

Carmine Giordano

MSCA Fellow/Assistant Professor

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PROFESSIONAL EXPERIENCE

- 01/03/2025-present** **Assistant Professor** **(Politecnico di Milano)**
Assistant Professor in Space Systems, funded by the project SpaceItUp! under the Italian National Recovery and Resilience Plan (PNRR). My main research activity will focus on robust autonomous guidance, navigation, and control algorithms for limited-capability spacecraft about minor bodies.
- 01/11/2023- present** **MSCA Researcher Fellow on CASTOR project** **(NASA, ESA, Polimi)**
PostDoc Fellow on CASTOR project, funded under the MSCA-PF Global Fellowship. CASTOR is a 28-month project aiming to develop autonomous guidance and control algorithms for CubeSats close to asteroids, employing low-power, high-performance computing boards. The project foresees collaboration with NASA's JPL, the GNC section at ESA, and DARTLab at Polimi.
- 01/02/2021-31/10/2023** **PostDoc Fellow on ERC EXTREMA Project** **(Politecnico di Milano)**
PostDoc Researcher on the EXTREMA project funded under the ERC Consolidator Grant scheme. My main activity was the high-fidelity simulation of the universe for the analog of a spacecraft in deep space.
- 01/11/2017-present** **Astrodynamics Software Developer** **(Politecnico di Milano)**
Developer and maintainer of "ULTIMAT" (Ultra Low-Thrust Interplanetary Mission Analysis Tool), a software firstly developed by Politecnico di Milano under ESA contract No. 4000118201/16/F/MOS and of "DIRETTO", a software for direct optimization developed by Polimi.

EDUCATION

- 01/11/2017-24/03/2021** **PhD in Aerospace Engineering (cum laude)** **(Politecnico di Milano)**
Title of the PhD dissertation: *Analysis, Design, and Optimization of Robust Trajectories for Limited-Capability Small Satellites*
Supervisor: Prof. Francesco Toppo
- 01/01/2020-30/04/2020** **Visiting PhD Student** **(ESA/ESOC)**
Working mainly on robust optimization for the Europa Phase of the mission JUICE, exploiting Polynomial Chaos Expansion and a novel guidance method. This activity received funds under the Erasmus+ programme.
Supervisors: Arnaud Boutonnet, Ruairaidh McKenzie, Gabor Varga
- 01/10/2014-27/04/2017** **MSc in Space Engineering (cum laude)** **(Politecnico di Milano)**
Title of the dissertation: *Modeling and Optimization of Aero-Ballistic Capture*
Supervisor: Prof. Francesco Toppo
- 18/09/2011-29/09/2014** **BSc in Aerospace Engineering** **(Politecnico di Milano)**

PARTECIPATION IN INTERNATIONAL PROJECTS (see next page for Publications)

- 01/06/2023-31/10/2023** **ERC PoC GUIDO** **(Politecnico di Milano)**
Project to develop a board for the autonomous guidance of spacecraft.
Responsibility: Support for the development and testing of the board
Keywords: real-time computing, high-performance computing, FPGA

ERC EXTREMA Project

Project to establish autonomous spacecraft exploiting high-fidelity simulations.

Responsibility: Development and Testing of the space environment simulator

Keywords: n-body high-fidelity models, stochastic integrators, real-time computing, high-performance computing, GPGPU

Main collaborators: DARTLab, EXTREMA advisors: Prof. Roberto Furfaro (University of Arizona), Prof. Angelo Cervone (TU Delft)

Publications: (J7), (J11), (J12), (B1), (C16), (C27), (C29), (C30), (C36), (C43)

01/02/2025-present

LUMOS Phase A

(Politecnico di Milano)

Spacecraft to observe space debris in cislunar environment.

Responsibility: Mission Analysis Lead, WP Leader

Keywords: trajectory design, optimal control theory, guidance and navigation

Main external collaborators: Alessandro Lazzari (SITAE), Igor Gai (Nautilus)

01/02/2025-present

RCS-1 Phase A

(Politecnico di Milano)

CubeSat mission on-board RAMSES to investigate Apophis.

Responsibility: Mission Analysis Lead, WP Leader

Keywords: trajectory design, applied mission analysis, guidance and navigation

Main external collaborators: Franco Perez-Lissi (ESA), Filippo Corradino (Tyvak), Prof. Sabrina Corpino (Politecnico di Torino), Yves Rogez (IPAG)

01/10/2024-present

SATIS Phase A-B

(Politecnico di Milano)

CubeSat to Apophis, with potential hazardous asteroids as alternative targets

Responsibility: Mission Analyst

Keywords: trajectory design, minor body exploration

Main external collaborators: Roger Walker (ESA), Richard Moissl (ESA)

01/07/2023-28/02/2024

RAMSES II Phase 0

(Politecnico di Milano)

A low-thrust spacecraft to Apophis to investigate its changes during 2029 fly-by.

Responsibility: Mission Analysis Lead, WP Leader

Keywords: trajectory design, optimal control theory, GNC

Main external collaborators: Paolo Martino (ESA), Pierluigi Visconti (Tyvak), Francisco Cabral (GMV)

Publications: (J9)

01/03/2020-present

LUMIO Phase A-B

(Politecnico di Milano)

CubeSat toward Earth-Moon L2 for the characterization of meteoroid impacts.

Responsibility: Mission Analysis Lead, WP Leader

Keywords: trajectory design, optimal control theory, GNC

Main external collaborators: Dr. Roger Walker (ESA), Prof. Angelo Cervone (TU Delft), Demetrio Labate (Leonardo), Eric Bertels (ISISpace)

Publications: (J10), (J17), (J18), (C4), (C10), (C12), (C17), (C19), (C21), (C28), (C34), (C38), (C41), (C42), (C44), (C46), (C48), (C50), (C51), (C52), (C55)

01/07/2020-present

Milani Phase A-E

(Politecnico di Milano)

CubeSat mission on-board HERA to investigate Didymos binary system.

Responsibility: Mission Analyst, WP Leader

Keywords: trajectory design, applied mission analysis, guidance and navigation

Main external collaborators: Franco Perez-Lissi (ESA), Pierluigi Visconti (Tyvak), Prof. Sabrina Corpino (Politecnico di Torino), Tomas Kohout (University of Helsinki), Nasila Antti (VTT)

Publications: (J14), (J20), (J22), (C8), (C13), (C15), (C24), (C25), (C32), (C33), (C37), (C39), (C40), (C45), (C47)

01/03/2019-28/02/2020

M-ARGO Phase A

(Politecnico di Milano)

CubeSat mission toward a Near-Earth Object for in-situ scientific observations.

Responsibility: Mission Analyst

Keywords: trajectory design, optimal control theory, guidance and navigation

Main external collaborators: Pablo Munoz (ESA), Hannah Goldberg (GomSpace Denmark), Marco Gulino (GomSpace Luxemburg)

Publications: (J16), (J21), (C31), (C35), (C49), (C57)

TEACHING AND TUTORING ACTIVITIES

Teaching Assistant for the following classes at Politecnico di Milano:

- Introduction to Space Mission Analysis, AY 2017/18 & 2018/19, BSc in Aerospace Engineering
- Analytical Mechanics, AY 2018/19, BSc in Aerospace Engineering
- Modelling and Simulation of Aerospace Systems, AY 2019/20 to 2022/23, MSc in Space Engineering

Technical consultant for the class “Space4InspirAction”, held at Politecnico di Milano and supported by ESA, AY 2016/17, MSc in Integrated Product Design

Co-supervisor of 26 MSc theses on topics of mission analysis, trajectory design, optimal control theory

HONORS AND AWARDS

- **Travel Award** from MDPI Aerospace for the 2025 AAS/AIAA Space Flight Mechanics Meeting in Kaua’i, Hawaii, 2025
- **National Scientific Qualification** for Associate Professor (II fascia) – Sector 09/A1 – SSD IIND-01/E (ex SSD ING-IND/05) – Valid from 08/07/2024 to 08/07/2035
- **MSCA-PF Global Fellowship** from the European Commission, 2022
- **PhD Scholarship** from the Italian Ministry of University and Research, 2017
- **COSPAR Financial Support** for the 44th COSPAR Scientific Assembly in Athens, Greece, 2022

JOURNAL ARTICLES

- (J1) C. Buonagura, **C. Giordano**, A. Cervone, and F. Topputo; Assessing control robustness of CubeSat propulsion systems for minor body proximity operations, Vol. 237, 2025, DOI: [10.1016/j.actaastro.2025.07.068](https://doi.org/10.1016/j.actaastro.2025.07.068)
Scientific significance: This study investigates the robustness of different propulsion systems for CubeSat in close-proximity operations about minor bodies performing hyperbolic arcs
- (J2) **C. Giordano**; A Deterministic-Stochastic Hybrid Integrator for Random Ordinary Differential Equations with Aerospace Applications, Aerospace, Vol. 12 No. 5, 2025, DOI: [10.3390/aerospace12050397](https://doi.org/10.3390/aerospace12050397)
Scientific significance: In this paper, a novel integration technique combining a high-accuracy deterministic step with a lower order stochastic integrator has been presented and implemented to reduce runtime and increase fidelity of trajectory computation in uncertain dynamics.
- (J3) A. Rizza, **C. Giordano**, and F. Topputo; A goal-oriented guidance approach for binary asteroids exploration, *Astrodynamics*, Vol. 9 No. 1, 2025, DOI: [10.1007/s42064-024-0237-1](https://doi.org/10.1007/s42064-024-0237-1)
Scientific significance: This work presents a novel methodology, based on reachability maps, to compute goal-oriented trajectory in close proximity operations about minor bodies.
- (J4) F. Ferrari, P. Panicucci, G. Merisio, **C. Giordano** et al.; Morphology of ejecta features from the DART impact on Dimorphos and their implications, *Nature Communications*, Vol. 1601 No. 16, 2025, DOI: [10.1038/s41467-025-56551-0](https://doi.org/10.1038/s41467-025-56551-0)
Scientific significance: In this paper it is shown that the features observed from ground during the NASA’s DART impact on Dimorphos result naturally from the dynamical interaction of the ejecta with the binary system and solar radiation pressure and can be used to characterize Dimorphos and the ejecta mass
- (J5) N. Michelotti, A. Rizza, **C. Giordano**, and F. Topputo; Uncertainty Propagation Performance in Proximity Operations Around Small Bodies, *Journal of the Astronautical Sciences*, Vol. 71 No. 55, 2024, DOI: [10.1007/s40295-024-00472-5](https://doi.org/10.1007/s40295-024-00472-5)
Scientific significance: This work studies the performances of different uncertainty propagation techniques for spacecraft trajectories in close proximity operations considering different minor bodies and trajectories
- (J6) G. Grossi, C. Buonagura, **C. Giordano**, and F. Topputo; On Optimal Three-Impulse Earth–Moon Transfers in a Four-Body Model, *Celestial Mechanics and Dynamical Astronomy*, Vol. 136 No. 22, 2024, DOI: [10.1007/s10569-024-10193-4](https://doi.org/10.1007/s10569-024-10193-4)
Scientific significance: This study addresses the possibility of reducing the fuel cost of two-impulse Earth–Moon transfers in a four-body model with the Earth, the Moon, and the Sun as primaries, exploiting Lawden’s primer vector theory and optimal control methodologies.

- (J7) M. Liotta, G. Merisio, **C. Giordano**, and F. Topputo; Synthesis of Ballistic Capture Corridors at Mars via Polynomial Chaos Expansion, *Journal of Guidance, Control, and Dynamics*, Vol. 47 No. 6, 2024, DOI: [10.2514/1.G007934](https://doi.org/10.2514/1.G007934)
Scientific significance: This paper introduces a fast and reliable methodology to compute and manipulate ballistic capture corridors on board of a spacecraft to be used in autonomous guidance schemes, exploiting polynomial chaos expansion as efficient interpolation method.
- (J8) N. L. Chabot et al; Achievement of the planetary defense investigations of the Double Asteroid Redirection Test (DART) mission, *The Planetary Science Journal*, Vol. 5(2) No. 49, 2024, DOI: [10.3847/PSJ/ad16e6](https://doi.org/10.3847/PSJ/ad16e6)
Scientific significance: In this work, a summary of the scientific activities of the mission DART and their outcomes, impact, and significance is provided.
- (J9) A. C. Morelli, A. Mannocchi, **C. Giordano**, F. Ferrari, and F. Topputo; Initial Trajectory Assessment of a low-thrust option for the RAMSES Mission to (99942) Apophis, *Advances in Space Research*, Vol. 73(8), 2024, DOI: [10.1016/j.asr.2024.02.005](https://doi.org/10.1016/j.asr.2024.02.005)
Scientific significance: This work presents a reachability analysis of (99942) Apophis using a low-thrust spacecraft, using a two-layer approach combining direct sequential convex programming and an indirect method for fast and reliable trajectory optimization.
- (J10) **C. Giordano** and F. Topputo; Analysis, Design, and Optimization of Robust Trajectories in Cislunar Environment for Limited-Capability Spacecraft, *Journal of the Astronautical Sciences*, Vol. 70 No. 53, 2023, DOI: [10.1007/s40295-023-00413-8](https://doi.org/10.1007/s40295-023-00413-8)
Scientific significance: This paper presents a novel methodology to address the problem of stochastic trajectory optimization in a highly non-linear environment under dynamics, navigation, and control uncertainties. LUMIO transfer trajectory is used as test case scenario.
- (J11) **C. Giordano**; Characterization of Gauss–Markov stochastic sequences for mission analysis applications, *Astrodynamics*, Vol. 8 No. 1, 2023, DOI: [10.1007/s42064-023-0183-3](https://doi.org/10.1007/s42064-023-0183-3)
Scientific significance: This paper addresses the gap in characterizing process uncertainties, represented as Gauss–Markov processes in mission analysis, by presenting models, evaluating derived quantities, and providing results on their impact of spacecraft trajectories.
- (J12) A. C. Morelli, A. Morselli, **C. Giordano**, and F. Topputo; Convex Trajectory Optimization using Thrust Regularization, *Journal of Guidance, Control, and Dynamics*, 2023, DOI: [10.2514/1.G007646](https://doi.org/10.2514/1.G007646)
Scientific significance: In this work, a method to find an exact definition of the thrust profile in terms of switch on and off times and thrust angles is investigated by proposing a double-layer algorithm that relies on convex optimization and direct shooting algorithm.
- (J13) F. Moreno et al.; Characterization of the Ejecta from the NASA/DART Impact on Dimorphos: Observations and Monte Carlo Models, *The Planetary Science Journal*, Vol. 4 No. 138, 2023, DOI: [10.3847/PSJ/ace827](https://doi.org/10.3847/PSJ/ace827)
Scientific significance: In this work, the characterization of the ejecta dust properties, i.e., particle size and speeds, ejection geometric parameters, and mass, due to the DART impact on Dymorphos are provided combining both observational data sets and using Monte Carlo models of the observed dust tail.
- (J14) C. Bottiglieri, F. Piccolo, **C. Giordano**, F. Ferrari and F. Topputo; Applied Trajectory Design and Analysis for Asteroid Exploration CubeSat Missions, *Aerospace*, Vol. 10(5), 2023, DOI: [10.3390/aerospace10050464](https://doi.org/10.3390/aerospace10050464)
Scientific significance: In this work, the impact of operational constraints and of uncertainties on the trajectory design for close-proximity operations about an asteroid is investigated. Hera’s Milani CubeSat CPOs are taken as a practical example.
- (J15) **C. Giordano**, G. Varga, R. Mackenzie, A. Boutonnet and F. Topputo; Target-based guidance method for multiple fly-bys trajectories, *Journal of Guidance, Control, and Dynamics*, Vol. 46(5), 2023, DOI: [10.2514/1.G006792](https://doi.org/10.2514/1.G006792)
Scientific significance: In this paper, a closed-loop control method is devised to deal with engineering and scientific constraints in multiple fly-bys trajectories and later applied to the scientific phase about Jupiter’s moon, Europa, for the spacecraft JUICE.
- (J16) A. Mannocchi, **C. Giordano** and F. Topputo; A Homotopic Direct Collocation Approach for Operational-Compliant Trajectory Design, *Journal of Astronautical Sciences*, Vol. 69, 2023, DOI: [10.1007/s40295-022-00351-x](https://doi.org/10.1007/s40295-022-00351-x)

Scientific significance: This paper presents a method to compute optimal trajectories compliant with operational duty cycles, i.e., with alternating thrusting and ballistic arcs, exploiting a homotopic approach. Deep-space trajectory of the M-ARGO are used as test case scenarios.

- (J17) F. Topputo, G. Merisio, V. Franzese, **C. Giordano** et al.; Meteoroids detection with the LUMIO lunar CubeSat, *Icarus*, Vol. 389:115213, 2023. DOI: [10.1016/j.icarus.2022.115213](https://doi.org/10.1016/j.icarus.2022.115213)
Scientific significance: This paper shows a methodology devised to predict the scientific outcome of LUMIO in terms of number and characteristics of the observed impact flashes on the Moon. The approach relies on combined modelling and simulation of payload, orbit, and environment.
- (J18) A. Cervone, F. Topputo, S. Speretta, A. Menicucci, E. Turan, P. Di Lizia, M. Massari, V. Franzese, **C. Giordano** et al.; LUMIO: A CubeSat for observing and characterizing micro-meteoroid impacts on the Lunar far side, *Acta Astronautica*, Vol. 195 June 2022, DOI: [10.1016/j.actaastro.2022.03.032](https://doi.org/10.1016/j.actaastro.2022.03.032)
Scientific significance: The paper presents the outcome of the Phase A of the LUMIO CubeSat. Both the mission analysis and the system design are shown and analysed.
- (J19) **C. Giordano** and F. Topputo; Aero-Ballistic Capture at Mars: Modeling, Optimization, and Assessment, *Journal of Spacecraft and Rockets*, Vol. 59(4), 2022, DOI: [10.2514/1.A35176](https://doi.org/10.2514/1.A35176)
Scientific significance: In this work, a novel technique, exploiting a combination of the ballistic capture and the aerocapture, is presented with application to a Mars mission. A final assessment shows its superiority compared to classical injection maneuvers for medium-to-high final orbits.
- (J20) F. Ferrari, V. Franzese, M. Pugliatti, **C. Giordano** and F. Topputo; Preliminary mission profile of Hera's Milani CubeSat, *Advances in Space Research*, Vol. 67(6), 2021, DOI: [10.1016/j.asr.2020.12.034](https://doi.org/10.1016/j.asr.2020.12.034)
Scientific significance: In this paper, initial trajectories and GNC baseline for the Milani CubeSat are presented, as a result of trade-off analyses. The feasibility of its mission is assessed and a preliminary solution in the close proximity of Didymos system is given.
- (J21) F. Topputo, Y. Wang, **C. Giordano**, V. Franzese, H. Goldberg, F. Perez-Lissi and R. Walker; Envelop of reachable asteroids by M-ARGO CubeSat, *Advances in Space Research*, Vol. 67(12), 2021, DOI: [10.1016/j.asr.2021.02.031](https://doi.org/10.1016/j.asr.2021.02.031)
Scientific significance: This work presents the initial results of the mission analysis and design of M-ARGO. In particular, the original procedure developed to extract the reachable near-Earth asteroids and the subsequent down-selection process are shown.
- (J22) F. Ferrari, V. Franzese, M. Pugliatti, **C. Giordano** and F. Topputo; Trajectory options for Milani CubeSat around (65803) Didymos, *Journal of Astronautical Sciences*, Vol. 68, 2021, DOI: [10.1007/s40295-021-00282-z](https://doi.org/10.1007/s40295-021-00282-z)
Scientific significance: In this paper, the methodology and design approach to find trajectories in the dayside of Didymos system is described, with reference to the Hera's Milani CubeSat mission scenario. Examples of suitable trajectory options for the close operational phase are provided.

BOOK CHAPTERS

- (B1) Di Domenico, E. Andreis, A. C. Morelli, G. Merisio, V. Franzese, **C. Giordano**, A. Morselli, P. Panicucci, F. Ferrari and F. Topputo; The ERC-Funded EXTREMA Project: Achieving Self-Driving Interplanetary CubeSats, Chapter in *Modeling and Optimization in Space Engineering*, 2022, DOI: [10.1007/978-3-031-24812-2_6](https://doi.org/10.1007/978-3-031-24812-2_6)
Scientific significance: This work presents an overview of the ERC-funded EXTREMA project, highlighting the approaches, methodologies, and objectives. The EXTREMA Simulation Hub is presented, and its features and expected impact are introduced and discussed.

CONFERENCE PAPERS

- (C1) **C. Giordano**, S. Campagnola and F. Topputo; Goal-Oriented Trajectories About Minor Bodies Using Sequential Convex Programming: a Deterministic Approach, *35th AIAA/AAS Space Flight Mechanics Meeting*, 2025
- (C2) **C. Giordano**, S. Campagnola and F. Topputo; Goal-Oriented Trajectories About Minor Bodies Using Sequential Convex Programming: a Stochastic Approach, *35th AIAA/AAS Space Flight Mechanics Meeting*, 2025

- (C3) G. Grossi, C. Buonagura, **C. Giordano** and F. Topputo; Optimal Three-Impulse Lunar Transfers in High Fidelity Models, *35th AIAA/AAS Space Flight Mechanics Meeting*, 2025
- (C4) A. Martinelli, C. Buonagura, **C. Giordano** and F. Topputo; Optimization of Weak Stability Boundary Transfers Under Uncertainty: the LUMIO Mission Case, *35th AIAA/AAS Space Flight Mechanics Meeting*, 2025
- (C5) **C. Giordano**, F. Topputo, S. Campagnola and M. Casasco; Enhancing autonomy for close-proximity operations: the MSCA-funded project CASTOR, *75th International Astronautical Congress (IAC)*, 2024
- (C6) **C. Giordano** and F. Topputo; A direct optimization approach for robust trajectories of interplanetary CubeSats, *75th International Astronautical Congress (IAC)*, 2024
- (C7) C. Buonagura, **C. Giordano**, F. Ferrari and F. Topputo; A Systematic Approach to Estimating Orbital Regions around Minor Bodies, *75th International Astronautical Congress (IAC)*, 2024
- (C8) I. Fodde, A. Cremasco, F. Piccolo, P. Califano, L. F. Civati, A. Rizza, **C. Giordano**, P. Panicucci, F. Ferrari and F. Topputo; Scientific and Technological Objectives for the NavCam Payload of Hera's Milani CubeSat to Binary Asteroid Didymos, *75th International Astronautical Congress (IAC)*, 2024
- (C9) C. Buonagura, A. Rizza, **C. Giordano** and F. Topputo; A Survey of Gravitational Modeling Techniques for Minor Body Proximity Operations, *75th International Astronautical Congress (IAC)*, 2024
- (C10) F. Topputo, F. Ferrari, **C. Giordano**, C. Buonagura, P. Panicucci, F. Piccolo et al.; LUMIO: Detecting Meteoroid Impacts on the Lunar Surface, *75th International Astronautical Congress (IAC)*, 2024
- (C11) M. Cardi, F. Corradino, F. Ingiosi, I. Pappagallo, A. Morselli, A. Mannocchi, **C. Giordano**, I. Fodde, F. Ferrari et al.; Zodiac Pioneer: An interplanetary small satellite platform for asteroid reconnaissance, *75th International Astronautical Congress (IAC)*, 2024
- (C12) F. Ferrari, F. Topputo, C. Buonagura, **C. Giordano**, P. Panicucci et al.; LUMIO: a CubseSat to detect meteoroid impacts on the lunar farside, *European Geosciences Union General Assembly 2024*, 2024
- (C13) I. Fodde, A. Cremasco, F. Piccolo, P. Califano, L. Civati, A. Rizza, **C. Giordano**, F. Ferrari and F. Topputo; Scientific Observations of the Didymos Binary Asteroid System using the Milani NavCam, *Europlanet Science Congress 2024*, 2024
- (C14) M. Cardi, F. Corradino, F. Ingiosi, I. Pappagallo, A. C. Morelli, A. Mannocchi, G. Oliveira Pinho, **C. Giordano** et al.; Zodiac Pioneer: an Interplanetary Small Satellite Platform for Asteroid Reconnaissance, *4S Symposium*, 2024
- (C15) M. Cardi et al.; The Hera Milani Mission, *4S Symposium*, 2024
- (C16) G. Di Domenico, D. Perico, F. Ornati, **C. Giordano**, A. Morselli, P. Panicucci and F. Topputo; The EXTREMA Simulation Hub: Advancements in the Development of an Integrated Hardware-In-the-loop Facility for Autonomous Cubesats GNC Technologies, *4S Symposium*, 2024
- (C17) F. Topputo, F. Ferrari, **C. Giordano**, P. Panicucci et al.; LUMIO Cubesat: Current Status and Lessons Learnt (so Far), *4S Symposium*, 2024
- (C18) I. Fodde, A. C. Morelli, A. Mannocchi, C. Giordano, F. Ferrari and F. Topputo; Science Opportunities and Payload Selection for a Rapid and Low-Cost Apophis Pre-Rendezvous Mission, *Apophis T-5 Workshop*, 2024
- (C19) A. Martinelli, C. Buonagura, **C. Giordano**, and F. Topputo; Design and Optimisation of Weak Stability Boundary Transfers to Unstable Libration-Point Orbits: an Application to the LUMIO CubeSat, *29th International Symposium on Space Flight Dynamics (ISSFD)*, 2024
- (C20) C. Buonagura, **C. Giordano**, F. Ferrari, and F. Topputo; The Orbital Regime Index: a Comprehensive Parameter to Determine Orbital Regions Around Minor Bodies, *46th AAS GNC Conference*, 2024
- (C21) **C. Giordano**, C. Buonagura, A. Martinelli, G. Merisio, V. Franzese, and F. Topputo; Trajectory Design and Analysis of the LUMIO CubeSat, *2024 AIAA SciTech Forum*, 2024
- (C22) A. Mannocchi, **C. Giordano**, and F. Topputo; An Indirect Formulation of Operational Compliant Low-Thrust Trajectories, *2024 AIAA SciTech Forum*, 2024
- (C23) A. Mannocchi, **C. Giordano**, and F. Topputo; Closed-Loop Guidance for Interplanetary CubeSats with Indirect Methods, *74th International Astronautical Congress (IAC)*, 2023
- (C24) M. Pugliatti, **C. Giordano**, and F. Topputo; The Image Processing of Milani: Challenges After DART Impact, *12th International Conference on Guidance, Navigation & Control Systems*, 2023

- (C25) **C. Giordano**, F. Topputo, F. Ferrari, et al.; The Hera Milani CubeSat Mission, *5th COSPAR Symposium*, 2023
- (C26) A. Rizza, **C. Giordano**, and F. Topputo; Goal-Oriented Guidance Strategy for Binary Asteroid Exploration: Investigation of Different Metrics, *45th AAS GNC Conference*, 2023
- (C27) **C. Giordano** and F. Topputo; A Hybrid Stochastic-Deterministic Integrator for Spacecraft Dynamics with Uncertainty, *33rd AIAA/AAS Space Flight Mechanics Meeting*, 2023
- (C28) **C. Giordano** and F. Topputo; Analysis and Optimization of Robust Trajectories in Cislunar Environment with Application to the LUMIO Cubesat, *33rd AIAA/AAS Space Flight Mechanics Meeting*, 2023
- (C29) **C. Giordano** and F. Topputo; SPESI: a Real-Time Space Environment Simulator for the EXTREMA Project, *33rd AIAA/AAS Space Flight Mechanics Meeting*, 2023
- (C30) A. C. Morelli, A. Morselli, **C. Giordano**, and F. Topputo; Combined Convex and Direct Shooting Optimization for Low-Thrust Trajectory Generation with Analytical Thrust Profile, *33rd AIAA/AAS Space Flight Mechanics Meeting*, 2023
- (C31) A. Mannocchi, **C. Giordano**, and F. Topputo; Design of Operational Compliant Trajectories Through a Homotopic Direct Collocation Algorithm, *33rd AIAA/AAS Space Flight Mechanics Meeting*, 2023
- (C32) M. Pugliatti, F. Ferrari, F. Piccolo, A. Rizza, C. Bottiglieri, V. Franzese, **C. Giordano**, and F. Topputo, The Design Pipeline of the Milani Mission: Overview and Challenges After DART Impact, *Exploration of Asteroid Symposium*, 2022
- (C33) F. Piccolo, A. Rizza, M. Pugliatti, V. Franzese, C. Bottiglieri, **C. Giordano**, F. Ferrari, and F. Topputo; Design of the Vision-Based GNC Subsystem of Hera's Milani Mission, *73rd International Astronautical Congress (IAC)*, 2022
- (C34) V. Franzese, G. Merisio, **C. Giordano**, F. Topputo, A. Cervone, S. Speretta, A. Menicucci et al.; Current Status of LUMIO: a Lunar CubeSat Mission at Earth-Moon L2, *4S Symposium*, 2022
- (C35) F. Topputo, **C. Giordano**, V. Franzese, Y. Wang, E. Cruz, F. Perez-Lissi and R. Walker; The Envelope of Reachable Asteroids of M-ARGO Interplanetary CubeSat, *4S Symposium*, 2022
- (C36) A. Morselli, G. Di Domenico, E. Andreis, A. C. Morelli, G. Merisio, V. Franzese, **C. Giordano**, P. Panicucci, F. Ferrari and F. Topputo; The EXTREMA Orbital Simulation Hub: a Facility for GNC Testing of Autonomous Interplanetary CubeSat, *4S Symposium*, 2022
- (C37) C. Bottiglieri, F. Piccolo, A. Rizza, M. Pugliatti, V. Franzese, **C. Giordano**, F. Ferrari and F. Topputo; Mission Analysis and Navigation Assessment for Hera's Milani CubeSat, *4S Symposium*, 2022
- (C38) S. Speretta, E. Turan, A. Cervone, A. Menicucci, F. Topputo, V. Franzese, **C. Giordano**, G. Merisio et al.; LUMIO: A CubeSat to Monitor Micro-Meteoroid Impacts on the Lunar Farside, *2022 IEEE Aerospace Conference*, 2022
- (C39) M. Pugliatti, V. Franzese, A. Rizza, F. Piccolo, C. Bottiglieri, **C. Giordano** and F. Topputo; Design of the On-Board Image Processing of the Milani Mission, *44th AAS GNC Conference*, 2022
- (C40) M. Pugliatti, A. Rizza, F. Piccolo, V. Franzese, C. Bottiglieri, **C. Giordano** and F. Topputo; The Milani mission: overview and architecture of the optical-based GNC system, *2022 AIAA SciTech Forum*, 2022
- (C41) G. Merisio, V. Franzese, **C. Giordano**, M. Massari, P. Di Lizia, F. Topputo, D. Labate et al.; LUMIO: a CubeSat to monitor the lunar farside, *European Planetary Science Congress*, 2021
- (C42) F. Topputo, G. Merisio, **C. Giordano**, V. Franzese, M. Massari, P. Di Lizia, D. Labate et al.; Current Status of LUMIO Mission: Characterizing Lunar Meteoroid Impacts with a CubeSat, *72nd International Astronautical Congress (IAC)*, 2021
- (C43) G. Di Domenico, E. Andreis, A. C. Morelli, G. Merisio, V. Franzese, **C. Giordano**, A. Morselli, P. Panicucci, F. Ferrari and F. Topputo; Toward Self-Driving Interplanetary CubeSats: the ERC-Funded Project EXTREMA, *72nd International Astronautical Congress (IAC)*, 2021
- (C44) A. Cervone, F. Topputo, S. Speretta, A. Menicucci, P. Di Lizia, M. Massari, V. Franzese, **C. Giordano**, G. Merisio et al.; Design Challenges and Opportunities Offered by the LUMIO Spacecraft: A CubeSat for Observing and Characterizing Micro-Meteoroid Impacts on the Lunar Far Side, *72nd International Astronautical Congress (IAC)*, 2021
- (C45) C. Bottiglieri, F. Piccolo, A. Rizza, **C. Giordano**, M. Pugliatti, V. Franzese, F. Ferrari and F. Topputo; Trajectory design and orbit determination of Hera's Milani CubeSat, *AAS/AIAA Astrodynamics Specialist Conference*, 2021

- (C46) F. Topputo, G. Merisio, **C. Giordano**, V. Franzese, M. Massari, J. Biggs, P. Di Lizia, D. Labate, G. Pilato et al.; LUMIO Cubesat: a Mission to Refine Meteoroid Population Knowledge, *7nd IAA Planetary Defense Conference*, 2021
- (C47) F. Topputo, F. Ferrari, V. Franzese, M. Pugliatti, **C. Giordano**, A. Rizza, F. Piccolo, C. Bottiglieri et al.; The Hera Milani Cubesat Mission, *7th IAA Planetary Defense Conference*, 2021
- (C48) G. Merisio, **C. Giordano**, V. Franzese, M. Massari, P. Di Lizia, J.D. Biggs, F. Topputo, D. Koschny, J. Vennekens and R. Walker; Predicting the scientific outcome of LUMIO Lunar CubeSat, *71st International Astronautical Congress (IAC)*, 2020
- (C49) V. Franzese, **C. Giordano**, Y. Wang, F. Topputo, H. Goldberg, A. Gonzales and R. Walker; Target Selection for M-ARGO Interplanetary CubeSat, *71st International Astronautical Congress (IAC)*, 2020
- (C50) A. Cervone, F. Topputo, S. Speretta, A. Menicucci, J. D. Biggs, P. Di Lizia, M. Massari, V. Franzese, **C. Giordano**, G. Merisio et al.; Phase A Design of the LUMIO Spacecraft: a CubeSat for Observing and Characterizing Micro-Meteoroid Impacts on the Lunar Far Side, *71st International Astronautical Congress (IAC)*, 2020 (Keynote Speak)
- (C51) F. Topputo, K. Mani, V. Franzese, **C. Giordano**, J.D. Biggs, M. Massari and P. Di Lizia; LUMIO CubeSat: toward a Lunar Situational Awareness, *25th Conference of the Italian Association of Aeronautics and Astronautics (AIDAA 2019)*, 2019
- (C52) G. Merisio, F. Topputo, V. Franzese, **C. Giordano**, A. Cervone, S. Speretta and R. Walker; LUMIO CubeSat: toward a Lunar Situational Awareness, *EPSC-DPS Joint Meeting*, 2019
- (C53) **C. Giordano**, C. Trenkel and F. Topputo; Dedicated mission to the Sun-Earth saddle point: a feasibility assessment, *29th AIAA/AAS Space Flight Mechanics Meeting*, 2019
- (C54) **C. Giordano** and F. Topputo; Modeling and Optimization of Aero-Ballistic Capture, *29th AIAA/AAS Space Flight Mechanics Meeting*, 2019
- (C55) F. Topputo, G. Merisio, V. Franzese, **C. Giordano**, A. Cervone, S. Speretta and R. Walker; LUMIO CubeSat: Toward a Lunar Situational Awareness, *iCubeSat*, 2019
- (C56) F. Topputo, D.A. Dei Tos, K. Mani, S. Ceccherini, **C. Giordano**, V. Franzese and Y. Wang; Trajectory Design in High-Fidelity Models, *7th ICATT*, 2018
- (C57) **C. Giordano**, V. Franzese, Y. Wang, F. Topputo, F. Perez-Lissi and R. Walker; Target Selection for M-ARGO, a CubeSat to near-Earth Asteroids, *44th COSPAR Assembly*, 2022 (Poster)
- (C58) V. Franzese, **C. Giordano**, Y. Wang, C. Hofmann, K. V. Mani and F. Topputo; Guidance, Navigation, and Control of Interplanetary CubeSats, *iCubeSat*, 2019 (Poster)

ATTENDED CONFERENCES

- 2025 AAS/AIAA Space Flight Mechanics Meeting, January 19-23, 2025, Kaua'i, Hawaii
- 75th International Astronautical Congress, October 14-18, 2024, Milan, Italy
- 2024 AIAA SciTech Forum, January 8-12, Orlando, Florida
- 33rd AAS/AIAA Space Flight Mechanics Meeting, January 15-19, 2023, Austin, Texas
- 44th COSPAR Scientific Assembly, July 16-24, 2022, Athens, Greece
- iCubeSat 2019, May 28-29, 2019, Milan, Italy
- 29th AIAA/AAS Space Flight Mechanics Meeting, January 13-17, 2019, Ka'anapali, Hawaii
- 7th International Conference on Astrodynamics Tools and Techniques, November 6-9, 2018, Oberpfaffenhofen, Germany

INVITED TALKS

- **C. Giordano**; UQ in Propagation with Optimization, *Workshop on Uncertainty Quantification in Orbit Propagation*, organized by COMMunauté d'ExperTs mécanique ORBitale (COMET-ORB), CNES, February 9-10, 2021, Virtual

SERVICE TO THE COMMUNITY

Guest Editor for the MDPI Aerospace Special Issue on "New Concepts in Spacecraft Guidance, Navigation, and Control", 2024-2025

Session Chair at the following conferences:

- 2025 AAS/AIAA Space Flight Mechanics Meeting, January 19-23, 2025, Kaua'i, Hawaii
- 2024 AIAA SciTech Forum, January 8-12, Orlando, Florida
- 33rd AAS/AIAA Space Flight Mechanics Meeting, January 15-19, 2023, Austin, Texas

Reviewer of more than 25 papers for the following scientific journals:

- Journal of Guidance, Control, and Dynamics
- Journal of Spacecraft and Rockets
- The Journal of Astronautical Sciences
- Advances in Space Research
- Acta Astronautica
- Planetary Science Journal
- Nature Scientific Reports
- Astrodynamics
- MDPI Aerospace

MEMBERSHIP OF SCIENTIFIC SOCIETIES

- Committee on Space Research, as **COSPAR Associate** – From 2018
- American Institute of Aeronautics and Astronautics, as **AIAA Member** – From 2021
- Associazione Italiana Di Aeronautica e Astronautica, as **AIDAA Member** – From 2020

OUTREACH

- Participation to outreach activities organized by Politecnico di Milano:
 - Open Day (secondary school and undergraduate students) – From AY 2018/19
 - Festival della Scienza (outreach activities for kids and general public) – September 2022, September 2023

OTHER ACTIVITIES

- I am involved as **associate member of the scientific groups** of the following spacecraft missions:
 - **LUMIO** (as from July 2023)
 - **DART** (as from December 2022)
- PhD Spokesman in the Department of Aerospace Science and Technologies Council

PRIVACY STATEMENT

Autorizzo al trattamento dati ai sensi del GDPR 2016/679 del 27 aprile 2016 (Regolamento Europeo relativo alla protezione delle persone fisiche per quanto riguarda il trattamento dei dati personali).

Autorizzo la pubblicazione del Curriculum Vitae sul sito istituzionale del Politecnico di Milano (sez. Amministrazione Trasparente) in ottemperanza al D. Lgs n. 33 del 14 marzo 2013 (e s.m.i.).