Mark Benazet Castells

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Education

ETH Zürich, MSc Robotics, Systems & Control — Sep 2024 – Present

- Current GPA: 5.6/6.0.
- Relevant Courses: Probabilistic AI, Planning for Autonomous Robots, Vision Algorithms for Mobile Robotics.

Institute of Science Tokyo, Graduate Exchange — Apr 2025 – Aug 2025

- GPA: 97.35%.
- Relevant Courses: Statistical Learning Theory, Advanced Machine Learning, Advanced Topics in AI.

ETH Zürich, BSc Mechanical Engineering (Robotics, Systems and Control Specialization) — Sep 2021 – Sep 2024

- GPA: 5.56/6.0 (Top 4% of cohort).
- Relevant Courses: Autonomous Mobile Robots, Programming for Robotics and Robot Dynamics.
- Thesis: *Wind-Aware Kinematic Model Predictive Contouring Control Formulation for Fixed-Wing Guidance* under the supervision of Prof. Dr. Roland Siegwart.

Experience

NOCTUA | ETH Zürich, Robotics Engineer — Sep 2023 – Present

- Contributed to the development of a long-endurance, fixed-wing autonomous UAV for wildlife monitoring, integrating the flight controller and onboard sensors with the Pixhawk 6X.
- Implemented a real-time thermal imaging pipeline to detect and localize heat signatures, integrating it with onboard perception and navigation systems.
- Developed a ROS 2-based geolocation module to relay target coordinates to the PX4 flight controller, and assisted in control tuning and field tests validating system performance over 100+ km of autonomous flight.

IDSC | ETH Zürich, Research Assistant — Jul 2025 – Present

- Conducting research under Prof. Dr. Melanie Zeilinger and Dr. Andrea Carron on learning-based and optimization-driven control with applications in embedded systems.
- Implementing and validating control algorithms on real hardware in collaboration with industry partners, bridging theory and practical deployment.

IDSC & OMEL | ETH Zürich, Teaching Assistant — Aug 2023 – Jan 2025

- Created 10+ Jupyter notebooks used by 400+ students to master classical control concepts.
- Supported 100+ students in hands-on labs implementing real-world control systems on robotic platforms.

Projects

Learning Agile Drone Maneuvers from VLM- Generated Preferences, RPG | UZH — Sep 2025 – Present

- Developing a Preference-based Reinforcement Learning framework for agile quadrotor maneuvers using Vision-Language Models to autonomously generate preference labels, replacing hand-crafted rewards and human evaluators, with implementation and testing on physical drones.

Learning-Based Control for Embedded Industrial Systems, IDSC - HILTI| ETH Zürich — Jul 2025 – Present

- Performed system identification and learned non-parametric residual dynamics from hardware-in-the-loop data, improving model accuracy by >60% for embedded robust control.

Honors and Awards

Institute of Science Tokyo Fund Scholarship, Institute of Science Tokyo — Feb 2025

Skills

Robotics & Control: Model Predictive Control (MPC), Preference-Based Learning, Reinforcement Learning, Classical & Modern Control Techniques, System Identification
Languages & Frameworks: Python (PyTorch, NumPy, CasADi, Acados), C++, ROS 1/2
Tools: PX4, Gazebo, MATLAB, Linux, Git, LaTeX
Languages: English (native), German (fluent), Spanish & Catalan (native)