

# Roberto Paoli

## Curriculum Vitae

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Birth date: January 30, 1991

Birth place: Pisa



### Current position

02/2023 - **Assegnista di Ricerca** (Researcher), Department of Mathematics, University of Pisa

### Previous positions

10/2019 - 01/2023 **Marie Skłodowska-Curie Early Stage Researcher** within the H2020 project Stardust-Reloaded, University "Alexandru Ioan Cuza" of Iași (Romania)  
Supervisor: Prof. Cătălin Gales

### Education

- 10/2019 - **PhD Student in Mathematics**, University "Alexandru Ioan Cuza" of Iași (Romania)  
Supervisor: Prof. Cătălin Gales
- 2015 - 2019 **Master's Degree in Mathematics**, University of Pisa (Italy)  
Thesis: *Chaos in the Anisotropic Kepler Problem*  
Supervisor: Prof. C. Bonanno  
Final Mark: 110/110 cum laude
- 2010 - 2015 **Bachelor's Degree in Mathematics**, University of Pisa (Italy)  
Thesis: *Una teora analitica per un flyby*  
Supervisor: Prof. G. Tommei  
Final Mark: 103/110
- 2005 - 2010 **High School Diploma**, Liceo Scientifico "Federigo Enriques", Livorno (Italy)  
*Diploma di maturità scientifica*  
Final Mark: 100/100 cum laude

### Publications and preprints

- [5] **Paoli, R.**, *Analytical and Numerical Estimates for Solar Radiation Pressure Semi-secular Resonances*, final stages of the reviewing process on Advances in Space Research, preprint available on arXiv - Journal Publication
- [4] Laino, M. A., Wilson, A. R., Vasile, M., **Paoli, R.**, Gales, C., *A Transport Network for In-Orbit Recycling Exploiting Natural Dynamics*, in 73rd International Astronautical Congress (2022) - Proceeding Paper
- [3] Peñarroya, P. and **Paoli, R.**, *Orbit propagation around small bodies using spherical harmonic coefficients obtained from polyhedron shape models*, IAU Symposium, vol. 364, pp. 203–210 (2022) - Proceeding Paper  
DOI:10.1017/S1743921321001496.

- [2] Peñarroya, P. and **Paoli, R.**, *Orbit propagation around small bodies using spherical harmonic coefficients obtained from polyhedron shape models.*, in 7th IAA Planetary Defense Conference, (2021) - Poster
- [1] Peñarroya, P., Vyas, S., **Paoli, R.**, & Kajak, K. M. *Survey of Landing Methods on Small Bodies : Benefits of Robotics Manipulators to the Field.* International Symposium on Artificial Intelligence, Robotics and Automation in Space (i-SAIRAS),(2020) - Poster  
DOI: 10.5281/zenodo.4275978

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## Awards

- 2022 Member of the CODEM Project Working Group, which presented the best Commercial and Research proposals during the Stardust-R Local Training Workshop II
- 2021 Leader of the team "Standing on the Shoulders of Giants", Winner of the space debris section of the "**Andrea Milani**" **Challenge**, organized by Stardust-R and the Advanced Concepts Team of ESA
- 2020 Member of the FLAIR Project Working Group, winner of best Research proposal at the Stardust-R Local Training Workshop I

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## Research interests

Celestial Mechanics Resonances in the Earth space environment, Orbit Determination  
Astronomy Dynamics around irregularly shaped bodies, Yarkovsky effect

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## Visits

- From: 20/09/2022 Visiting period (secondment) at Deimos Space, Tres Cantos, Madrid, Spain, supervised  
To: 16/12/2022 by Simone Centuori
- From: 21/02/2022 Virtual secondment at the University of Strathclyde, Glasgow, Scotland, Uk, supervised  
To: 20/05/2022 by Prof. Massimiliano Vasile

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## Tutoring activity

- 2018-2019 *Supporto alla Didattica* (teaching assistant) for the class of *Linear Algebra*, Energy Engineering School, University of Pisa. Teachers: Prof.ssa Francesca Acquistapace e Prof. Vincenzo Maria Tortorelli
- 2017-2018 *Supporto alla Didattica* (teaching assistant) for the class of *Mathematics and Statistics*, school of "Scienze delle Preparazioni Erboristiche e della Salute", University of Pisa. Teacher: Prof. Carlo Petronio

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## Research projects

- [1] **Title:** Attività scientifiche per la missione Hera  
**Funding Entity:** Agenzia Spaziale Italiana  
**PI:** Paolo Tortora, University of Bologna  
**Amount Granted:** 1.000.000,00 EUR  
**Start-End Date:** 2022-2025  
**Contribution:** Assegnista di Ricerca
- [1] **Title:** Stardust-Reloaded (ref: H2020 Grant Agreement N. 813644)  
**Funding Entity:** European Commission's Horizons 2020 programme  
**PI:** Massimiliano Vasile, Aerospace Center of Excellence, University of Strathclyde (UK)  
**Amount Granted:** 3.867.284,00 EUR  
**Start-End Date:** 01/01/2019-31/12/2022  
**Contribution:** Early Stage Researcher

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## Editorial Work

Referee for the following journals: Advances in Space Research

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## Conferences and meetings

- 2024 Dynamics and Physics in the Solar System: The legacy of Paolo Farinella and Andrea Milani, University of Pisa (Italy), 18-21 June  
**Oral presentation:** *Analytical development of the mixed Yarkovsky effect for objects in a non-circular orbit*  
Hera Community Meeting, European Space Research and Technology Centre (ESTEC), Noordwijk (Netherlands), 25-26 April
- 2023 Hera Community Meeting, European Space Research and Technology Centre (ESTEC), Noordwijk (Netherlands), 10-13 October
- 2022 STARCON2 - Stardust-R Final Conference, European Space Research and Technology Centre (ESTEC), Noordwijk (Netherlands), 7 - 11 November  
**Oral presentation:** *An overview of the resonances arising from the coupling of the Earth's oblateness with the solar radiation pressure effect*  
CELMEC VIII - International Meeting on Celestial Mechanics, University of Roma Tor Vergata (Italy), 5 - 9 September  
**Oral presentation:** *Resonances arising from the interaction of the Earth's oblateness with the Solar third-body and radiation pressure effects*  
I-CELMECH Workshop - Theory, models and simulations in Celestial Mechanics, University of Pisa (Italy), 14 - 16 June  
**Oral presentation:** *Analysis of Solar Radiation Pressure semi-secular resonances*
- 2021 Multiscale (time and mass) dynamics of space objects, IAU Symposium 364, University Alexandru Ioan Cuza of Iasi (Romania), 18 - 22 October  
**Oral presentation:** *Orbit propagation around small bodies using spherical harmonic coefficients obtained from polyhedron shape models, with Pelayo Peñarroya*  
Space Traffic Management and Resilient Space Environment - Stardust-R Global Virtual Workshop II, Online Conference, 13 - 17 September  
**Oral presentation:** *Investigations on the solar radiation pressure semi-secular resonances for space debris*
- 2020 Asteroid Exploration and Exploitation - Stardust-R Global Virtual Workshop I, University of Pisa (Italy), 7 - 10 September  
**Oral presentation:** *The Dynamics around Extended Bodies: Tools and Techniques*

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## Summer and training schools

- 2023 SPICE training, European Space Astronomy Center, (ESAC/ESA), Madrid, Spain, 18-21 April
- 2022 Stardust-R Local Training Workshop II, Delft University of Technology (Netherlands), 21 - 23 February
- 2021 Stardust-R Training School III, University Alexandru Ioan Cuza of Iasi (Romania), 15 - 19 March
- 2020 Stardust-R Local Training Workshop, Technical University of Madrid (Spain), 18 - 21 May  
Stardust-R Training School II, Politecnico di Milano (Italy), 10 - 13 February  
I-CELMECH Training School, University of Milan (Italy), 3-7 February
- 2019 Stardust-R Opening Training School, University of Strathclyde, (Glasgow, UK), 2 - 7 December

2018 School/Workshop "Recent Advances in Hamiltonian Dynamics and Symplectic Topology", University of Padova (Italy), 12-16 February

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## Conference organization

2024 Dynamics and Physics in the Solar System: The legacy of Paolo Farinella and Andrea Milani, University of Pisa (Italy), 18-21 June 2024

2021 Multiscale (time and mass) dynamics of space objects, IAU Symposium 364, University Alexandru Ioan Cuza of Iasi (Romania), 18 - 22 October

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## Outreach activity

2021 Interview on Romanian public television TVR Iași with journalist Maria Florea to talk about the science behind the "Andrea Milani" Challenge

Participation to "Space Debris", short sci-fi movie inspired by the work of researchers, available on Youtube

2019 Guide for one day at the Glasgow Science Centre as part of the Stardust-R Opening Training School

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## Languages

Italian Mother tongue  
English Fluent

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## Computer skills

OS Advanced knowledge of **GNU/Linux** and **Windows**  
Programming Advanced knowledge of **Fortran** and **Python**,  
good knowledge of **C**, basic knowledge of **Ocaml**  
Scientific Advanced knowledge of **Matlab** and **Mathematica**  
Basic knowledge of NASA/Naif **SPICE**  
Writing Advanced knowledge of **LaTeX**  
Office Good knowledge of **Microsoft Office**  
Other Basic knowledge of **Geogebra**

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## Other informations

Driving Car driving license, B category

Hobbies Playing guitars and synthesizers, skateboarding, and watching movies

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## References available upon request

**Prof. Giacomo Tommei**, Dipartimento di Matematica, University of Pisa, Largo Bruno Pontecorvo 5, 56127 Pisa (Italy)

Email address: [giacomo.tommei@unipi.it](mailto:giacomo.tommei@unipi.it)

**Prof. Cătălin Gales**, Faculty of Mathematics, University "Alexandru Ioan Cuza" (UAIC), Bulevardul Carol I 11, 700506, Iași (Romania)

Email address: [gales@uaic.ro](mailto:gales@uaic.ro)

Livorno, July 4, 2024

Signature

