Saverio Maria Currà

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Date of birth: 16/09/2001   **Nationality:** Italian

CURRENT POSITION

[10/2023 – Current]   **Master's degree student of Space and Astronautical Engineering**

Current arithmetic average grade - 29.42/30

Current weighted average grade - 29.33/30

[11/2020 – Current]   **Student of Scuola Superiore di Studi Avanzati Sapienza**

[11/2024 – Current]   **Student of Excellence Program of Space and Astronautical Engineering**

[05/2025 – Current]   **Research fellowship recipient**

Research Fellowship for DIMA: "Development of digital twins and AI tools for the design, manufacturing, testing, and operations of space systems"

Supervisor: Prof. Michele Pasquali

OTHER QUALIFICATIONS

[11/2024 – 10/2025]   **Excellence Program or an equivalent qualification awarded by other universities**

- Excellence Program of Aerospace Engineering, 11/2021 - 10/2023
- Excellence Program of Space and Astronautical Engineering, 11/2024 - 10/2025

Experiences relevant to the educational objectives of the PhD program, such as diplomas and training or specialization courses, collaboration grants, research fellowships, and similar activities, as well as other experiences related to the PhD topics but carried out outside the formal educational pathways of the degree program attended by the candidate

- **Sapienza Superior School of Advanced Studies (SSAS)**
  - University school of excellence offering a parallel academic curriculum that complements the standard Bachelor's and Master's programs with interdisciplinary training, advanced coursework, and research. Upon completion of both cycles, students are awarded an additional second-level Master's degre.

- **Workshops and Training Courses**
  - ESA Ladybird Guide to Spacecraft Communications Training Course, 13/03/2023 – 17/03/2023
  - NASA Juno Data Analysis Workshop for Science Capacity Building, 17/07/2023 – 20/07/2023

- **Research fellowships and collaboration grants**
  - DIMA Research Fellowship: "Development of digital twins and AI tools for the design, manufacturing, testing and operations of space systems.", Prof. Michele Pasquali, 05/2025 - 10/2025
  - "Borsa di collaborazione DIMA presso il laboratorio di impianti e sistemi aerospaziali", Prof. Fabrizio Piergentili, 03/2024 - 09/2024
  - DIAEE Research Fellowship: "Attività di supporto alle operazioni degli osservatori EQUO-AD e all'analisi dati per caratterizzazione, identificazione e determinazione orbitale per detriti spaziali e oggetti in orbita.", Prof. Fabio Santoni, 17/01/2024 – 17/02/2024

- **Research Projects and Activities**

- BILAR project (Benchmarking and Inversion of Light Curve for Attitude Reconstruction)
- CALIPSO Cubesat (for participation in the ESA Fly Your Satellite 2024 Competition)

- **Networks and memberships**
  - Sapienza Space Systems and Space Surveillance Laboratory (S5Lab)
  - SASA (Sapienza Aerospace Student Association) Technology Team
  - Young ISSNAF Mentorship 2024

Publications

- Light Curves Sequential Comparison Strategy for Improved Understanding of LEO Uncontrolled Objects, 2024
- BILAR (Benchmarking and Inversion of Light Curve for Attitude Reconstruction with Expert Centre Support), accepted, 2025
- DEVELOPMENT OF A LABORATORY FACILITY FOR SIMULATING LIGHT CURVES, accepted, 2025

EDUCATION AND TRAINING

[10/2020 – Current]

Sapienza Superior School of Advanced Studies (SSAS)

La Sapienza University of Rome   https://web.uniroma1.it/sssas/

University school of excellence offering a parallel academic curriculum that complements the standard Bachelor's and Master's programs with interdisciplinary training, advanced coursework, and research. Upon completion of both cycles, students are awarded an additional **second-level Master's degree**.

Each academic year includes 12 extra ECTS credits through:

- **Interdisciplinary projects**, involving collaborative group work across different academic disciplines;
- **Advanced courses**, selected from diverse scientific and humanistic fields beyond the standard curriculum;
- **Research projects**, carried out under faculty supervision or within laboratories at Sapienza.

The research projects include:

- *Theoretical study and experimental analysis of the performance of model rockets* (2021): prediction and validation of speed, acceleration, and altitude using onboard sensors and mathematical modeling.
- *Control of position and orientation of a robotic Stanford manipulator* (2022): implementation of an inverse kinematics-based control system in Simulink for robotic end-effector manipulation.
- *Light curve reconstruction from simulated satellite passage observation* (2023): use of a 6-DOF robotic arm, high-efficiency camera, and solar simulator to replicate the passage of a OneWeb satellite and extract the corresponding light curve through image processing and comparison with real observational data.
- *CALIPSO CubeSat project* (2024): proposal development for the ESA Fly Your Satellite program, focusing on the design of an AI-based payload for autonomous attitude determination and in-orbit algorithm testing.

[10/2023 – Current]

Space and Astronautical Engineering -- M. Sc.

La Sapienza University of Rome

City: Rome | **Country:** Italy | | **Final grade:** 29.42/30 (current arithmetic average grade), 29.33/30 (current weighted average grade) | **Thesis:** Optimal Mission Planning Strategies for an earth observation SAR Satellite: Optimization under Sequential Constraint Validation

Excellence Program (Tutor: Prof. Fabrizio Piergentili)

Conducted literature research in support of the Master's thesis activities, focusing on metaheuristic algorithms and machine/deep learning approaches for optimal task planning in Earth observation satellite missions and constellations.

Transcript of Grades:

- CONTROL SYSTEMS - 30/30
- GAS DYNAMICS - 27/30
- SPACE STRUCTURES - 30/30 E LODE

- SPACE MISSIONS AND SYSTEMS - 30/30
- ROCKET PROPULSION - 27/30
- SPACEFLIGHT MECHANICS - 30/30
- ELECTRONICS - 30/30 E LODE
- ELECTRONICS FOR SPACE SYSTEMS - 29/30
- INTERPLANETARY TRAJECTORIES - 30/30
- SPACE GEODESY AND GEOMATICS - 30/30 E LODE
- CONCEPTUAL DESIGN OF A SPACE MISSION - QUALIFIED
- SPACE SURVEILLANCE AND SPACE TRAFFIC MANAGEMENT - 30/30 E LODE
- SPACECRAFT DESIGN - 30/30 E LODE

[10/2020 – 10/2023]

Aerospace engineering -- B. Sc.

La Sapienza University of Rome

City: Rome | **Country:** Italy | | **Final grade:** Cum Laude -- final GPA 29.46/30 | **Thesis:** Dawn spacecraft orbit uncertainty estimation due to the uncertainty on Ceres gravity field and RCS firings using Monte-Carlo approach, performed using MATLAB and GMAT.

Honors Program (Tutor: Prof. Antonio Genova)

Conducted literature research in preparation for the Bachelor's thesis, focusing on spacecraft orbit propagation under the influence of RCS attitude maneuvers and gravity field uncertainties. The work supported the development of a semi-analytical detection method and Monte Carlo simulations for the Dawn Mission at Ceres.

RESEARCH SCOLARSHIPS

[05/2025 – Current]

DIMA Research Fellowship: "Development of digital twins and AI tools for the design, manufacturing, testing and operations of space systems."

Institution: Sapienza Space Systems and Space Surveillance Laboratory (S5Lab), Sapienza University of Rome

Supervisor: Prof. Michele Pasquali

Activity: Research activity conducted in the context of the Master's thesis, in collaboration with Thales Alenia Space Italia. The work focuses on optimal mission planning for a SAR-equipped Earth observation satellite through advanced optimization techniques. It involves the development and testing of algorithms such as Particle Swarm Optimization, Genetic Algorithms, and Integer Linear Programming, tailored to maximize acquisition request satisfaction under resource constraints. The entire optimization setup is implemented in Python and interfaces with the deterministic planner through a communication protocol based on Protocol Buffers (protobuf). The objective is to identify scalable planning strategies for both single-satellite and constellation scenarios.

[03/2024 – 09/2024]

"Borsa di collaborazione DIMA presso il laboratorio di impianti e sistemi aerospaziali"

Institution: Sapienza Space Systems and Space Surveillance Laboratory (S5Lab), Sapienza University of Rome

Supervisor: Prof. Fabrizio Piergentili

Activity: Research activity conducted on simulating spacecraft–telescope relative orbital and attitude motion to validate light curve inversion techniques for attitude reconstruction. Responsibilities included implementing MATLAB-based simulations, developing a Python GUI for robotic control software integration, and coordinating synchronized camera-robot acquisition. Additional activities focused on the design of an AI-based payload for autonomous attitude determination and onboard control, including participation in ADCS engineering and mission planning for CubeSat platforms.

[17/01/2024 – 17/02/2024]

DIAEE Research fellowship: "Attività di supporto alle operazioni degli osservatori EQUO-AD e all'analisi dati per caratterizzazione, identificazione e determinazione orbitale per detriti spaziali e oggetti in orbita."

Institution: Sapienza Space Systems and Space Surveillance Laboratory (S5Lab), Sapienza University of Rome

Supervisor: Prof. Fabio Santoni

Activity: Conducted research on the attitude evolution of uncontrolled objects in Low Earth Orbit (LEO), including the MATLAB simulation of tumbling dynamics via robotic arms and 3D models realised in SolidEdge, light curve acquisition and processing, and development of sequential

comparison strategies for reflectance variation analysis. The research contributed to the paper *"Light Curves Sequential Comparison Strategy for Improved Understanding of LEO Uncontrolled Objects"*, presented at the 22nd IAA Symposium on Space Debris (IAC 2024).

PUBLICATIONS

[2024]

Light Curves Sequential Comparison Strategy for Improved Understanding of LEO Uncontrolled Objects

Reference: Lorenzo Chiavari, Lorenzo Cimino, Sidhant Kumar, Simone Varanese, Saverio Maria Currà, Lorenzo Mariani, Matteo Rossetti, Riccardo Fermo, Lorenzo Cardinale, Luca Galassi, Gaetano Zarcone, Francesco Nasuti, Thomas Schildknecht,Fabrizio Piergentili

Conference: 22nd IAA Symposium on Space Debris, Held at the 75th International Astronautical Congress (IAC 2024)

[2025]

BILAR (Benchmarking and Inversion of Light Curve for Attitude Reconstruction with Expert Centre Support)

Accepted, not yet published

Conference: 23rd IAA Symposium on Space Debris, Held at the 76th International Astronautical Congress (IAC 2025)

Authors: Saverio Maria Currà, Riccardo Fermo,Marco Vittori,Daniele Gallozzi,Lorenzo Cardinale,Francesco Basile,Matteo Gallo,Matteo Barba,Ilaria Imoletti,Thomas Schildknecht,Fabrizio Piergentili

[2025]

DEVELOPMENT OF A LABORATORY FACILITY FOR SIMULATING LIGHT CURVES

Reference: Lorenzo Cimino, Riccardo Mariani, Tommaso Pantalani, Daniele Gallozzi, Marco Vittori, Ilaria Imoletti, Saverio Maria Currà, Andrea Ederle, Lorenzo Frezza, Paolo Marzioli, Fabrizio Piergentili

Accepted, not yet published

Conference: 11th European Conference for Aerospace Sciences (EUCASS) 2025

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING C1 **READING** C2 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

FOREIGN LANGUAGES CERTIFICATES

English - Certificate in Advanced English (C1) - Cambridge Assessment English

NETWORKS AND MEMBERSHIPS

[10/2023 – Current]

Sapienza Space Systems and Space Surveillance Laboratory (S5Lab)

Research activities mainly carried out within two junior research scholarships, focusing on attitude simulation and light curve analysis for space object characterization, and AI-based mission planning for Earth observation satellites.

Link: https://www.s5lab.space

[09/2020 – 12/2023]

SASA (Sapienza Aerospace Student Association) Technology Team

- Robotic arm design using CATIA and SolidEdge.
- Arm control software development for the ERC 2023 Sapienza rover, using MATLAB, Python and Simulink.

Link: https://www.sasa-aerospace.it/tech-team/

[01/2024 – 12/2024]	**Young ISSNAF Mentorship 2024**

Tutor: Prof. Riccardo Bevilacqua, Embry-Riddle Aeronautical University

Included an introduction to tools such as STK for orbital and attitude analysis, and participation in a PhD group meeting to explore ongoing research on guidance, navigation, and control (GNC) topics carried out within his research group.

Link: https://www.issnaf.org/post/young-issnaf-mentoring-programs-2024

PROJECTS

[04/2023 – Current]	**BILAR project (Benchmarking and Inversion of Light Curve for Attitude Reconstruction)**

Research activity within a Sapienza Space Systems and Space Surveillance Laboratory (S5Lab) – ESA/AIUB collaboration aimed at validating light curve inversion techniques for attitude reconstruction of space objects. Work focused on simulating spacecraft–telescope relative orbital and attitude motion, and translating these into robotic arm trajectories for controlled laboratory experiments. Implemented MATLAB-based simulations and developed a Python GUI to interface simulation outputs with robotic control software, enabling synchronized camera–robot acquisition.

[10/2023 – 02/2024]	**CALIPSO Cubesat (for participation in the ESA Fly Your Satellite 2024 Competition)**

Design of an AI-based payload for autonomous attitude determination, image-based detection, and onboard control. Activities included ADCS and payload engineering, as well as participation in the ESA Selection Workshop. The project aims to validate AI algorithms through in-orbit testing on a CubeSat platform.

WORKSHOPS AND TRAINING COURSES

[13/03/2023 – 17/03/2023]	**ESA Ladybird Guide to Spacecraft Communications Training Course**

Intercative lessons about the basics of space operations, live pass simulation from the ESOC main control room assisted by the ESA OPS-SAT team.

Link: https://www.esa.int/Education/ESA_Academy/A_new_look_for_the_Ladybird_Guide_to_Spacecraft_Communications_Training_Course

[17/07/2023 – 20/07/2023]	**NASA Juno Data Analysis Workshop for Science Capacity Building**

MATLAB implementation of a digital phase locked loop for Juno Probe doppler-ranging, assisted by the NASA Juno Science Team.

Link: https://junoworkshop.space.swri.edu/romejuly2023workshop/

SKILLS

MATLAB | Python | Microsoft Office | Arduino | Linux | Solid Edge | Simulink | LaTeX

HOBBIES AND INTERESTS

amateur level violin player

Member of the Isernia youth Orchestra (during High School)

Small city orchestra of young passionate music students