXPERIENCE

Mechanical Engineering Intern
Made In Space | June 2017-Sept 2017
- Upgraded and modified components of the additive manufacturing facility (AMF) 3D printer on the International Space Station.
- Designed and prototyped the Satellite Manufacturing Machine, which boasts multi-material printing and electronic component placement.

Mechanical Design Intern
AIO Robotics | Oct 2016-Jan 2017
- Collaborated with Florida-based club Handling the Future to design and 3D print a prosthetic hand mimicking the curvature of human hands.

OTHER

Competitive Compound Archer
UCLA and MIT | 2015-present
- Compete at the regional and national levels.
- 3rd place at the 2016 CA State Indoor Championships and at the 2016 West Regional Outdoor Collegiate Championships.
- 1st place on the male compound team at West Regionals.

ENGINEERING PORTFOLIO

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