

Paolo Cappuccio



Education

University

11/2017–11/2020 **Ph.D. Aeronautical and Space Engineering**, *La Sapienza University*, Rome, co-funded by European Space Agency (ESA) in the context of ESA's Networking/Partnering Initiative (NPI).
Collaborating on JUICE 3GM's and BEPICOLOMBO MORE's gravity experiments

11/2015–10/2017 **M.S. Space and Astronautical Engineering**, *La Sapienza University*, Rome, 110/110 with honors.

09/2012–11/2015 **B.S. Aerospace Engineering**, *La Sapienza University*, Rome, 110/110 with honors.

High School

09/2007–07/2012 **Diploma di Liceo Scientifico (Science Major)**, *Liceo Scientifico "Nomentano"*.

Master's thesis

Title *JUICE orbit determination data analysis in order to calibrate the on-board accelerometer*

Supervisors Prof. Luciano Iess, Ph.D. Mirco Junior Mariani.

Bachelor's thesis

Title *Radiation Doses in a Human Mission to Mars*

Supervisors Prof. Luciano Iess

Experience

University

01/02/2019–20/12/2019 **Visiting scientist at the European Space Operations Center (ESOC)**, Darmstadt, Germany.

24-29/03/2019 **Winner of Caltech Space Challenge 2019 with the Team Voyager. SILENUS: A Mission Concept for Investigating Habitability on Enceladus**, *Caltech/JPL*, Pasadena, California.

18/04/2018–20/04/2018 **ESA's JUICE End-to-End Orbit Determination Simulation to Calibrate On-Board Accelerometer**, 2nd prize at the 14th PEGASUS student conference, Madrid, Spain.

16/04/2018 **"Laureato Eccellente" (Excellent graduate) award**, *Fondazione Roma Sapienza*, Roma, Italy.

03/2017–10/2018 **"Percorso d'eccellenza" (Excellence Pathway) in Master's studies**.

24/07/2017– 30/09/2017	Visiting Scholar at the University of Colorado Boulder , <i>ASI-CAIF scholarship</i> , Boulder, Colorado. Thanks to the ASI-CAIF "Borse di apprendistato scientifico in USA" funding, I developed a research project of two months at the University of Colorado Boulder. My work consists in the study of a complex dynamic of fuel slosh implemented in Basilisk , a software for astrodynamics simulation developed by Prof. Hanspeter Schaub and his team.
15/03/2017– 15/06/2017	ESTEC Internship , <i>Trainee</i> , Noordwijk, Netherlands. I worked on the REACH Information Portal webpage, in the TEC-QE department. Detailed achievements: - REACH regulation background; - Learned of the internal working at ESA.
24/07//2015– 20/08/2015	CVA Summer School , Bremen, Germany, co-funded by CVA and Sapienza University. I had lectures about the European launchers family and the possibility of having re-usable launchers. Furthermore, together with other student, I developed the design of a horizontal take-off and landing vehicle.
12/07/2015– 23/07/2015	Summer School Alpbach 2015 , Alpbach, Austria, funded by ASI. I had some lecture about mission design and quantum physics. Intense ten days of mission design leading to the project: "JANOS: First experimental study of quantum decoherence induced by spacetime curvature" Report , Presentation
01/2016–12/2016	"Borsa di collaborazione" (Fellowship for working in University library), <i>Employer</i> , Rome.
03/2014–11/2015	"Percorso d'eccellenza" (Excellence Pathway) in Bachelor's studies.

Languages

Italian	Mother tongue.
English	C1 , <i>Common European Framework of Reference for Languages</i> , TOEFL exam preparation course in Dublin from 30th July to 20th August 2016.

Computer skills

Programs	NASA's JPL MONTE , SPENVIS, ADINA, STK, Joomla CMS.
MATLAB	Good knowledge, Largely used during my studies.
Python	Good knowledge, used for my research.
Basics of	Fortran, C++, Objective-C, OpenMP, Javascript, HTML, LaTeX.

Luogo e Data
Roma, 15/10/2020

Journal Publications

- 01/01/2020 **Prospects for measuring Mercury's tidal Love number h_2 with the Bepi-Colombo Laser Altimeter**, *RN Thor, R Kallenbach, Ulrich R Christensen, A Stark, G Steinbrugge, A Di Ruscio, Paolo Cappuccio, L Iess, H Hussmann, J Oberst*, Astronomy and Astrophysics 633, 10.1051/0004-6361/201936517.
- 07/2020 **Report on first inflight data of BepiColombo's Mercury Orbiter Radio-science Experiment**, *P. Cappuccio, V. Notaro, A. Di Ruscio, L. Iess, A. Genova, D. Durante, I. di Stefano, S. W. Asmar, S. Ciarcia, L. Simone*, IEEE Transactions on Aerospace and Electronic Systems, 10.1109/TAES.2020.3008577.
- 08/2020 **Ganymede's gravity, tides and rotational state from JUICE's 3GM experiment simulation**, *P. Cappuccio, A. Hickey, D. Durante, M. Di Benedetto, L. Iess, F. DeMarchi, C. Plainaki, A. Milillo, A. Mura*, Planetary and Space Science 187, <https://doi.org/10.1016/j.pss.2020.104902>.
- 15/01/2021 **Observability of Ganymede's gravity anomalies related to surface features by the 3GM experiment onboard ESA's JUperiter ICy moons Explorer (JUICE) mission**, *De Marchi, F. and Di Achille, G. and Mitri, G. and Cappuccio, P. and di Stefano, I. and Di Benedetto, M. and Iess, L.*, Icarus 354, <https://doi.org/10.1016/j.icarus.2020.114003>.

Conference Publications

- 09/04/2018 **Quantum Key Distribution (QKD) Experiments on-board a 6-Units CubeSat**, *F. Piergentili, N. Spagnolo, G. Cialone, P. Marzioli, A. Gianfermo, P. Cappuccio, F. Sciarrino, L. Iess and P. Gaudenzi*, IAA Italy-Israel bilateral workshop on Nanosatellite Technologies, Italian Space Agency, Rome, Italy.
- 18/04/2018 **ESA's JUICE End-to-End Orbit Determination Simulation to Calibrate on-board Accelerometer**, *P. Cappuccio and G. Cascioli*, XIV PEGASUS Student Conference, etsiae, Madrid, Spagna.
Second prize for best paper
- 19/08/2018 **Analysis of the 3GM Gravity Experiment of ESA's JUICE Mission**, *P. Cappuccio, M. Di Benedetto, G. Cascioli and L. Iess*, AAS/AIAA Astrodynamics Specialist Conference 2018, Snowbird, UTAH, USA.
- 19/08/2018 **Fully-coupled Spherical Modular Pendulum Model to Simulate Spacecraft Propellant SLOSH**, *P. Cappuccio, C. Allard and H. Schaub*, AAS/AIAA Astrodynamics Specialist Conference 2018, Snowbird, UTAH, USA.
- 16/09/2018 **Report on JUICE 3GM gravity experiment performance**, *P. Cappuccio, M. Di Benedetto, G. Cascioli and L. Iess*, EPSC European Planetary Science Congress 2018, Berlin, Germany.
- 04-08/02/2019 **Determination of the Mercury's Moho depth with ESA BepiColombo MORE**, *I. di Stefano, P. Cappuccio, F. De Marchi and G. D'Achille*, XV Congresso Nazionale di Scienze Planetarie, Turin, Italy.
- 04-08/02/2019 **Investigation of superficial features of the Galilean moons by 3GM experiment aboard ESA JUICE mission**, *F. De Marchi, G. D'Achille, I. di Stefano and P. Cappuccio*, XV Congresso Nazionale di Scienze Planetarie, Turin, Italy.

- 19-21/06/2019 **Analysis on the solar irradiance fluctuations effect on the BepiColombo Superior Conjunction Experiment**, *I. di Stefano, P. Cappuccio and L. Iess*, 2019 IEEE 5th International Workshop on Metrology for AeroSpace (MetroAeroSpace), Torino, Italy.
- 11-15/08/2019 **Orbit Determination and Tests of General Relativity in the Cruise Phase of BepiColombo**, *L. Iess, I. di Stefano, P. Cappuccio and G. Cascioli*, AAS/AIAA Astrodynamics Specialist Conference 2019, Portland, MAINE, USA.
- 15-20/09/2019 **SILENUS: A Mission Concept Investigating the Habitability of Enceladus**, *K Balachandran, P Cappuccio, J Di, K Doerksen, J Fuchs, A Gloder, R Jolitz, M Li, D Limonchik, L Massarweh, A Meszaros, D Naftalovich, E Nathan, T Peev, M Rovira-Navarro, S Santra*, EPSC European Planetary Science Congress 2019, Geneva, Switzerland.
- 15-20/09/2019 **Expected insights on Mercury's interior from the BepiColombo Laser Altimeter**, *RN Thor, R Kallenbach, Ulrich R Christensen, A Stark, G Steinbrugge, A di Ruscio, P Cappuccio*, EPSC European Planetary Science Congress 2019, Geneva, Switzerland.
- 16-18/09/2019 **Rapid Mission Concept Development at the 2019 Caltech Space Challenge: A Small Lander Network Studying the Habitability of Enceladus**, *K Balachandran, P Cappuccio, J Di, K Doerksen, J Fuchs, A Gloder, R Jolitz, M Li, D Limonchik, L Massarweh, A Meszaros, D Naftalovich, E Nathan, T Peev, M Rovira-Navarro, S Santra*, 3rd Symposium on Space Educational Activities, Leicester, UK.
- 24-27/09/2019 **The implementation of a Radio-Science capability in the ESA tracking Network of Antennae**, *J. de Vicente, M. Lanucara, M. Mercolino, J. Villalvilla and P. Cappuccio*, TTC 2019, Darmstadt, Germany.
- 21-25/10/2019 **Environmental Disturbances on Missions for Precise Tests of Relativistic Gravity and Solar System Dynamics: the BepiColombo Case**, *I. di Stefano, G. Cascioli, L. Iess and P. Cappuccio*, 70th International Astronautical Congress, Washington, USA.
- 21-25/10/2019 **Multi-Station Tracking Configuration for the Reduction of Doppler Noise For BepiColombo and JUICE Radio Science Experiment**, *A. Di Ruscio, P. Cappuccio, M. di Benedetto and V. Notaro*, 70th International Astronautical Congress, Washington, USA.
- 9-13/12/2019 **First results from cruise tests of the Mercury Orbiter Radio science Experiment (MORE) of ESA's BepiColombo mission**, *Paolo Cappuccio, Virginia Notaro, Luciano Iess, Sami Asmar, James Border, Sabatino Ciarcia Sr., Andrea Di Ruscio, Elsa Montagnon, Javier De Vicente, Mattia Mercolino, Meegyeong Paik, Lorenzo Simone, Francesco Fiori, Alessandra Palli, Paolo Tortora, Marco Zannoni and Jose Villalvilla*, 2019 AGU Fall Meeting, San Francisco, California, USA.
- 06-10/01/2020 **On the Restricted 3-Body Problem for the Saturn-Enceladus system: mission geometry and orbit design for plume sampling missions**, *L. Massarweh and P. Cappuccio*, SciTechForum, Orlando, USA.
- 06-10/01/2020 **BepiColombo Gravity and Rotation Experiment in a Pseudo Drag-Free System**, *P. Cappuccio, A. Di Ruscio, L. Iess and M. J. Mariani*, SciTechForum, Orlando, USA.

- 16-20/03/2020 **PROSPECTS FOR MEASUREMENTS OF MERCURY'S SOLID BODY TIDES WITH THE BEPICOLOMBO LASER ALTIMETER**, *RN Thor, R Kallenbach, Ulrich R Christensen, A Stark, G Steinbrugge, A Di Ruscio, Paolo Cappuccio, L Iess, H Hussmann, J Oberst*, 51st Lunar and Planetary Space Conference, The Woodlands, Texas, USA.
- 16-20/03/2020 **A MISSION CONCEPT INVESTIGATING THE HABITABILITY OF ENCELADUS: S.I.L.E.N.U.S.**, *K Balachandran, P Cappuccio, J Di, K Doerksen, J Fuchs, A Gloder, R Jolitz, M Li, D Limonchik, L Massarweh, A Meszaros, D Naftalovich, E Nathan, T Peev, M Rovira-Navarro, S Santra*, 51st Lunar and Planetary Space Conference, The Woodlands, Texas, USA.
- 9-13/08/2020 **ANALYSIS OF 3GM CALLISTO GRAVITY EXPERIMENT OF THE JUICE MISSION**, *M. Di Benedetto, P. Cappuccio, S. Molli, L. Federici and A. Zavoli*, AAS/AIAA Astrodynamics Specialist Conference 2020, Lake Tahoe, California, USA.
- 12-14/10/2020 **JUICE's 3GM gravity experiment around Ganymede - Comparison between nominal and extended mission**, *P. Cappuccio, M. Di Benedetto, L. Iess*, 71st International Astronautical Congress, Cyber Edition.

Technical Meetings

- 12/07/2018 **JUICE 3GM KaT ICDR**, *Thales Alenia Space, Rome, Italy*, ESA's JUICE 3GM gravity experiment performances, P. Cappuccio, M. Di Benedetto and L. Iess.
- 16/10/2018 **JUICE Science Working Team 12**, *Cité de l'espace, Toulouse, France*, Callisto tides assessment on CReMA3.2, P. Cappuccio and M. Di Benedetto.
- 09/12/2018 **BepiColombo MORE's KaT Near Earth Commissioning Phase**, *ESOC, Darmstadt, Germany*.
- 06-08/03/2019 **JUICE Science Working Team 13**, *ESTEC, Noordwijk, Netherlands*, 3GM report on the gravity experiments, P. Cappuccio, M. Di Benedetto and L. Iess.
- 14-18/10/2019 **BepiColombo Science Working Team 13**, *ESTEC, Noordwijk, Netherlands*, Delta Commissioning Report of Mercury Orbiter Radio science Experiment (MORE), P. Cappuccio and L. Iess.

Luogo e Data
Roma, 15/10/2020