Tommaso **Bocchietti**

Mechanical Engineer | MSc Mechatronics & Robotics (Dec 2025)

Gilching, Munich Metropolitan Area (DE)

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"Innovation through hands-on engineering"

Enthusiastic Mechanical Engineer passionate about model-based design, control theory, and embedded systems.
Driven by curiosity and hands-on experience, with a constant focus on optimizing existing solutions and designing what has yet to be imagined.
Seeking opportunities in dynamic environments spanning robotics, aerospace systems, and embedded development, where mechatronic solutions and intelligent control systems push the boundaries of innovation.

Experience

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)

Oberpfaffenhofen, Munich (DE)

Robotics Researcher — *01.04.2025 - 19.12.2025*

- Developing a regrasping framework for the DLR's Hybrid Compliant Gripper (HCG).

Polimi Sailing Team

Politecnico di Milano, Milan (IT)

Mechatronic Engineer — *19.10.2023 - 20.10.2024*

- Developed high-performance NMEA0183 communication libraries in C/C++ for real-time marine sensor integration.
- Designed STM32/ESP32 firmware to interface peripheral sensors and actuators with control units via CAN and ESP-NOW protocols.
- Selected as the overall winners of the 2024 edition of the "SuMoth" competition among 11 participating teams.

Orienteering Como

Lombardy (IT)

Mapper — *02.02.2018 - PRESENT*

- Responsible for the society's cartography.
- Drawn several new Orienteering maps using the International Symbols Specification.
- Handled many homologation iter with the official Italian Federation for this sport.
- Developed a cloud-based architecture to facilitate the access and use of the map archive to all the members of the society.

Self-Employed

Online & Como (IT)

Private teacher — *02.2018 - PRESENT*

- One-on-one tutoring and support in scientific subjects for students who are facing challenges.
- Students range in age from 14 to 19.

Politecnico di Milano in partnership with RIMAC Automobili

Politecnico di Milano, Milan (IT) & RIMAC Automobili, Zagreb (HR)

Mechanical Engineer Intern — *09.03.2023 - 01.06.2023*

- Designed an innovative electric personal transportation vehicle concept aligned with RIMAC Automobili's vision for sustainable urban mobility.
- Developed 3D CAD models in OnShape and conducted structural FEA simulations to validate design integrity.
- Conducted ergonomic analysis and iterative design refinements to optimize user comfort, safety, and vehicle performance.
- Collaborated in an international team of 10 students from multiple European universities.
- Selected by company engineers as the best project among the 4 participating teams.

Confedilizia Como

Como (IT)

Software developer — *04.2020 - 02.2021*

- Responsible for the development of a custom software for the management of the real estate properties.
- Full stack development of the web platform for the secure distribution of the software to the clients.

Ennova Research

ComoNExT, Como (IT)

Web Programmer — *04.06.2018 - 13.06.2018*

- Period of internship for the "Alternanza Scuola Lavoro" national project.
- Developed a dynamically generated web page using Node.js and JavaScript.

Education

Politecnico di Milano

Milan (IT)

MSc in Mechanical Engineering (Mechatronics and Robotics) — *13.09.2023 - 10.12.2025 (expected graduation)*

- Current GPA: 29.32/30
- Joined the "Polimi Sailing Team" in the "Mechatronics" department (A.Y. 2023/24)

University of Waterloo

Waterloo (CA)

MSc in Mechanical Engineering (Erasmus+ exchange)

01.01.2024 - 26.04.2024

Relevant courses taken:

- Advanced Finite Element Analysis: coded a 2D FEM solver for non-linear and plastic materials in MATLAB (A.Y. 2023/24)
- Computational Fluid Dynamics: coded a 2D CFD solver for incompressible fluid and a 1D solver for compressible fluid (A.Y. 2023/24)
- Materials for Nano and MEMS: complete a research project about Chip-Scale Atomic Clocks (A.Y. 2023/24)

Politecnico di Milano

Milan (IT)

BSc in Mechanical Engineering

14.09.2020 - 21.07.2023

- Selected for participating in the "Pro Hackin' Project 2023" (A.Y. 2022/23)
- Selected for competing at SWERC 2021 (A.Y. 2020/21)
- Third place in an internal coding competition using MATLAB (A.Y. 2020/21)

Scientific High School "Paolo Giovio"

Como (IT)

High School Diploma, Scientific

14.09.2015 - 06.2020

- Italian Physics Olympiad: admitted to regional selection (02.2019)
- Italian Informatics Olympiad: admitted to regional selection (04.2019, 04.2018)
- Italian Mathematics Olympiad: admitted to local district selection (02.2017)

Technical Skills

Modeling & Simulation	MATLAB/Simulink, ROS, Model-Based Design
Embedded Systems	STM32, ESP32, Arduino, Raspberry Pi
Programming	C/C++, Python, Java | Web stack (JS, PHP, MySQL)
CAD & Design	CATIA V5, SolidWorks, Inventor
Tools	Git, CI/CD, LaTeX, Linux, Windows

Languages

Italian	Native
English	Proficient

Extracurricular Activity

Italian Orienteering Committee

Italy

IT Technician

11.2018 - PRESENT

- Organizational IT aid at major Italian Orienteering Events.
- 5 Days of Italy (07.2022)
- International MeetingOfVenice (11.2018 - PRESENT)

Orienteering Como

Lombardy (IT)

Events Organizer

01.2017 - PRESENT

- Educational and promotional outings in the role of instructor (mainly for schools or local association).
- Organizer playing key roles (controller or course-setter) in smaller events such as promotional or regional competitions.

Orienteering Como

Villa Guardia, Como (IT)

Council Members

09.2021 - PRESENT

- Member since 02.2016
- Council Member since 09.2021

Tennis Como

Como (IT)

Ball boy

2012 - 2014

- Assisted the organization of the annual ATP Challenger tournament held in Como.
- Played the role of ball boy for the years 2012, 2013, and 2014.

Honors & Awards

2024	**Merit Exemption,** Scholarship aimed at the group of top students based on GPA	*Milan (IT)*
2023	**Merit Exemption,** Scholarship aimed at the group of top students based on GPA	*Milan (IT)*
2022	**Merit Exemption,** Scholarship aimed at the group of top students based on GPA	*Milan (IT)*
2021	**Merit Exemption,** Scholarship aimed at the group of top students based on GPA	*Milan (IT)*
2021	**Best Freshman Award,** Scholarship aimed at the group of top freshmen students based on GPA	*Milan (IT)*

Presentation

Online Webinar by F.I.M.A.A COMO *Online*

PRESENTER FOR <CONTRATTI A CANONE CONCORDATO> *16.02.2021*

- Explained the importance of a computer based system to efficiently generate the new type of real estate contract.
- Demonstrated the app developed for Confedilizia Como as a potential solution for compliance with new laws.

Certifications

Arduino 90/100 Official Arduino certification, obtained on 17.04.2024

TOEFL 90/120 Test of English as a Foreign Language, obtained on 23.08.2023

TOEIC 975/990 Test of English for International Communication, obtained on 12.07.2023

Hobby & Personal interests

For the past 8 years, I've been practicing orienteering, a sport that demands map reading, physical effort, and fast decision-making. I've also done some bikepacking trips, covering routes like Como-London (1200km+), Como-Barcelona (1100km+) and Como-Roma (750km+).
These self-supported adventures showcase my tenacity, adaptability, and problem-solving skills in facing new situations and challenges.

Projects

Selection (not exhaustive) of some projects I've worked on that relate to my academic, professional, and personal interests.
I consider them as way to experiment, learn, and get a hands-on approach to engineering.

Academic Projects

Politecnico di Milano, Milan (IT) & University of Waterloo, Waterloo (CA)

MOST OF THE PROJECTS WERE DONE INDIVIDUALLY, AT THE EXPLICIT REQUEST OF THE PROFESSOR. *14.09.2020 - PRESENT*

- **Implementation of path planning algorithms**: memory-efficient graph and sample-based search algorithms (A*, Dijkstra, RRT, RRT* and RRT-Kinodynamic) for path planning in robotics. Implementation in MATLAB, validation on both 2D and 3D environments via ROS ecosystem.
- **Study on Nonreciprocal Behavior in Time-Space Modulated Beams**: analysis of diode-like behavior in time-space modulated beams by means of piezoelectric shunts. Structure simulations in Comsol Multiphysics, experimental data analysis with MATLAB.
- **Topology Optimization of Hub Carrier**: mass minimization of a hub carrier structure, with constraints on the compliance and the manufacturability. Analysis with Altair HyperWorks suite.
- **Modeling and Control of a MagLev system**: analysis of the dynamics of a magnetic levitation system, parameter identification and control/filters design (PID, LQR and MPC, coupled with KF and EKF). Simulation in MATLAB/Simulink and hardware deployment on *RTDAC/PCI I/O* board from INTECO.
- **Topology Optimization of 2D structures**: implementation of optimization routines based on the CONLIN algorithm. Validation on both discrete and continuous problems.
- **Structural Health Monitoring (SHM) as a multivariate outlier detection problem**: analysis of a tie-rods element subjected to both damage and environmental variability, by means of statistical indices as Mahalanobis Squared Distance (MSD) and Principal Component Analysis (PCA).
- **Drag Coefficient Analysis of a Model Rocket Using Ansys Fluent**: simulation of the flow around a model rocket to determine the drag coefficient and comparison with theoretical model.
- **Development of a 2D CFD solver in C/C++ for the solution of the Navier-Stokes equations for incompressible flows**: implementation of the SCGS and SIMPLE algorithms, with validation on the lid-driven cavity flow.
- **Implementation of a nonlinear Finite Element Analysis (FEA) solver**: implementation of the plasticity theory based on the radial return algorithm on top of a linear FEA solver.
- **Chip Scale Atomic Clocks (CSAC)**: analysis of the physics behind their operation and current state of the art, with a focus on MEMS/NEMS technology.
- **Laser/Material Interaction**: thermal analysis of the laser cutting process, with a focus on the vaporization and melt mechanisms.
- **Analysis of the electronic density for a given molecule**: visualization of the electronic density field of a molecule using MATLAB.

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\begin{cases}
\dot{z} = v \\
\dot{v} = m^{-1}\left(\frac{1}{2}\frac{\partial L_1}{\partial z} I_1^2 + \frac{1}{2}\frac{\partial L_2}{\partial z} I_2^2 - \frac{1}{2} C_d A \rho \dot{z}|\dot{z}| + mg\right) \\
\dot{I}_1 = \left(\frac{1}{2}\frac{\partial^2 L_1}{\partial I_1^2} I_1^2 + 2\frac{\partial L_1}{\partial I_1} I_1 + L_1\right)^{-1}\left(-\frac{1}{2}\frac{\partial^2 L_1}{\partial I_1 \partial z}\dot{z} I_1^2 - \frac{\partial L_1}{\partial z}\dot{z} I_1 - R_1 I_1 + V_1\right) \\
\dot{I}_2 = \left(\frac{1}{2}\frac{\partial^2 L_2}{\partial I_2^2} I_2^2 + 2\frac{\partial L_2}{\partial I_2} I_2 + L_2\right)^{-1}\left(-\frac{1}{2}\frac{\partial^2 L_2}{\partial I_2 \partial z}\dot{z} I_2^2 - \frac{\partial L_2}{\partial z}\dot{z} I_2 - R_2 I_2 + V_2\right)
\end{cases}
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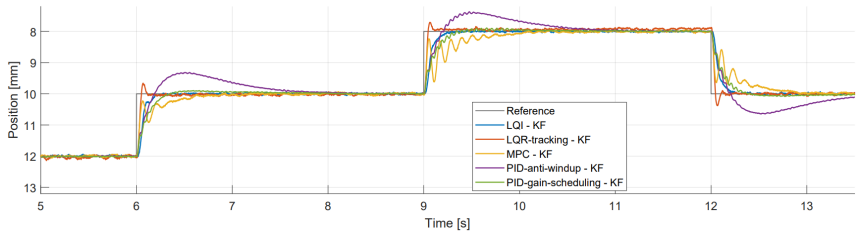
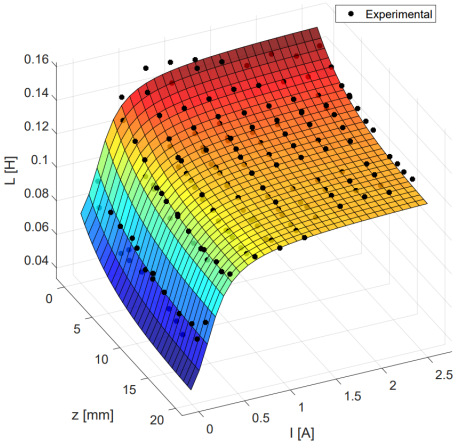




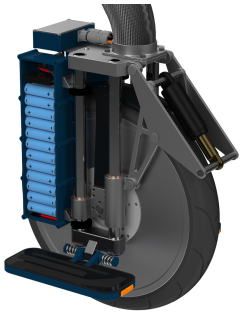
Extrapolated results from the MagLev project: system's equations of motion (top-left), inductance parameter identification (right) and system's response to a multistep input under different controllers (bottom-left). Accuracy of simulations allowed designing stable controllers in the full operability range of the system (3-22[mm]).

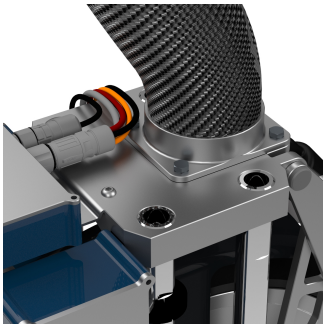
Personal Transportation Vehicle (Sidewalk vehicle)

Politecnico di Milano, Milan (IT) & RIMAC Automobili, Zagreb (HR)

PRO HACKIN' PROJECT 2023, IN PARTNERSHIP WITH RIMAC AUTOMOBILI

09.03.2023 - 01.06.2023





Idealize and Design a Personal Transportation Vehicle (Sidewalk vehicle).
Team-based project with students from 4 top European universities, featuring feedback sessions after each hackathon by company engineers. Selected as winning team.

- Hackathon 1: visions, user personas and functions & requirements
- Hackathon 2: functional decomposition, morphological matrix and concepts development
- Hackathon 3: CAD design, FEM simulations, FMEA and cost analysis.

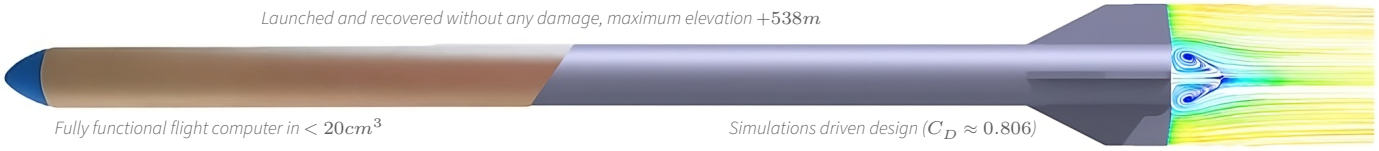
Model Rocket with On-Board Flight Computer

Personal Workshop, Como (IT)

PERSONAL PROJECT TO CELEBRATE BSC

12.07.2023 - 21.07.2023

Launched and recovered without any damage, maximum elevation $+538m$



Fully functional flight computer in $< 20cm^3$

Simulations driven design ($C_D \approx 0.806$)

Designing, optimization and building of a $63cm$ model rocket.

Final design was achieved after a couple of iterations between CAD model and CFD simulations. Built mostly from cheap materials (cardboard & wood) and 3D printed parts (PLA based). Essential characteristics:

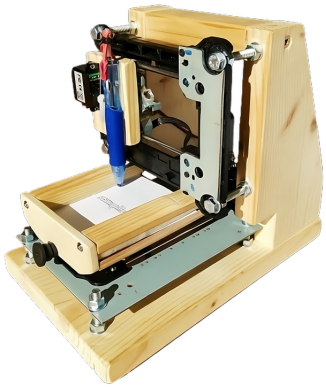
- Flight time $\approx 60s$, maximum speed reached $+120m/s$, maximum acceleration $+10g$.
- Recovery system based on parachute, fully functional and reliable.
- On board flight computer with barometric, temperature and acceleration sensors capable of logging data.

Selection of other minor projects

Personal Workshop, Como (IT)

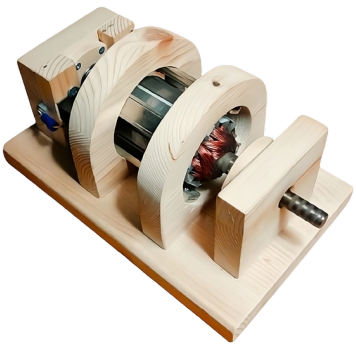
DONE FOR FUN OR FOR EDUCATIONAL PURPOSES

2021 - PRESENT



CNC plotter to go from any digital image to its physical representation.

- Arduino based plotter with custom software.
- Canny edge detection algorithm.
- Recycled components from old DVD drives and wood.



DC electric motor model to explain its working principle to my peer students.

- Recycled components from an old lawn mower and wood.
- Controllable in speed via a custom electrical circuit (diodes bridge and potentiometer).

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