

Francesco Mazzone

Intelligent Systems for Autonomous Decision-Making

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RESEARCH INTERESTS

Intelligent Systems · Computer Vision · Machine Learning

EDUCATION

- **Mechanical Engineering BSc | Politecnico di Milano** 2016 - 2019
Milan, Italy
 - **GPA:** 107/110 (91.5% faculty average)
 - **Selected Coursework:** Calculus 1 & 2, Statistics, Numerical Methods, Informatics, Mechanics
- **Mechanical Engineering MSc | ETH Zürich** 2020 - 2023
Zürich, Switzerland
 - **GPA:** 5.23/6.0
 - **Selected Coursework:** Control Systems 1 & 2, Flow Visualization & Computer Vision
 - **Master's Thesis:** Extracting Aerodynamic Insights from 3D Wind Tunnel Models: A Novel Computer Vision-Based Approach to Surface Flow Characterization, carried out at *ETH Zürich* and *Audi F1 Racing Team*.
 - **Notes:** converted to part-time student as of 2021.
- **Researcher (non-degree), EECS | The Chinese University of Hong Kong** 2024 - 2025
Hong Kong, HKSAR
 - **GPA:** not yet available
 - **Selected Coursework:** Introduction to Deep Learning, Image Processing and Computer Vision

AWARDS & HONORS

- **2 x Full Tuition Exemption** for students with particularly high merits, awarded by Polytechnic University of Milan (A.Y. 2017-2018, A.Y. 2018-2019)
 - Conferred in recognition of an outstanding grade point average from the previous academic year.
- 1st place European Rocketry Challenge, 3rd place Spaceport America Cup
 - Europe- and world-wide student rocket launching competitions involving the design, construction, and launch of a sounding rocket, where I took part through ARIS (Academic Space Initiative Switzerland), the student-led rocket project at ETH Zürich.

RESEARCH EXPERIENCE

- **Graduate Researcher | Multimedia Lab, CUHK** 09.2024 - Current
Hong Kong SAR, China
 - Currently working in the domains of perception, scene reconstruction and rendering for autonomous driving in Prof. Hongsheng Li's group at *The Chinese University of Hong Kong*, in the Multimedia Lab (MMLab) and Centre for Perceptual and Interactive Intelligence (CPII).
- **Research Assistant | EMPA, ETH Zürich** 04.2021 - 04.2022
Zürich, Switzerland
 - Responsible for camera calibration for a measurement setup used to monitor crack propagation on plane fuselages (Airbus A350 project in Prof. Giovanni Terrasi's group)
 - Implemented a Digital Image Correlation algorithm with template-matching to assess real-time fuselage structural health

WORK EXPERIENCE

- **Computer Vision Engineer | Audi F1 - Formula 1 Racing Team** 03.2023 - 08.2024
Zürich, Switzerland
 - **3D aerodynamic data processing:**
 - Performed point cloud registration (FPFH/RANSAC and ICP), segmentation, and rasterization on 3D wind tunnel model scans
 - Developed CV algorithms for flow features detection and classification
 - Reconstructed the features' 3D location with an error of less than 1% relative to measurement accuracy
 - Developed application software with an intuitive frontend integrated with the team's software infrastructure and cloud-based data warehouse
 - **Aeroelastic deflections tracking:**
 - Implemented monocular 3D vehicle pose estimation and object detection for front/rear-wing deflection tracking using markers on the Formula 1 car
- **Software Engineering Intern | Beyond Gravity AG** 08.2022 - 02.2023
Zürich, Switzerland
 - Developed a micro-vibration model in python for solar array wings control (SADM Solar Array Drive Mechanism for ESA/NASA projects)
 - Developed a computer vision algorithm to inspect the quality of aluminum honeycomb in composite structures for space by automatically detecting manufacturing defects
- **Robotics Intern | Pick8ship Technology AG** 05.2022 - 08.2022
Zürich, Switzerland
 - Implemented a simulator for a smart warehouse robotic system
 - Achieved 30% system performance improvement by using the simulator to establish new hardware requirements.
- **Software Engineer | Jenzer Motorsport - Formula 3 Racing Team** 09.2021 - 02.2022
Bern, Switzerland
 - Integrated an off-the-shelf F3 car physical model into the F3 car simulator
 - Improved the model with the car knowledge available in the team to achieve deviations below 10% in lap-time between hardware on track and simulation setup.

LEADERSHIP & SOCIAL ACTIVITIES

- **Controls Team Lead | ARIS (rocket project at ETH Zürich)** 10.2020 - 10.2021
Zürich, Switzerland
 - Led a team of 5 students in designing a pneumatic stage separation system and implementing control algorithms (Kalman filter for state estimation under supersonic flight conditions) for the ARIS rocket.
 - Successfully deployed the system during launch events and won international competitions (1st place European Rocketry Challenge, 3rd place Spaceport America Cup)
- **Software Engineer (Charity) | Fondazione Banco Alimentare Onlus** 09.2011 - 09.2016
Como, Italy
 - Developed and maintained a simple software tool for *Fondazione Banco Alimentare Onlus*, a non-profit organisation in Italy, to manage food storage and weekly distribution to those in need

SKILLS

- **Programming:** C/C++, Python, SQL
- **Frameworks and Tools:** PyTorch, Git, Vim, Docker, CSS, Matlab, Jira, 3D CAD software, Blender
- **Languages:** Italian (C2), English (C1), German (C1), Spanish (C1), French (C1), Portuguese (B2), Mandarin Chinese (A1)
- **Interests:** sailing, analog film photography, languages, reading