Oliver Zhang

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Education

Carnegie Mellon University, BS in Mechanical Engineering with an additional major in Robotics with University Honors – Pittsburgh, USA — Aug 2015 – May 2019

- Completed a wide range of course work from mechanical engineering fundamentals to computer vision, artificial intelligence, and systems engineering.

Experience

Senior Mechanical Engineer, PA Consulting – San Francisco, USA — July 2019 – present

Collaborating with diverse engineers and designers to find the path through complex challenges and turn inventive ideas into innovative products.

- Delivering projects across many different industries, from medical robotics to industrial food production.
- Coordinating highly disciplinary teams spread across multiple geographies.
- Breaking complex problems down into key interactions and applying first principles analysis and modeling.
- The team's go-to expert for robotics, systems engineering, and analysis.
- Building prototypes at the right fidelity to rapidly drive to the optimal design.
- Growing the team's capabilities through weekly forums and training sessions, covering topics like analysis, sketching, or programming.

Project Engineer Intern, Autel Robotics – Pittsburgh, USA — May 2017 – Aug 2017

Implemented tracking and gesture recognition systems for embedded execution on a quadcopter.

Skills

Programming: Python, C++, ROS

Mechanical Engineering: Concept development and prototyping, Analysis of complex systems, DfM

Systems Engineering: Requirements development, System architecture design

Languages: English (native speaker), Mandarin (native speaker)

Patents

US11058204B2 — July 2021

Automated total nail care systems, devices, and methods

Projects

Novel Machine — Aug 2025 – present

Developing a consumer facing electromechanical machine.

- Owned design of an Alpha prototype system with 7 actuated degrees of freedom.
- Designed complex motion systems in heavily space constrained and finish constrained environment.
- Balanced industrial design intent with mechanical reliablility, while meeting aggressive schedule.
- Interfaced with a diverse team of systems engineers, electrical engineers, software engineers, and industrial designers.
- Led prototype build effort and ensured successful delivery to client.

Novel Cable Splicing Machine Aug 2024 – Aug 2025

Developing an underground cable splicing machine that automates a complex process typically done by a trained technician.

- Built complex set of system requirements drawn from multiple different stakeholders, and managed key risks.
- Designed system architecture to maximise reliability while meeting stringent weight and space constraints.
- Created system workflows to validate concept of operation.
- Developed multiple electromechanical mechanisms that each perform dextrous operations that previously required highly coordinated human actions.

Novel Smart Fitness Machine Aug 2022 – Aug 2024

Devloped a novel fitness machine that is controllable wirelessly and can report data from multiple integrated sensors.

- Implemented and refined controls algorithms to realistically simulate inertia with an electric motor.
- Built custom dyanmometer rig with custom software which simulates human motion and displays metrics in real-time.
- Led systems engineering effort to manage the integration and testing of the prototype across multiple locations globally.
- Coordinated a highly cross-functional team with industrial designers, electrical engineers, firmware engineers, and mechanical engineers

Optimising Industrial Food Production Aug 2023 – Nov 2023

Analysed an industrial food production line to identify root causes of defects and improve throughput without changing line footprint.

- Analytically modeled complex dynamic behavior of key components in the production line leveraging high-speed camera footage collected on-site.
- Developed several concepts for improvement, covering the full solution space.
- Client implemented designs and achieved 1.75x increased throughput without increasing line footprint.

Optimising Commercial Appliance Mar 2022 – Nov 2022

Analysed airflow through a commercial appliance to optimise efficiency.

- Built thermodynamic model of the system based on lab data collected from dozens of sensors.
- Created simulation software that allowed quick iterations through different designs.
- Developed a feedback control system that dynamically adjusts air flow rate for best system performance.
- Coordinated with firmware engineers and technicians to deploy and test control system.

Electromechanical Security Product Feb 2022 – Mar 2022

Rapidly developed concepts and prototypes for addressing a critical issue in a electromechanical security product.

- Analysed the existing design, identifying root causes of issues found in the field.
- Brainstormed ideas and mapped the solution space with a dozen key architectures.
- Built multiple prototypes that successfully demonstrated five leading concepts.

Medical Robot Arm Apr 2021 – Feb 2022

Developed mechanical designs for one of the arms in a medical robot.

- Optimised structural components with stringent weight and stiffness requirements.
- Analysed and designed parts with extremely tight tolerances to ensure assemblability while minimising clearance.
- Built comprehensive analytical model of a linkage mechanism to predict motion, loads, and deflection.
- Modified existing designs to improve ease of integration and manufacturability.

Novel Subsystem Prototype Sept 2020 – Apr 2021

Developed a proof-of-principle prototype to de-risk a key robotic subsystem.

- Developed a complex analytical model of the behavior of elastic materials fed from a spool.
- Exprimented with medical grade extruded tube materials, coatings, and cross-sectional profiles to generate desired properties such as bending stiffness, resilience, creep, and friction.
- Designed and built a robotic system that process various sensor inputs to drive a custom control algorithm. The system uses clinical trial data to simulate real user motion, allowing high fidelity testing of expected behavior.

Evolv Express® Threat Detection System July 2019 – Sept 2020

Developed manufacturable prototype in support of client electronics, addressing challenging structural, materials, mobility, and environmental requirements.

- Architected mechnical structure to improve stiffness, assemblability, and serviceability.
- Converted fiberglass sheet-based design into structural foam/RIM plastic extrusions.
- Developed integrated mobility design to allow users to move system around with ease.
- Performed comprehensive Six sigma tolerance stack analysis and implemented GD&T tolerance controls.

Novel Human Machine Interface (Harman International) May 2018 – Aug 2018

Developed robotic device to support client invistigations into novel human-machine interfaces.

- Developed concepts through brainstorming, cross-pollination, and down-selection proccesses.",
- Built an integrated electromechanical prototype that was displayed at a major international trade show.",
- Built a graphics user interface to prove prototype usability and reliability."