Patrick Benito Eberhard

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Education

ETH Zurich, MSc in Robotics, Systems, and Control — Zurich, Switzerland — 2023 – 2025
- Relevant courses: Advanced Model Predictive Control, Planning and Decision Making, Computational Control.
- Current GPA: 5.96/6.0.

Massachusetts Institute of Technology, Graduate Visiting Student — Cambridge, MA, U.S. — Feb. – July 2023
- Relevant courses: Optimal control and Estimation, Introduction to Machine Learning, Nonlinear Control.
- Final GPA: 5.0/5.0.

ETH Zurich, BSc in Mechanical Engineering — Zurich, Switzerland — 2019 – 2022
- Graduated Valedictorian with a GPA of 5.83/6.0.

Experience

Stanford University, Visiting Researcher — Stanford, CA, U.S. — Feb. – Aug. 2025
- Researching the control of infinite-dimensional systems using Graph Neural Networks under Prof. Marco Pavone at the Autonomous Systems Laboratory (ASL).
- Developing Neural Model Predictive Control and model-based reinforcement learning for autonomous systems .
- Creating a data-driven physics simulation framework to evaluate control policies in dynamic environments using *MuJoCo*.

Sevensense Robotics (ABB), Robotics Engineer Intern — Zurich, Switzerland — June – Dec. 2024
- Developed a fleet management system based on VDA5050, contributing to ABB's earn-out target.
- Designed and implemented a multi-agent resource manager API to optimize robot deployment in shared environments.
- Improved automated calibration and created repeatability validation pipelines for Model Predictive Control-based precise docking using VSLAM.
- Built a real-time safety system utilizing LiDAR scan data for collision avoidance in autonomous vehicles.
- Executed automated release testing for autonomous navigation and perception stacks on *Nvidia Jetson* hardware.

IDSC, ETH Zurich, Research Assistant — Zurich, Switzerland — Jan. – Dec. 2024
- Developed a novel motion planning algorithm for coverage control of nonlinear systems with time-varying densities under Prof. Melanie Zeilinger.
- Co-authored a paper on periodic disturbance observers with Stanford University, presented at IEEE IROS.
- Implemented a data-driven Gaussian Process-based MPC framework for the IDSC autonomous go-kart platform under Prof. Emilio Frazzoli.
- Writing a journal article on optimal coverage control for periodic and non-periodic densities as first author.

e-Sling, Cellsius, Software Engineer — Zurich, Switzerland — Sept. 2021 – Dec. 2022
- Co-developed a four-seater electric aircraft with a hydrogen fuel cell powertrain in a team of 8 students.
- Led the software development of the main control unit, human-machine interface, and battery management system.
- Created a real-time time-series data streaming and analysis tool for *CAN* messages, used by test pilots and the development team.
- Collaborated on test flights as a crew member, contributing to the aircraft's flight performance validation.

Publications

Perfecting Periodic Trajectory Tracking: Model Predictive Control with a Periodic Observer (Π-MPC), L. Pabon, J. Köhler, J. I. Alora, P. B. Eberhard, A. Carron, M. N. Zeilinger, M. Pavone — IROS 2024

Time-Varying Coverage Control: A Distributed Tracker-Planner MPC Framework, P. Benito Eberhard, J. Köhler, O. Hüsser, M. N. Zeilinger, A. Carron

Honours and Awards

Outstanding D-MAVT Teaching Award, ETH Zürich — Mar. 2024
Excellence Scholarship and Opportunity Programme, ETH Zürich — Sept. 2023 – 2025
Outstanding D-MAVT Bachelor Award, ETH Zürich — Sept. 2020 and Sept. 2023
Prize for the Best Matura Diploma, Swiss School of Barcelona — June 2019
Youth and Science Scholarship, Catalunya La Pedrera Foundation — 2017–2019

Skills and Interests

Languages: English, German, Spanish, Catalan
Interests: Open-water swimming, sailing, technology entrepreneurship, robotics, autonomous vehicles.
Programming Languages: Python, C++, Matlab, Rust, SQL, ROS 1 & 2, Pytorch, CUDA, Docker, Git, Linux.