# Lorenzo Feruglio

*PhD Candidate at Politecnico di Torino*

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## Education

2006–2009 **Aerospace Engineering**, *Politecnico di Torino*, Torino, *Bachelor's Degree*.

2009–2012 **Aerospace Engineering**, *Politecnico di Torino*, Torino, *Master of Science*.
Graduated with Honors

2014–now **Aerospace Engineering**, *Politecnico di Torino*, Torino, *PhD Candidate*.

2014 Exchange student at **Massachussetts Institute of Technology** for the project 'CubeSat for Space Exploration: a new paradigm for Planetary Science Missions'

2015 Visiting Student Researcher (JVSRP) at **Jet Propulsion Laboratory** (JPL) for Mission Autonomy Research

## Summary

*research* Autonomous Space Systems, Artificial Intelligence

*experience* Five years and counting of *hands-on* experience with CubeSats
Polito CubeSat Team Leader for C&DH, AOCS and GCS design

*knowledge* Detailed subsystem knowledge (AOCS, C&DH)
STK, Matlab, Python, C

*hands-on projects* e-st@r CubeSat project followed from design to LEOP
e-st@rII CubeSat currently performing Environmental Test Campaign at ESTEC among Fly Your Satellite! Competition
3-STAR CubeSat for GNSS Remote Sensing

## Experience

### PhD Student - Space Engineering

2014–now **Mission Autonomy Engineer**, *Politecnico di Torino*, Torino.

Methodologies and Technologies to Improve Small Satellites Space Mission Autonomy
Current field of research:

- Neural networks for image quality assessment and event detection
- Fuzzy logics for failure detection of actuators
- Definition of case studies (Interplanetary CubeSats) in order to investigate on mission autonomy-enhancing technologies
- Genetic Algorithms to optimize Multi-Attribute Tradespace Exploration problems
- Hardware-In-The-Loop testing of training algorithms for neural networks for asteroid recognition

### Space System Engineer

2013–2014 **Assistant Researcher**, *Politecnico di Torino*, Torino.

Capture and De-Orbiting Technologies.
Field of Research:

- Development of a Simulator Technology to perform mission analyses and In-The-Loop simulations
- Research on GNC strategies for the latest phases of a rendez-vous and mating manoeuvre
- Attitude Determination and Control Algorithms testing on specific hardware (ARM architecture)
- Code development and upgrading for ADCS and OBC subsystems (e-st@rII CubeSat)
- e-st@r-II CubeSat Subsystem and System Functional Testing

2012–2013 **Operation Architecture Engineer**, *SES (contractor)*, Luxembourg.

Efficient Automation of Satellite Operations (EASO Project).
Detailed achievements:

- Development, verification and validation of automated procedures for Satellite Operations
- Payload and Bus operation procedures for the SES Orbital fleet:
  - Dynamic Satellite Simulators (Orbital)
  - AOCS, TCR, TCS, EPS, CDH procedures development and subsystem analysis by means of DSS
  - Ground Control Station Software (SCORPIO)
- SPELL, Python, Eclipse

2009–2012 **Polito CubeSat Team - Team member**, *Politecnico di Torino*, Italy.

Member of the University CubeSat Team, developing and launching 1U+ CubeSats.
Detailed achievements:

- Satellite (1U and 3U CubeSat) experience:
  - System Engineering methodologies
  - ADCS, C&DH Subsystem development and testing
  - CubeSat functional testing (test definition and execution)
  - ECSS standards for software development and testing
  - Real-time OS (Salvo, RTLinux)

## Computer skills

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|---|---|
| Analysis | STK, Dynamic Satellite Simulation (AOCS, Failure Detection Systems), Space Debris Mitigation |
| Programming | C, C++, Python, Matlab/Simulink |
| System Eng | Multi-Attribute Tradespace Exploration, Satellite System Budgets, SysML, UML, Requirements and Functional Analysis |
| Embedded | MPS430, ARM9, Satellite Hardware-In-The-Loop Testing |
| Miscellaneous | MS Office, Visio, LaTex |
| OS | UNIX (Ubuntu), RTLinux, Windows |

## Languages

| | |
|---|---|
| Italian | Mother language |
| English | Proficient |
| French | Basic Knowledge |
| German | Basic Knowledge |