Alessandro Lotti

Aerospace Engineer - BS, MS, Ph.D. Candidate

I am a passionate **aerospace engineer** and **Ph.D. candidate** specializing in **space systems** and **computer vision**. With a strong work ethic I excelled in my BSc and MSc, while also privately teaching high school students and working as a degree program tutor. I proudly co-founded EUROAVIA Forlì-Bologna. In February 2021, I joined the **Microsatellites and Space Microsystems Lab** at the University of Bologna.

Info and Contacts

Born in 1996, Italian citizen

+39 **********

alessandro@alessandrolotti.com

Personal website: alessandrolotti.com

LinkedIn

Skills

Research: self-learning, critical thinking, public speaking.

Scientific: space systems, neural networks, computer vision, problem solving.

Software: Simulink, Blender, COMSOL Multiphysics, TracePro.

Programming: MATLAB, Python, TensorFlow, GitHub, AWS, Astro.

Languages

Italian (native - C2)

English (fluent - C1)

French (intermediate - B2)

Certifications

2024 - **Chair, editor, reviewer**, WACE 2024.

2023 - **Reviewer**, **Acta Astronautica**, Elsevier.

2021 - **Deep Learning Specialization**, Coursera.

Awards

2021 - 1st place team, ***T-TeC***, Telespazio - Led the proposal "**Multi-Purpose Modular Satellite Servicer**". (€ 10,000 prize)

2020 - **Top student**, *Aerospace Eng. 2nd year*, University of Bologna. (€1,500 prize)

2017 - 1st place team, ***AlmaContest***, University of Bologna - Developed "**AlmaOrienteering**", enhanced university information Android app. (€ 2,750 prize)

Featured Experiences

Research Fellow — Nov. 2024 - current
Alma Mater Studiorum - University of Bologna, Italy

My research topic is: onboard technologies for attitude and orbital control of satellites in very low Earth orbit.

Teaching Assistant and Student Supervisor — 2020 - 2024
Alma Mater Studiorum - University of Bologna, Italy

I have supervised 8 students on their final projects covering various **deep learning** topics **for space applications**. Since 2021, I have coordinated and supervised the annual Summer School in **Industrial Engineering for Advanced Automotive**. Additionally, in 2021, I worked as a teaching tutor for a course on Calculus and Linear Algebra.

MATLAB Student Ambassador — 2021 - 2023
The MathWorks Srl, Italy.

I hosted educational events on the use of **MATLAB**, numerical computing, and deep learning, including seminars within bachelor's and master's degree courses.

Graduate Research Fellow — 2021
Alma Mater Studiorum - University of Bologna, Italy.

I created a **photorealistic dataset** of a COSMO-SkyMed spacecraft using **Blender** and developed a pose estimation algorithm. This research project received funding from Thales Alenia Space Italia.

Education

Doctorate - Aerospace Science — 2021 - 2024
Alma Mater Studiorum - University of Bologna, Italy.

My Ph.D. focused on **autonomous satellite navigation for proximity and docking operations**. I specialized in **monocular pose estimation** using deep learning, emphasizing algorithm **deployability** and **domain gap**. In 2022 I ranked 4th and 5th in the ESA's satellite pose estimation challenge. In 2024 I conducted a research visit at the **Australian Institute for Machine Learning** (University of Adelaide) on **3D model reconstruction** and pose estimation from monocular images.

Supervisor: Prof. Paolo Tortora; co-supervisor: Prof. Dario Modenini.

Master of Science - Aerospace Engineering — 2018 - 2020
Alma Mater Studiorum - University of Bologna, Italy.

I contributed to a microsatellite mission study, focusing on **attitude and power subsystems**, and developed a **thermal analysis model** for LEO satellites. I conducted my **thesis in collaboration with Alén Space** (Spain) on the preliminary design of the communication system for an ESA-contracted **robotic lunar cave exploration** study.

Exam average (out of 30): **29.87**; **graduation mark** (out of 110): **110 with honours.**

Bachelor of Science - Aerospace Engineering — 2015 - 2018
Alma Mater Studiorum - University of Bologna, Italy.

My internship and final thesis focused on **GPS algorithms for orbit determination**.

Exam average (out of 30): **29.40**; **graduation mark** (out of 110): **110 with honours.**

Featured Publications

A. Lotti, et al., 'Deep Learning for Real-Time Satellite Pose Estimation on Tensor Processing Units', Journal of Spacecraft and Rockets, 2023, doi: 10.2514/1.A35496.

A. Lotti, et al., 'Investigating Vision Transformers for Bridging Domain Gap in Satellite Pose Estimation', Studies in Computational Intelligence, 2023, doi: 10.1007/978-3-031-25755-1_20.

A. Lotti, 'Improving satellite pose estimation across domain gap with generative adversarial networks', 3rd Aerospace PhD Days, 2023, doi: 10.21741/9781644902677-55.