Europass Curriculum Vitae

Personal information

First name(s) / Surname(s)	**Giuseppe Pucacco**
Address(es)	1, via della Ricerca Scientifica, I-00133 Rome, Italy
Telephone(s)	+39 06 72594580 Mobile: +39 328 1032012
E-mail	pucacco@roma2.infn.it
Nationality	Italian
Date of birth	July 27th, 1956
Gender	Male

Work experience

Dates	1989-present
Occupation or position held	Assistant Professor
Main activities and responsibilities	Research, Assistance to Teaching.
Organisation	Department of Physics, University of Rome “Tor Vergata”
	Public University

Education and training

Dates	1984-1987
Title of qualification awarded	Ph.D. in Astrophysics
Principal subjects	Thesis title: "Anisotropy in Cosmology and Galactic Dynamics".
Organisation	University of Rome “la Sapienza”

Competence

Research	Researcher in Mathematical Physics with applications to Celestial Mechanics, Galactic Dynamics and Physics of Gravitation
Teaching	Experienced Teacher for several Physics and Mathematics courses: Celestial Mechanics and Dynamical Systems, General Physics, Acoustics

For more information on Europass go to http://europass.cedefop.europa.eu
© European Union, 2004-2010 24082010

Career summary

Scientific profile:

Giuseppe Pucacco has an Assistant Research position at the Physics Department of the University of Rome "Tor Vergata". He is currently qualified (Abilitato) for the role of Full Professor in the class of Mathematical Physics.

His research activity is mainly devoted to the study of Hamiltonian dynamical systems and to their applications to Celestial Mechanics, Galactic Dynamics and to other branches of Astrophysics and Classical and Relativistic Mechanics. The original research contributions cover the study of multi-body resonant dynamics, orbits around the collinear points of the 3-body problem, orbits in elliptical galaxies, the integrability of selected classes of Hamiltonian systems and the assessment of formation stability for satellite constellations.

In these fields, in addition to several papers on ISI-Scopus journals, he is coauthor with D. Boccaletti of a textbook, Theory of Orbits, conceived as a general introduction to the problems of analytical mechanics, with particular emphasis on perturbation methods.

He gives regular courses of Celestial Mechanics for the *laurea* in astronomy and for the *laurea specialistica* in Scienze dell'Universo and participates, with the role of co-supervisor of an early stage researcher, in the European Training Network STARDUST with a project devoted to Advanced Modelling of Asteroid and Debris Attitude Dynamics. He is didactic coordinator of the 2nd level master course in Space Science and Technology.

He was responsible, for the Tor Vergata section of the LARASE project aiming at verifying general relativistic effects by accurate laser ranging tracking of high-M/A satellite orbits and of the HERMES project with the role of optimization of the constellation orbits. He collaborates with INFN for the LAG experiment for the measure of the gravitational force at short distances and for the LISA experiment which aims at the detection of gravitational waves with a laser space interferometer based on a satellite constellation in heliocentric orbit.

Background experience:

Giuseppe Pucacco has extensively applied in the field of galactic dynamics the tools originally developed to tackle problems in modern celestial mechanics. To investigate the existence and stability of periodic orbits he has applied the perturbation methods based on the Lie transform method to construct Hamiltonian normal forms of the non-integrable dynamical system. The algebraic manipulation of the expansion series needed to investigate the orbit structure of the system is performed with a Mathematica program for the general symbolic case and with a Fortran program for the high-order model specific case. The application of the Lie transform perturbation approach leads to construct high-order Hamiltonian normal forms which allows us to make quantitative predictions concerning the phase-space structure of the system under investigation.

The scientific activity is testified by 120 entries in the SAO/NASA Astrophysics Data System (ADS), 72 entries referring to refereed publications in the Scopus database and by the numerous congress and meeting participations.

Affiliations and Committee Memberships:

- GNFM (Gruppo Nazionale di Fisica Matematica)
- INFN (Istituto Nazionale di Fisica Nucleare)
- IAPS (Istituto di Astrofisica e Planetologia Spaziali)
- SIMCA (Societa' Italiana di Meccanica Celeste e Astrodinamica)
- Referee for Astrophysical Journal, Astronomy & Astrophysics, Celestial Mechanics and Dynamical Astronomy, Monthly Notices of the RAS, New Astronomy, EPJplus, Advances in Space Research, International Journal of Nonlinear Dynamics, Journal of Mathematical Physics
- Chair of the Master course in Space Science and Technology

For more information on Europass go to http://europass.cedefop.europa.eu
© European Union, 2004-2010 | 24082010

Most Recent Publications

Medians (at the present epoch) compared with the italian ones for the qualification to Full Prof. in Mathematical Physics:

	# art. (last 10 ys.)	# cit. ac. age	H-C index
my score	41	341	10
threshold	12	125	7

Cavallari, I. Pucacco, G. 2022, ***Bifurcation of Frozen Orbits in a gravity field with zonal harmonics***, Celestial Mechanics and Dynamical Astronomy, in press.

Pucacco, G. 2022, ***Perturbation Theory and the method of detuning***, in: Meyers, R. A. (eds) Encyclopedia of Complexity and Systems Science, Springer, doi.org/10.1007/978-3-642-27737-5-761-1.

Celletti, A. Pucacco, G. Vartolomei 2022, ***Proper elements for space debris***, Celestial Mechanics and Dynamical Astronomy, 134, 11.

Tartaglia, A. Bassan, M. Pucacco, G. Ferroni, V. Vetrugno, D. 2022, ***Detecting gravito-magnetism with space based gravitational wave observatories***, Classical and Quantum Gravity, 39, 195010.

Celletti, A. Karampotsiou, E. Lhotka, C. Pucacco, G. and Volpi, M. 2022, ***The role of tidal forces in the long-term evolution of the Galilean system***, Regular and Chaotic Dynamics, 27, 381-408.

Lucchesi, D. M. Anselmo, L. Bassan, M. Lucente, M. Magnafico, C. Pardini, C. Peron, R. Pucacco, G. Visco, M. 2021, ***Testing Gravitation Theories in the field of the Earth with the SaToR-G Experiment***, Universe, 7, 192.

Celletti, A. Pucacco, G. Vartolomei 2021, ***Reconnecting groups of space debris to their parent body through proper elements***, Nature Scientific Reports, 11, 22676.

Celletti, A. Karampotsiou, E. Lhotka, C. Pucacco, G. and Volpi, M. 2021, ***Laplace-like resonances with tidal effects***, Astronomy & Astrophysics, 655, A94.

Pucacco, G. 2021, ***Normal Forms for the Laplace Resonance***, Celestial Mechanics and Dynamical Astronomy, 133, 11.

Luo, T. Pucacco, G. Xu, M. 2020, ***Lissajous and Halo orbits in the restricted three-body problem by normalisation method***, Nonlinear Dynamics, 101, 2629-2644.

Hanssmann, H. Marchesiello, A. Pucacco, G. 2020, ***On the detuned 2:4 Resonance***, Journal of Nonlinear Science, 20, 2513-2544.

Pucacco, G. 2019, ***Structure of the centre manifold of the L_1, L_2 collinear libration points in the restricted three-body problem***, Celestial Mechanics and Dynamical Astronomy, 131, 44.

Lucchesi, D. M. Anselmo, L. Bassan, M. Magnafico, C. Pardini, C. Peron, R. Pucacco, G. Visco, M. 2019, ***General Relativity Measurements in the Field of Earth with Laser-Ranged Satellites: State of the Art and Perspectives***, Universe, 5, 141.

Bassan, M. De Laurentis, M. De Rosa, R. Di Fiore, Errico, L. Garufi, F. Grado, A. Minenkov, Y. Pucacco, G. Visco, M. 2019b, ***Liquid actuated gravity experiments***, International Journal of Modern Physics D, 28, 1950115.

For more information on Europass go to http://europass.cedefop.europa.eu
© European Union, 2004-2010 24082010

Bassan, M. De Laurentis, M. De Rosa, R. Di Fiore, Errico, L. Garufi, F. Grado, A. Minenkov, Y. Pucacco, G. Spagnuolo, V. Stanga, R. Visco, M. 2019a, ***Improving sensitivity and duty-cycle of a double torsion pendulum***, Classical and Quantum Gravity, 36, 125004.

Gkolias, I. Celletti, A. Efthymiopoulos, C. Pucacco, G. 2019, ***Accurate modelling of the low-order secondary resonances in the spin-orbit problem, Communications in Nonlinear Science and Numerical Simulation***, 77, 181--202.

Pucacco, G. and Lucchesi, D. 2018, ***Tidal effects on the LAGEOS-LARES satellites and the LARASE program***, Celestial Mechanics and Dynamical Astronomy, 130, 66.

Paita, F. Celletti, A. Pucacco, G. 2018, ***Element history of the Laplace resonance: a dynamical approach***, Astronomy & Astrophysics, 617, A35

Celletti, A. Paita, F. Pucacco, G. 2018, ***The dynamics of the de Sitter resonance***, Celestial Mechanics and Dynamical Astronomy, 130, 15--30.

Tartaglia, A. Lorenzini, E. Lucchesi, D. Pucacco, G. Ruggiero, M.L. and Valko, P. 2018, ***How to use the Sun-Earth Lagrange points for fundamental physics and navigation***, General Relativity and Gravitation, 50, 9--30.

Bassan, M. Cavalleri, A. De Laurentis, M. De Marchi, F. De Rosa, R. Di Fiore, L. Dolesi, R. Finetti, N. Garufi, F. Grado, A. Hueller, M. Marconi, L. Milano, L. Minenkov, Y. Pucacco, G. Stanga, R. Vetrugno, D. Visco, M. Vitale, S. Weber, W. J. 2018, ***Actuation crosstalk in free-falling systems: torsion pendulum results for the engineering model of the LISA Pathfinder gravitational reference sensor***, Astroparticle Physics, 19, 19--26.

Pucacco, G. Rosquist, K. 2017, ***Energy dependent integrability***, Journal of Geometry and Physics, 115, 16—27

Gkolias I., Efthymiopoulos C., Pucacco G., Celletti A. 2017, ***Hamiltonian Formulation of the Spin-Orbit Model with Time-Varying Non-Conservative Forces***, Communications in Nonlinear Science and Numerical Simulation, 51, 23—38

Celletti A., Paita F., Pucacco G. 2017, ***Twist and non-twist regimes of the oblate planet problem***, Rend. Lincei Math. Appl., 28, 535—552

Celletti, A. Gales, C. Pucacco, G. Rosengren, A. 2017, ***Analytical development of the lunisolar disturbing function and the critical inclination secular resonance***, Celestial Mechanics and Dynamical Astronomy, 127, 259—283

Celletti, A. Efthymiopoulos, C. Gachet, F. Gales, C. Pucacco, G. 2017, ***Dynamical models and the onset of chaos in space debris,*** International Journal of Non-Linear Mechanics, 90, 147—163

Gachet, F. Celletti, A. Pucacco, G. Efthymiopoulos, C. 2017, ***Geostationary secular dynamics revisited: application to high area-to-mass ratio objects***, Celestial Mechanics and Dynamical Astronomy, 128, 149—181

Ceccaroni, M. Celletti, A. Pucacco, G. 2016, ***Bifurcation thresholds of Halo orbits***, Astrophysics and Space Science Proceedings, 44, 35—44

Vetrisano, M. Celletti, A. Pucacco, G. 2016, ***Asteroid Debris: Temporary Capture and Escape Orbits***, International Journal of Non-Linear Mechanics, 86, 23--32.

Celletti, A. Gales, C. Pucacco, G. 2016, ***Bifurcation of Lunisolar Secular Resonances for Space Debris Orbits***, SIAM J. APPLIED DYNAMICAL SYSTEMS, 15, 1352--1383.

For more information on Europass go to http://europass.cedefop.europa.eu
© European Union, 2004-2010 24082010

Gkolias, I. Celletti, A. Efthymiopoulos, C. Pucacco, G. 2016, ***The theory of secondary resonances in the spin-orbit problem***, Monthly Notices of the Royal Astronomical Society, 459, 1327—1339

Bassan M, Cavalleri A, De Laurentis M, De Marchi F, De Rosa R, Di Fiore L, Dolesi R, Finetti N, Garufi F. Grado A, Hueller M, Marconi L, Milano L, Pucacco G, Stanga R, Visco M, Vitale S, Weber W J 2016, ***Approaching Free Fall on Two Degrees of Freedom: Simultaneous Measurement of Residual Force and Torque on a Double Torsion Pendulum,*** Physical Review Letters, 116, 051104

Ceccaroni, M. Celletti, A. Pucacco, G. 2016, ***Halo orbits around the collinear points of the restricted three-body problem***, Physica D, 317, 28—42

Ceccaroni, M. Celletti, A. Pucacco, G. 2016, ***Birth of periodic and artificial halo orbits in the restricted three-body problem***, International Journal of Non-Linear Mechanics, 81, 65--74.

Marchesiello, A. Pucacco, G. 2016, ***Bifurcation sequences in the symmetric 1:1 Hamiltonian resonance***, International Journal of Bifurcation and Chaos, 26, 1630011.

Bucciarelli, S. Ceccaroni, M. Celletti, A. Pucacco, G. 2015, ***Qualitative and analytical results of the bifurcation thresholds to halo orbits***, Annali di Matematica Pura e Applicata, 195, 489--512

Lucchesi, D. M. Anselmo, L. Bassan, M. Pardini, C. Peron, R. Pucacco, G. Visco, M. 2015, ***Testing the gravitational interaction in the field of the Earth via Satellite Laser Ranging and the LAser RAnged Satellites Experiment (LARASE)***, Classical and Quantum Gravity, 32, 155012.

Celletti, A. Pucacco, G. Stella, D. 2015, ***Lissajous and Halo orbits in the restricted three-body problem***, Journal of Nonlinear Science, 25, 343—370.

Pucacco, G. 2015, ***Polynomial separable indefinite natural systems***, Journal of Geometry and Physics, 87, 382--395.

Marchesiello, A. Pucacco, G. 2014, ***Universal unfolding of symmetric resonances***, Celestial Mechanics and Dynamical Astronomy, 119, 357--368.

Pucacco, G. Marchesiello, A. 2014, ***An energy-momentum map for the time-reversal symmetric 1:1 resonance with Z_2 X Z_2 symmetry***, Physica D, 271, 10—18.

Marchesiello, A. Pucacco, G. 2014, ***Equivariant singularity analysis of the 2:2 resonance*****,** Nonlinearity, 27, 43—66.

Marchesiello, A. Pucacco, G. 2013, ***Resonances and bifurcations in systems with elliptical equipotentials*****,** Monthly Notices of the Royal Astronomical Society, 428, 2029–2038.

Marchesiello, A. Pucacco, G. 2013, ***The symmetric 1:2 resonance***, Eur. Phys. J. Plus, 128, 21.

De Marchi, F. Pucacco, G. Bassan, M. 2012, ***Optimizing the Earth-LISA "rendez-vous",*** Classical and Quantum Gravity, 29, 035009.

Pucacco, G. 2012, ***Normal forms for the epicyclic approximations of the Kepler problem*****,** New Astronomy, 17, 475–482.

Marchesiello, A. Pucacco, G. 2011, ***Relevance of the 1:1 resonance in galactic dynamics*****,** Eur. Phys. J. Plus, 126, 104.

Pucacco, G. Bassan, M. Visco, M. 2010, ***Autonomous perturbations of LISA orbits***, Classical and Quantum

For more information on Europass go to http://europass.cedefop.europa.eu
© European Union, 2004-2010 24082010

Gravity, 27, 235001.

Pucacco, G. 2009, ***Resonances and bifurcations in axisymmetric scale-free potentials*,** Monthly Notices of the Royal Astronomical Society, 399, 340 – 348.

Bolsinov, A. V. Matveev, V. S. Pucacco, G. 2009, ***Normal forms for pseudo-Riemannian 2-dimensional metrics whose geodesic flows admit integrals quadratic in the momenta***, Journal of Geometry and Physics, 59 (7), 1048--1062.

Pucacco, G. Rosquist, K. 2009, ***Nonstandard separability on the Minkowski plane***, Journal of Nonlinear Mathematical Physics, 16, 421--430.

Pucacco, G. Boccaletti, D. Belmonte, C. 2008, ***Quantitative predictions with detuned normal forms***, Celestial Mechanics and Dynamical Astronomy, 102, 163--176.

Pucacco, G. Boccaletti, D. Belmonte, C. 2008, ***Periodic orbits in the logarithmic potential***, Astronomy & Astrophysics, 489, 1055--1063.

Belmonte, C. Boccaletti, D. Pucacco, G. 2007, ***On the orbit structure of the logarithmic potential***, The Astrophysical Journal, 669, 202--217.

Pucacco, G. Rosquist, K. 2007, ***(1+1)-dimensional separation of variables***, Journal of Mathematical Physics, 48, 112903--112925.

Belmonte, C. Boccaletti, D. Pucacco, G. 2006, ***Stability of axial orbits in galactic potentials***, Celestial Mechanics and Dynamical Astronomy, 95, 101--116.

Pucacco, G. Rosquist, K. 2005, ***Integrable Hamiltonian systems with vector potentials***, Journal of Mathematical Physics, 46, 012701--012725.

Pucacco, G. Rosquist, K. 2005, ***Configurational invariants of Hamiltonian systems***, Journal of Mathematical Physics, 46, 052902--052921.

For more information on Europass go to http://europass.cedefop.europa.eu
© European Union, 2004-2010 24082010