Mercedes Ollé Torner is a Professor of the <u>Department of Mathematics</u> of the <u>Universitat Politècnica de</u> <u>Catalunya.</u>

Her researcher numbers are: Orcid code <u>https://orcid.org/0000-0002-8050-9055</u> Web of Science Researcher ID: F-9617-2015 Scopus profil·le: <u>https://www.scopus.com/authid/detail.uri?authorId=660267035</u>

Bibliometric data (in the last 10 years)

- 17 publications in <u>MathSciNet</u> with 10 JCR-indexed articles in the first quartile (Q1)
- h-index: 11
- 2 theses supervised
- 5 "Spanish Research sexennials", the last one awarded in 2018
- 377 citations (Scopus).

CV SUMMARY (of the last 10 years)

Since my PhD Thesis in 1989 (supervised by Prof. Gerard Gomez), I have always been interested in exploring topics in Celestial Mechanics and Hamiltonian systems. Being the N-body problem the keystone problem, which is very far from being well understood, I have devoted my research to apply Dynamical Systems (DS) theory to study it, both from the theoretical and numerical points of view.

Being a member of the UPC-UB Dynamical Systems Group (a large group of researchers in DS based in Barcelona), and the DANCE network (Spanish members in DS with different interests), I have had the excellent opportunity to collaborate with some of its members, producing as a result not only joint papers (and the attendance to Conferences to explain them), but also to gain a solid expertise in specific items like the study of some type of periodic orbits, homoclinic and heteroclinic phenomena, hyperbolic invariant manifolds, Hopf bifurcation with application to some specific models. Going from the macroscale problems to the atomic scale ones, and using the DS theory, I have also explored problems in Atomic Dynamics.

Main scientific interests. Several fundamental dynamical problems for nonlinear systems of ordinary differential equations (global description of the phase space, existence and computation of the main relevant objects of the dynamics, continuation of families of invariant objects, analysis of bifurcations, oscillatory motions) in the framework of Celestial Mechanics problems and also in Atomic physics. I am very interested in both the theoretical approach and numerical simulations.

RELEVANT MERITS

Publications (10 most relevant publications in the last 10 years)

1. E. Barrabés, M. Ollé, F. Borondo, D. Farrelly, J. M. Mondelo, Phase space structure of the hydrogen atom in a circularly polarized microwave field, Physica D: Nonlinear phenomena 241, 333--349, 2012.

2. E. Barrabés, J. M. Mondelo, M. Ollé, Numerical continuation of families of heteroclinic connections between periodic orbits in a Hamiltonian system, Nonlinearity, 26, 2747--2765, 2013.

3. E. Barrabés, G. Gómez, J. M. Mondelo, M. Ollé, Pseudo-heteroclinic connections between bicircular restricted four-body problems, Monthly Notices of the Royal Astronomical Society, 462, 740--750, 2016.

4. E. Barrabés, J. M. Cors, L. Garcia, M. Ollé, Tails and bridges in the parabolic restricted three-body problem, Monthly Notices of the Royal Astronomical Society, 472(3), 2554--2568, 2017.

5. M. Ollé, To and fro motion for the hydrogen atom in a circularly polarized microwave field, Communications in Nonlinear Science and Numerical Simulation, 54, 286--301, 2018

6. M. Ollé, J. R. Pacha, Hopf bifurcation for the hydrogen atom in a circularly polarized microwave field, Communications in Nonlinear Science and Numerical Simulation, 62, 27--60, 2018.

7. M. Ollé, O. Rodríguez, J. Soler, Ejection-collision orbits in the RTBP, Communications in Nonlinear Science and Numerical Simulation, 55, 298--315, 2018.

8. M. Ollé, O. Rodríguez, J. Soler, Analytical and numerical results on families of n-Ejection-collision orbits in the RTBP, Communications in Nonlinear Science and Numerical Simulation, 90 (105294), 1--27, 2020.

9. M. Ollé, O. Rodríguez, J. Soler, Transit regions and ejection/collision orbits in the RTBP, Communications in Nonlinear Science and Numerical Simulation, 94 (105550), 1--29, 2020.

10. M. Alvarez-Ramirez, E. Barrabés, M. Medina, M. Ollé, Ejection–Collision Orbits in Two Degrees of Freedom Problems in Celestial Mechanics, J. Nonlinear Science, 31:68, 1--33, 2021.

Research projects and grants (6 most relevant projects in the last 10 years)

MECMANA, *PGC2018-100928-B-I00*, UPC, 2019-2022, PR: M. Ollé and P. Martín, 7 researchers, 35 695 EUR

"UPC Dynamical Systems SGR", **2017SGR-1049**, UPC, 2017-2021, PR: T. M. Seara, 23 researchers, 44 480 EUR

"UPC Dynamical Systems SGR", *CIRIT 2014SGR504*, UPC, 2014-2016, PR: T. M. Seara, 33 researchers, 63 000 EUR

Dynamics associated with connections among invariant objects, Applications to Astrodynamics, neuroscience and other Applications, **PGC2018-100928-B-I00**, UPC, 2016-2018, PR: T. M. Seara, 17 researchers, 167 200 EUR

DACOBIANO, *MINECO-FEDER MTM2012-31714*, UPC, 2013-2015, PR: A. Delshams, 32 researchers, 282 672 EUR

DACOBIAN, MCyT-FEDER MTM2009-06973, UPC, 2010-2012, PR: A. Delshams, 30 researchers, 533 489 EUR

Experience in Research Management

Jury member to award the Noether prize, 2019. Jury member to award post-doc grants in the BGSMath, 2017.

Experience in organization of Research activities

- Dynamical systems day, Barcelona, 2018, Scientific Committee.
- Dynamical systems day, Barcelona, 2019, Scientific Committee.
- Recent trends in Nonlinear Science, Palma Mallorca, 2019, Scientific Committee.
- Workshop in Celestial Mechanics, Manresa, 2016, Organizing Committee.

Several recent invited Conferences (2 in 2020 cancelled by COVID)

- DYSCA III, Mexico, June 21-23, 2013
- HAMSYS2014, <u>http://www.gsd.uab.cat/hamsys2014/</u> CRM Bellaterra, June 2-6, 2014.
- II Joint Conference of the Belgian, Royal Spanish and Luxembourg Mathematical Societies, Logroño, June 6-8, 2016 18.
- TRAX 2018, Madrid, May 9-10, 2018.
- EQUADIFF, Leiden, July 8-12, 2019.

Diffusion Activities

- Four conferences: 3 of them entitled 'Mathematics and galaxies: tails and bridges', (1) Agrupació Astronòmica de Sabadell (16/Janauary/2019), (2) Institute Sant Gervasi in Mollet del Vallés (29/April/2021), (3) Oak House, in Barcelona (3/November/2021). 4th one entitled 'Celestial Mechanics and Mathematics: a shocking relationship', Summer Camp, FME in Barcelona (7/July/2021).
- E. Barrabés and M. Ollé. Paper: Dinàmica de varietats espacials: les autopistes de l'univers; Butlletí de la Societat Catalana de Matemàtiques, 34, 97-123, 2019. <u>https://publicacions.iec.cat/repository/pdf/00000283/0000006.pdf</u>

Distinction

The paper Dynamics of the parabolic restricted three-body problem, in Comm. Nonlinear Sci. Numer. Simulat., 29,400-415, 2015, was selected by Elsevier in the Virtual Special Issue on Women in Physics, March, 8, 2016.

University management

Head of the Department of Mathematics at the Universitat Politècnica de Catalunya, since February 2021.