

EDOARDO GRAMIGNA

PostDoctoral Researcher

Radio Science and Planetary Exploration Laboratory
Alma Mater Studiorum - University of Bologna

01/15/1995

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PROFESSIONAL EXPERIENCE

Feb 2024 /
Present

PostDoctoral Researcher

Radio Science and Planetary Exploration Laboratory - University of Bologna
CIRI-AEROSPAZIALE, 12 Carnaccini, Forlì, Italy

- Design of the Radio Science experiments with the Hera mission (ESA)
- Orbit Determination of Hera (cruise phase + Mars flyby)
- Development and characterization of Hera InterSatellite Link (ISL) ranging measurements

Nov 2022 /
Jun 2023

Visiting PhD Candidate

NASA Jet Propulsion Laboratory (JPL) - California Institute of Technology
Solar System Dynamics Group 392R.
4800 Oak Grove Dr, Pasadena, CA 91109 - [jpl.nasa.gov](https://www.jpl.nasa.gov)

Estimation of the Didymos-Dimorphos binary system orbital state using Hera data.

Aug 2022 /
Jan 2023

Flight Dynamics Engineer

Radio Science and Planetary Exploration Laboratory - University of Bologna
Department of Industrial Engineering (DIN), 40, Fontanelle Street, Forlì, Italy

Orbit Determination, Navigation and Flight Path Control of LICIACube and ArgoMoon space missions.

Nov 2021 /
Dec 2021

Visiting PhD Candidate

GomSpace
Langagervej 6, Aalborg E, 9220, Denmark

Radio Frequency stability tests and characterization of the end-to-end ISL link system for the Hera mission.

Apr 2020 /
Nov 2020

Research Fellow

Alma Mater Studiorum - University of Bologna
Department of Industrial Engineering (DIN), 40, Fontanelle Street, Forlì, Italy

- Responsible for the *orbit determination* and *ISL development* tasks for the European project H2020-NEO-MAPP.

- Development and characterization of a new deep space miniaturized satellite-to-satellite link system, to increase the accuracy of the doppler measurements for RSE;
- Management of the partners involved in the OD task; Definition of the ICD documents to include the partners' external observables (LIDAR, OPNAV, S/C module) in MONTE S/W; Implementation of the partners' external modules in MONTE to increase the accuracy of the OD at NEOs.

Nov 2019 /
Mar 2020

Visiting Student Researcher (Master's thesis)
NASA Jet Propulsion Laboratory (JPL) - California Institute of Technology
Planetary Radar and Radio Sciences Group 332K.
4800 Oak Grove Dr, Pasadena, CA 91109 - jpl.nasa.gov

Radio Occultation Experiments of Venus and Mars: similarities and differences.

Jun 2018 /
Nov 2018

Space Engineering Intern
Alma Mater Studiorum - University of Bologna
Tecnopolo-CIRI Aerospaziale, 12, Baldassarre Carnaccini Street, Forlì, Italy

Non-gravitational accelerations modelization for the BepiColombo mission.

Feb 2017 /
Sep 2017

Thermal Engineering Intern (Internship and BSc thesis)
N.P.C. New Production Concept S.r.l./Spacemind
27-29, Errico Malatesta Street, Imola, Italy - npcspacemind.com

EDUCATION BACKGROUND

May 2024 /
Present

MASTER IN BUSINESS ADMINISTRATION
Executy Business and Technology Academy

Nov 2020 /
Jan 2024

DOCTOR OF PHILOSOPHY
Alma Mater Studiorum - University of Bologna
Department of Industrial Engineering (DIN), 40, Fontanelle Street, Forlì, Italy

PhD in Aerospace Science and Technology

Thesis: Design of the Radio Science experiments with the Hera mission (ESA)

- Numerical simulations in MONTE software of the Hera Radio Science experiments (RSE), to estimate the dynamical state of the Didymos system, Didymos and Dimorphos extended gravity fields, heliocentric and mutual orbits, and non-gravitational accelerations.
- Involved in: Design of the Radio Science experiments for the ESA RAMSES mission; M7-mission proposal *Heavy Metal* to study the (216) Kleopatra asteroid and its moons; Radio Occultation experiments analysis to investigate the atmospheres of solar system bodies (JUNO, Cassini, Venus Express missions).

Oct 2017 /
Mar 2020

MASTER'S DEGREE IN AEROSPACE ENGINEERING
Alma Mater Studiorum - University of Bologna
Grade: 110 cum Laude

Sep 2014 /
Oct 2017

BACHELOR'S DEGREE IN AEROSPACE ENGINEERING
Alma Mater Studiorum - University of Bologna
Grade: 109/110

SOFTWARE

- MONTE (JPL NASA SW)
- GMAT
- MATLAB + SPICE
- Signal and data processing tools
- ANSYS - LISA (FEM)
- C code / Python
- AutoCAD
- Adobe InDesign
- Microsoft Office

CERTIFICATES

IELTS Academic 20/07/2017
Overall Band Score: **7.0**
CEFR Level: **C1**

LANGUAGES

Italian (mother tongue)
English (fluent)

PUBLICATIONS

1. **Gramigna, E.**, Calibration techniques for studying Venus and Mars atmospheres, *Aerotecnica Missili & Spazio* 99.4 (2020): 255-261.
2. **Gramigna, E.**, Parisi, M., Buccino, D., Casajus, L. G., Zannoni, M., Bourgoïn, A., ... & Oudrhiri, K. (2023). Analysis of NASA's DSN Venus Express radio occultation data for year 2014. *Advances in Space Research*, 71(1), 1198-1215.
3. Bourgoïn, A., **Gramigna, E.**, Zannoni, M., Gomez Casajus, L., Tortora, P., Determination of uncertainty profiles in neutral atmospheric properties measured by radio occultation experiments, *Advances in Space Research*, 2022.
4. Buccino, D. R., Parisi, M., **Gramigna, E.**, Gomez-Casajus, L., Tortora, P., Zannoni, M., ... & Bolton, S., Ganymede's Ionosphere observed by a Dual-Frequency Radio Occultation with Juno, *Geophysical Research Letters*, e2022GL098420.
5. Lombardo, M., Zannoni, M., Gai, I., Gomez-Casajus, L., **Gramigna, E.**, Lasagni Manghi, R., Tortora, P., Di Tana, V., Cotugno, B., Simonetti, S., Patruno, S., Pirrotta, S. Design and Analysis of the Deep-Space Navigation for the ArgoMoon CubeSat Mission, *MDPI Aerospace*, 2022.
6. Tortora, P., Modenini, D., Zannoni, M., **Gramigna, E.**, Strollo, E., Togni, A., ... & Simone, L. (2023). Ground and Space Hardware for Interplanetary Communication Networks. In *A Roadmap to Future Space Connectivity: Satellite and Interplanetary Networks* (pp. 107-138). Cham: Springer International Publishing.
7. Parisi, M., Caruso, A., Buccino, D. R., **Gramigna, E.**, Withers, P., Gomez-Casajus, L., ... & Bolton, S. (2023). Radio occultation measurements of Europa's ionosphere from Juno's close flyby. *Geophysical Research Letters*, 50(22), e2023GL106637.
8. Dotto, E., ..., **Gramigna, E.**, et al., (2023) The Dimorphos ejecta plume properties revealed by LICIAcube, *Nature*.
9. Richardson, D. C., **Gramigna, E.**, et al. (2024). The dynamical state of the Didymos system before and after the DART impact. *The Planetary Science Journal*, 5(8), 182.
10. **Gramigna, E.**, Lasagni Manghi, R., Zannoni, M., Tortora, P., Park, R.S., Tommei, G., Le Maistre, S., Michel, P., Castellini, F., Kueppers, M., (2023). The Hera Radio Science Experiment at Didymos. *Planetary and Space Science*, 246, 105906.
11. Tortora P., **Gramigna, E.**, Park, R.S., et al. (2024), The Radio Science Experiment on Hera, *Juventas and Milani, Space Science Reviews*, under review.
12. Buccino, D., ..., **Gramigna, E.**, et al., (2024) Electron Density in Io's Alfvén Wing Observed via Radio Occultation with Juno. *Geophysical Research Letters*, accepted.
13. Zannoni, M., **Gramigna, E.**, et al., (2025) LICIAcube Navigation and Orbit Determination: Guiding Italy's First Deep Space CubeSat to Document the DART Impact. To be submitted.

CONFERENCE PROCEEDINGS

1. **Gramigna, E.**, Johansen, G. J., Lasagni Manghi, R., Magalhães, J., Zannoni, M., Tortora, P., Togni, A., Le Bras, E., Hera Inter-Satellite link Doppler characterization for Didymos Gravity Science experiments, 2022 IEEE 9th International Workshop on Metrology for AeroSpace (MetroAeroSpace).
2. **Gramigna, E.**, Dias, N., Lasagni Manghi, R., Zannoni, M., Tortora, P., Gordo, P., Melicio, R., Improvement to Hera Orbit Determination and Gravity Science via Inclusion of LIDAR Measurements, 33rd AAS/AIAA Space Flight Mechanics Meeting, Austin, Texas, January 15-19 2023.
3. Tortora, P., Zannoni, M., Lasagni Manghi, R., **Gramigna, E.**, et al. Radio Science Investigations for the Heavy-Metal mission to asteroid (216) Kleopatra. 33 AAS/AIAA Space Flight Mechanics Meeting, January 2023 Texas, US.
4. **Gramigna, E.**, Lasagni Manghi, R., Zannoni, M., Tortora, P., Michalis, G., Gkolias, I., Tsiganis, K., Park, R.S., Meyer, A., Pravec, P., Hera orbit determination covariance analysis of Didymos binary asteroid with the full two-body problem 2024 AAS/AIAA Astrodynamics Specialist Conference, Broomfield, Colorado, August 2024.
5. **Gramigna, E.**, Karatekin, O., Ritter, B., Fodde, I., Ferrari, F., Piccolo, F., Tortora, P., Lasagni Manghi, R., Zannoni, M., Park, R.S. Milani and Juventas optical navigation images in support of the Hera radio science experiment. 2025 AAS/AIAA Space Flight Mechanics Meeting, Kauai, Hawaii, January 2025.

CONFERENCE ABSTRACTS

Author and co-author of abstracts at the EGU, AGU, and EPSC conferences in recent years.

April 24, 2025

Date

Edoardo Gramigna
Signature