Helene Levy

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Education

University Of California, Los Angeles — Expected: Dec. 2026
Ph.D. in Mechanical Engineering — *GPA: 3.9/4*
Dissertation Title: *Trajectory Planning with Real-Time Motion Primitive Search*
Advisor: *Dr. Brett Lopez*

University Of California, Los Angeles — June 2022
M.S. in Mechanical Engineering — *GPA: 3.9/4*

University of California, Santa Barbara — June 2020
B.S. in Mechanical Engineering — *GPA: 3.9/4*

Relevant Coursework

Neural Networks and Deep Learning | Advanced Dynamics | Optimal Control | Convex Optimization | Robust Control | Probability and Stochastic Processes | Linear Dynamic Systems | Robot Kinematics

Skills

Technologies: C++, Python, ROS, RViz, SolidWorks, MATLAB, LaTeX, Motive, COMSOL, LabVIEW, Simulink
Developer Tools: Git, Linux, Jupyter Notebooks, VS Code, Google Colab
Machine Shop: Soldering, Waterjet, 3D Printing, Lathe, Mill (End Milling and Drilling), and Hand-Tapping
Languages: English (Native), French (Basic), Vietnamese (Basic)

Research Experience

Graduate Student Researcher — Oct. 2020 – Present
UCLA, Verifiable Control-Theoretic Robotics (VECTR) Lab — *Los Angeles, CA, USA*

- Creating innovative, real-time trajectory planning frameworks combining graph search algorithms (Dijkstra's, A*) with optimal control to ensure safe, long-range, dynamically feasible trajectories.
- Applying learning methods to learn search heuristics and solutions to general optimal control problems.
- Designing, fabricating, and testing custom uncrewed aerial vehicles (UAVs) for hardware experiments.
- Mentored 10 highschool and undergraduate students, providing guidance in their research projects.

UCLA, Chen Intelligence Lab - First Year Lab Rotation

- Established and verified software to autonomously land a UAV on a moving target using imaging processing techniques (object masking, contour detection) and control.
- Designed and 3D printed custom camera mount to increase vertical field-of-view of UAV.

Robotics Research Assistant — June 2019 – Sept. 2019
Tokyo Institute of Technology, Iwatsuki Group — *Tokyo, JP*

- Designed, manufactured, and tested feasibility of a novel rickshaw robot with position and velocity control.
- Optimized and designed two four-bar linkage systems for a natural bipedal gait of the rickshaw puller.
- Developed C++ code for programming photo-interrupters to use as motor encoders.

Featured Project Work

Batch Norm on Hessian of Shallow Network | *Python, TensorFlow, Google Colab* — Sept. 2021 – Dec. 2021

- Collaborated in team of two to investigate how batch normalization accelerates convergence by analyzing the Hessian of the loss function in a shallow neural network.
- Designed and ran empirical experiments on a two-layer fully connected network to study how the Hessian's condition number evolves during training when batch normalization is introduced.

NOAA Retrievable Ocean Mooring | *SolidWorks, MATLAB, Abaqus* — Sept. 2019 – June 2020

- Collaborated in a team of five to create a novel, retrievable mooring system at 1/10th of the price of competitors. Previously, moorings at the Channel Islands Sanctuary were left as waste on the ocean floor.
- Pitched our design idea to venture capitalists, NOAA Sanctuary Advisory Board, professional engineers, UCSB faculty, and general public.

Teaching and Graduate Student Leadership

MAE 157A - Senior Capstone Aerospace Design Lab Teaching Assistant Apr. 2025 – June 2025
UCLA, Department of Mechanical and Aerospace Engineering *Los Angeles, CA*

- Led two weekly 3-hour lab sessions with 25 students, guiding them through the design and testing of UAVs.
- Assisted students in troubleshooting software for trajectory generation, position and attitude control.
- Achieved an average 94% satisfaction rating (8.5/9) as a teaching assistant on student evaluations.

Mentorship Program Board Member Sept. 2023 – June 2024
UCLA, Society of Women Engineers *Los Angeles, CA*

- Organized and led mentorship events such as "How to Join a Research Lab" for undergraduate students.
- Regularly hosted office hours for undergraduate students offering graduate school and career advice.

Vice President Mar. 2022 – Mar. 2023
UCLA, Mechanical and Aerospace Engineering Graduate Council *Los Angeles, CA*

- Established online discussion board for 250+ students to discuss enrollment, graduation requirements, etc.
- Planned and fundraised social events for graduate students in Mechanical and Aerospace Engineering.

Volunteer Experience

Middle and High School Robotics Competition Judge Oct. 2024 – Present
VEX Robotics *Los Angeles, CA*

- Interview middle and high school VEX Robotics teams on their robot design process, software formulation, game strategy, and team dynamics.

Academic Coach June 2021 – Present
UPchieve *Online*

- Tutor underserved middle and high school students in the following topics: algebra, geometry, trigonometry, pre-calculus, calculus, physics, and college admissions process.

Publications

- **H. J. Levy** and B. T. Lopez, "STITCHER: Constrained trajectory planning in complex environments with real-time motion primitive search", *IEEE Transactions on Robotics*. (Submitted)
- **H. J. Levy** and B. T. Lopez, "STITCHER: Real-time trajectory planning with motion primitive search", *IEEE International Conference on Robotics and Automation*, 2026. (Submitted)

Posters

- **H. J. Levy** and B. T. Lopez, "STITCHER: Real-time trajectory planning with motion primitive search," presented at the IEEE International Conference on Robotics and Automation, Atlanta, GA, 2025.
- **H. J. Levy**, et al., "Long duration autonomous high-speed flight for geometric mapping of unknown environments," presented at the UCLA MAE Industry Advisory Board, Los Angeles, CA, 2024.

Awards and Recognition

NSF GRFP Honorable Mention	Apr. 2022
Outstanding Senior (Rank 1/91)	June 2020
Undergraduate Research and Creative Activities Grant ($750)	Jan. 2018

Professional Affiliations

- Society of Women Engineers, *Student Member*
- American Society of Mechanical Engineers, *Student Member*
- Institute of Electrical and Electronic Engineers (IEEE), *Student Member*
- IEEE Control System Society, *Student Member*
- IEEE Robotics and Automation Society, *Student Member*
- Tau Beta Pi, *Lifetime Member*

References

Dr. Brett Lopez
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