

# Dylan Harootunian

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## Profile

Graduate student in Civil Engineering with a background in Robotics and Automation, developed through both undergraduate education and professional experience. Research experience in transportation simulation (SUMO, MATLAB, Python) and traffic signal optimization, with planned research on autonomous vehicle integration. Skilled in robotics automation, sensing, and risk analysis, and dedicated to advancing safe, reliable and accessible transportation through interdisciplinary research bridging civil, systems, and robotics engineering.

## Education

### **M.S. CIVIL ENGINEERING | SANTA CLARA UNIVERSITY | 2024–2026 (EXPECTED)**

- Pursuing a Master's in Civil Engineering to bridge the gap between robotics and transportation.
- Coursework includes: Municipal Engineering, Geotechnical Engineering, BIM, Decision/Risk Analysis, Robotics, Pavement Engineering, Linear Algebra, and Mobility & Society.
- Upcoming coursework: Traffic Engineering, Special Topics in Transportation, Earthquake Engineering, and Sustainable Construction.
- Independent research on SUMO-based traffic engineering simulations (see Research)

### **B.S. ROBOTICS ENGINEERING | UNIVERSITY OF CALIFORNIA, SANTA CRUZ | 2017–2021**

- Minor: Electrical Engineering.
- Program focused on robotics and autonomy, with a foundation in electrical, mechanical, mathematical, and programming fundamentals.
- Courses of note: Small-Scale UAVs, Analog Electronics, Sensing and Sensors, Linear Dynamical Systems, Microcontroller System Design, and Control Systems.
- Held undergraduate research positions in the Baskin School of Engineering (see Research).
- Senior Capstone Project — Design, Simulation, and Fabrication of a Buoyant Drone (see Projects).

### **SYSTEMS ENGINEERING CERTIFICATE | CALIFORNIA INSTITUTE OF TECHNOLOGY | 2024**

- Training in complex systems integration, reliability engineering, and risk management.
- Skills gained: Throughput Analysis, Fishbone Diagrams, Gantt Charts, FMEA, and Poka Yoke.

## Research & Projects

- **Graduate Research | Santa Clara University (with Prof. Rachel He) | 2025–Present**
  - Conducting simulation-based traffic signal optimization.
  - Developed a Max Pressure controller integrated with SUMO for signalized intersections.
  - Reviewed current literature on adaptive traffic signal optimization to inform simulation design and controller development.
  - Created MATLAB-based analysis tools for simulation data visualization and evaluation.
  - Planned expansion into novel controller types and autonomous and connected vehicles.
- **Undergraduate Senior Capstone Project – Buoyant Long-Flight Drone | UCSC | 2020–2021**
  - Designed and fabricated a semi-autonomous drone for the U.S. Geological Survey.
  - Integrated sensors and actuators for autonomous navigation.
  - Conducted force analysis, CAD design in SolidWorks, and prototype testing.
  - Performed flight tests on fabricated prototype.
  - Maintained system block diagram and power budget.
  - Managed project timelines, systems integration, and stakeholder requirements.
- **Undergraduate Research – Smart Electrical Anomaly Detection System | UCSC | 2020–2021**
  - Designed and fabricated sensor hardware for anomaly detection in microgrids.
  - Supported development of a database-driven approach to detect electrical anomalies using a network of deployed sensors that monitor signals from standard 120V outlets across the grid.

## Professional Experience

### MECHANICAL ENGINEER (VACUUM ROBOTICS) | APPLIED MATERIALS | 2022 – PRESENT

- Led development and deployment of autonomous robotic teaching routines, integrating advanced sensors and safety systems for calibration in semiconductor process chambers.
- Designed and implemented safety interlocks to ensure reliable operation of wireless calibration methods in high-risk environments.
- Developed and launched a user-friendly interface that streamlined adoption of automated teaching methods by operators and engineers.
- Designed and fabricated novel robotic hardware using both traditional machining and rapid 3D printing prototyping, enabling fast iteration and deployment.
- Submitted a U.S. patent for hardware that enabled safe and reliable autonomous calibration routines.
- Coordinated cross-functional engineering teams to deliver complex automation projects, ensuring reliability, scalability, and compliance with safety standards.
- Automated routines reduced tool downtime by ~110 hours per tool per year, creating an estimated \$200K in additional tool uptime value annually per tool.
- Automated routines also reduced particle contamination in semiconductor process chambers by minimizing exposure to atmospheric conditions, improving tool reliability and yield.
- **CSG Connectivity Award:** Recognized for fostering seamless collaboration and communication across teams, cultivating strong professional relationships to achieve outstanding results.

## Technical Skills

**Software & Simulation:** SUMO, MATLAB, AutoCAD, Revit, SolidWorks, NX, Simulink

**Programming:** Python, C, C++, Java, Assembly, JavaScript, HTML5

**Methods & Tools:** Robotics Automation, Systems Integration, Probabilistic Risk Assessment, Decision Trees, Utility Theory, Control Systems, Sensor Systems, 3D Printing

## References

**Professor Rachel He** — Santa Clara University | rhe1@scu.edu

**Matvey Farber** — Vacuum Robotics Manager, Applied Materials | Matvey\_Farber@amat.com