

CV at January 2024

Full name: M. Teresa M-Seara Alonso.
Date of birth: 15 July 1961, Ourense, Spain.
Marital status: Married, 3 adult children.
Present Appointment: Full Professor.
Departament: Departament de Matemàtiques
University: Universitat Politècnica de Catalunya (UPC).
ORCID: 0000-0001-8421-8717.
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Academic qualifications

Bachelor in Mathematics: U. B. 30 June 1984.
Master thesis: U. B. 27 January 1986.
PhD. in Mathematics: U. B. 11 October 1991.

Teaching:

Bachelor: Infinitesimal calculus, Differential equations, Numerical calculus, Dynamical systems, Finite elements, Real Analysis, Complex Analysis.
Master: Analyticity and integrability, Introduction to Resurgence Theory, Geometric and algebraic methods in Dynamical Systems, Asymptotic methods in Dynamical Systems, Qualitative and Quantitative methods in Dynamical Systems, Hamiltonian Systems.

Committees and responsibility positions:

President of the “Comité de Selecció i d’Avaluació del Personal Docent i Investigador de la UPC” (CSAPDIU): 2016-2017 (member 2013-2017).
Director of the Departament de Matemàtica Aplicada I (UPC): 2009–2012.
Treasurer of the Catalan Mathematical Society: 2007–2011.
Member of the Scientific Committee of the Catalan Mathematical Society: from 2016
Coordinator of the Spanish net of Dynamical Systems DANCE (<http://www.dance-net.org/>): 2014-2018.
Member of the Scientific Committee of the Barcelona Graduate School of Mathematics (BGSMAH): 2013–2016.
Member of the Executive advisory board of the “Centre de Recerca Matemàtica” 2022-2024.

Research/evaluation Committees:

French National Research Agency (ANR), 2021
Member of the scientific Committee of the “Ferran Sunyer i Balaguer price 2019-2020”, Institut d’Estudis Catalans.
President of the committee of the “Emmy Noether price”: 2019
President of the committee of the “Antonio Valle price to young researchers”, 2018/2019.
Member of the “Antonio Valle price to young researchers”:2017.
Member of the Comité de acreditación de Profesorado de Ciencias Experimentales, Agencia de Calidad del Sistema Universitario Vasco: from 2016.
Member of the Comisión de acreditación nacional para el acceso al Cuerpo de Catedráticos de Universidad (prog. ACADEMIA, ANECA): 2013–2016.
President of the Committee for the “Premi Evariste Galois” of the Catalan Mathematical Society.
Member of the Comité Asesor de la Comisión Nacional Evaluadora de la Actividad Investigadora (CNEAI) de Matemáticas y Física: 2012–2013.

SIAG-DS Advisory Committee (SIAM, Dynamical Systems): 2012–2013
 AGAUR (Agència de Gestió d'Ajuts Universitaris i de Recerca): 2011, 2015.
 Proyectos de Investigación de la Dirección General de Investigación y Gestión del Plan Nacional de I+D+i Ministerio de Ciencia e Innovación: 2011, 2017.
 ANEP (Agencia Nacional de Evaluación y prospectiva): 2010, 2016.
 The Netherlands Organisation for Scientific Research (NWO): Research grants to stimulate most promising research.

Research

Researcher ID: G-1702-2015 Orcid code: 0000-0001-8421-8717

Some quantitative data:

- **Publications: 79.**
 Publications in refereed journals: 65, among them 52 at 1st. quartile (29 at first decile) in the JCR classification. Other publications: 15.
 Main journals where I have published: Advances in Mathematics, Communications in Mathematical Physics, Chaos, Communications in Pure and Applied Mathematics, Discrete and Continuous Dynamical Systems, Ergodic Theory and Dynamical Systems, Inventiones Mathematicae, Journal of Differential Equations, Journal of Dynamics and Differential Equations, Journal of Nonlinear Science, Memoirs of the A.M.S., Nonlinearity, Physica D, Siam Journal of Applied Dynamical Systems.
- **Preprints: 5**
- **Citations: 2539 (Google Scholar), 1237 (Scopus)**
- **h index: 27 (Google Scholar), 20 (Scopus)**
- **Invited International seminars: 47**
- **Plenary talks in International Conferences: 45**
- **Invited Advanced International Courses: 15**
- **Supervised Thesis: 10**
- **Current PhD. students: 2**
- **postdocs: 3**
- **Grants as PI: 18**
- **10 scientific committees and 37 organizing committees in International Conferences and advances courses.**

Awards and Prizes

- **Barcelona Dynamical Systems Prize 2015, for the paper:**
 Oscillatory motions for the restricted planar circular three body problem.
 M. Guàrdia, P. Martín, T. M. Seara.
 Inventiones Mathematicae. 203, 417-492, 2016. DOI: 10.1007/s00222-015-0591-y, 2015.
- **Eisenbud Professorship (Simons Foundation), fall 2018 at MSRI (U. Berkeley).**
- **Icrea academia award (Generalitat de Catalunya) 2019-2024**

Editorial boards

- **Siam Journal of Applied Dynamical Systems (SIADS): 2010-2021.**

- [Journal of Dynamics and Differential equations \(JDDE\)](#).
- [Nonlinearity](#).
- [Nonlinear Differential Equations and Applications \(NoDEA\)](#).

PhD. Students

- Carme Olivé Farré (Associated Professor at URV, Spain).
Càlcul de l'escissió de separatrius usant tècniques de matching complex i ressurgència aplicades a l'equació de Hamilton-Jacobi.
July 10, 2006. UPC
- Marcel Guàrdia Munárriz (ERC Starting grant, Full Professor at UB, Spain).
From non-smooth to analytical Dynamical Systems: low codimension bifurcations and exponentially small splitting of separatrices.
July 19, 2010. UPC.
- Oswaldo Larreal Barreto (Associated Professor at U. Técnica de Manabí).
Calculo de la escisión de separatrices y regiones de estabilidad usando multi-precisión: El microtrón y la singularidad Hopf-Zero.
July 21, 2011. UPC
- Albert Granados Corsellas (Professor d'ensenyament secundari, Spain).
Local and global phenomena in piece-wise defined systems: from big bang bifurcations to splitting of heteroclinic manifolds.
September 17, 2012. UPC
- Abraham de la Rosa Ibarra (GeoNumerics, S.L, Spain).
Global instability in the elliptic restricted three body problem.
June 16, 2014. UPC
- Oriol Castejón Company (cyberclick, Spain).
Study of invariant manifolds in two different problems: the Hopf-zero singularity and neural synchrony.
July 16, 2015. UPC
- Juliana Fernandes Larrosa (Associated Professor at UFMSM, Brazil).
Generic bifurcations in planar Filippov systems.
November 27, 2015. Universidade estatual de Campinas
- Alberto Perez Cervera (Asistant professor at UPC, Spain.)
On the role of oscillatory dynamics in neural communication
April 4, 2019. Universitat Politècnica de Catalunya
- Otávio Marçal Leandro Gomide (Associated Professor at UFederal de Goiás, Brazil)
Sobre Condições de Estabilidade para Sistemas de Filippov e Sistemas Hamiltonianos
July 1, 2019. Univeridade estatual de Campinas
- Jaime Paradela Díaz (Postdoc at Maryland U.).
Unstable motions in the Three Body Problem.
July 3, 2023. UPC

Actual PhD. Students

- Roman Moreno Gonzalez
Arnold diffusion through resonances
- José Lamas Rodriguez
Collisions in the three body problem

Post-docs

- Marina Gonchenko. **Juan de la Cierva Incorporación**, 2018-2019.
- Jianlu Zhang. **postdoc at MSRI**, fall 2018
- Gerard farré. **Juan de la Cierva Incorporación**, 2022-2024.

Actual grants

- Dinámica, Atractores y Nolinealidad: Caos y Estabilidad. Red excelencia n° RED2022-134273-T. PI: Joan Torregrosa, Patricia Yanguas. Number of researchers: 15. Amount: 24.000 Euros
- **Invariant Manifolds, Hamiltonian Systems and Dynamics in Neuroscience, Epidemiology and Atmosphere IMHNEA), PID2021-122954NB-I00**
PI: T. M-Seara, I. Baldomá Number of researchers: 9, Amount: 338.800,00 Euros

Scientific and Organizing committees

12 scientific committees and 42 organizing committees in International conferences. 3 organizing committees of research semesters.

Since 2013:

- Member of the Scientific Committee of the IMJ-PRG Summer School: Stability and rigidity in dynamical systems, beyond classical KAM theory, Paris, 10-21 June, 2024.
- **Co-Organizer of the summer course: Jornades d'Introducció als Sistemes Dinàmics i les EDP (JISD) since 2002, with 20 editions.**
<https://www.crm.cat/jisd-2023/>
- Scientific committee of the School on conformal symplectic dynamics and related fields, CIRM, Marsella, 8-12 May, 2023
- Co-Organizer of the Internacional seminar: One World Dynamics Seminar, On-line 2020-2022: *<https://sites.google.com/view/oneworlddynamics/home>*
- Co-organizer of the Cimpa School 2022: The N-Body Problem, Old and New, San Cristobal de las Casas, Chiapas, Mexico, 8-18 June 2022.
- Scientific Committee of the: CEDYA/CMA 2022, Zaragoza, Spain, 18-22 June 2022.
- Scientific Committee of the: Colloque International de Dynamique Hamiltonienne, Paris, France, 7-10 June 2021.
- Co-organizer of the international workshop: Connections for Women: Hamiltonian Systems, from topology to applications through analysis. MSRI; Berkeley, USA, 16-17 August 2018
- Co-organizer of the Scientific program: Hamiltonian Systems, from Topology to Applications through Analysis. MSRI; Berkeley, USA, 13th August- 14 December 2018
- Co-organizer of the CIMPA school: Dynamical Systems and Applications: geometrical, topological and numerical aspects. Dangbo, Benin, 1-14 July 2018
- Member of the scientific Committee of the international workshop: Advances in Nonsmooth Dynamics 2018. Bristol, UK, 13-15 June 2018.
- Co-organizer of the conference: A broad perspective on finite and infinite dimensional Dynamical Systems (FIDDS-17), Barcelona, 2017.
- Co-organizer of the conference: Global Dynamics in Hamiltonian Systems (GDHAM), Nuria, Girona, 2015.

- Co-organizer of the Special session: Celestial mechanics, The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid, 2014.
- Co-organizer of the conference: SIAM meeting for the Applications of Dynamical Systems, Snowbird, Utah, 2013.
- Member of the Scientific Committee of the conference: XXIII CEDYA/XIII CMA, Castellon, 2013.
- Co-organizer of the Sesión de dinámica no lineal, Nolineal 2012, Zaragoza, 2012.
- Co-organizer of the Special session: Global Dynamics in Hamiltonian Systems, the 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, USA, July 2012.
- Member of the Scientific Committee of the conference: Dynamical Systems: 100 years after Poincaré, Gijón, 2012.
- Member of the Scientific Committee of the workshop: DDDAYS, Benicàssim, 2012.

Main publications in the last 10 years

- D. Reyner-Parra, C. Bonet, T. M-Seara, G. Huguet
Traveling waves in a model for cortical spreading depolarization with slow-fast dynamics.
Chaos. An Interdisciplinary Journal of Nonlinear Science 33 (8), 2023
DOI: <https://doi.org/10.1063/5.0160509>
- S. W. Akingbade, M. Gidea, T. M-Seara
Arnold diffusion in a model of dissipative system.
Siam Journal on Applied Dynamical Systems 22 (3):1983–2023, 2023.
DOI: <https://doi.org/10.1137/22M1525508>
- I. Baldomà, M. Capiński, M. Guardia, T. M-Seara.
Breakdown of Heteroclinic Connections in the Analytic Hopf-Zero Singularity: Rigorous Computation of the Stokes Constant.
Journal of Nonlinear Science 33 (28), 2023.
DOI: <https://doi.org/10.1007/s00332-022-09882-x>
- T. M-Seara, M. Ollé, O. Rodriguez, J. Soler.
Generalised analytical results on n-ejection-collision orbits in the RTBP. Analysis of bifurcations.
Journal of Nonlinear Science 33 (17), 2023.
DOI: <https://doi.org/10.1007/s00332-022-09873-y>
- C. Bonet-Revés, T.M-Seara.
Two regularizations of the grazing-sliding bifurcation giving non equivalent dynamics.
Journal of Differential Equations 332: 219-277, 2022.
DOI: <https://doi.org/10.1016/j.jde.2022.05.028>
- M. Capiński, M. Guardia, P. Martín, T. M-Seara, P. Zgliczyński.
Oscillatory motions and parabolic manifolds at infinity in the planar circular restricted three body problem.
Journal of Differential Equations 320: 316- 370, 2022.
DOI: <https://doi.org/10.1016/j.jde.2022.02.056>
- M. Guardia, J. Paradela, T. M-Seara, C. Vidal.
Symbolic dynamics in the restricted elliptic isosceles three body problem.
Journal of Differential Equations 294 (5): 143-177, 2021.
DOI: <https://doi.org/10.1016/j.jde.2021.05.017>
- T. M-Seara, J. Zhang
Oscillatory orbits in the restricted planar four body problem. **Nonlinearity**

33(12): 6985–7015, 2020.

doi:<https://doi.org/10.1088/1361-6544/abaf5f>

- A. Pérez-Cervera, T. M-Seara, G. Huguet
Global phase-amplitude description of oscillatory dynamics via the parameterization method
Chaos: An Interdisciplinary Journal of Nonlinear Science 2020.
doi:<https://doi.org/10.1063/5.0010149>
- Marian Gidea, Rafael de la Llave, Tere M-Seara
A general mechanism of instability in Hamiltonian systems: Skipping along a normally hyperbolic invariant manifold
Discrete and continuous dynamical systems (DCDS) 2020.
doi: <https://doi.org/10.3934/dcds.2020166>
- Otavio M. L. Gomide, Marcel Guardia, Tere M-Seara
Critical velocity in kink-defect interaction models: rigorous results
Journal of Differential Equations (JDE) 269(4): 3282–3346, 2020.
doi:<https://doi.org/10.1016/j.jde.2020.02.030>
- Marian Gidea, Rafael de la Llave, Tere M-Seara
A General Mechanism of Diffusion in Hamiltonian Systems: Qualitative Results
Communications in Pure and Applied Mathematics (CPAM) 73 (1): 150–209, 2019.
doi:<https://doi.org/10.1002/cpa.21856>
- I. Baldomá, S. Ibañez, Tere M-Seara
Hopf-Zero singularities truly unfold chaos
Communications in Nonlinear Science and Numerical Simulation (CN-SNS) 2020.
doi:<https://doi.org/10.1016/j.cnsns.2019.105162>
- A. Pérez-Cervera, T. M-Seara, G. Huguet
A Geometric Approach to Phase Response Curves and Its Numerical Computation Through the Parameterization Method
Journal of Nonlinear Science29(6): 2877–2910, 2019.
doi:<https://doi.org/10.1007/s00332-019-09561-4>
- A. Delshams, V. Kaloshin, A. de la Rosa, T. M. Seara
Global Instability in the Restricted Planar Elliptic Three Body Problem.
Communication in Mathematical Physics (CMP)366(3):1173-1228, 2019.
DOI:<https://doi.org/10.1007/s00220-018-3248-z>
- I. Baldomá, O. Castejón, T. M. Seara
Breakdown of a 2D Heteroclinic Connection in the Hopf-Zero Singularity (I)
Journal of Nonlinear Science (JNLS) 28(5): 1551-1627, 2018.
DOI:<https://doi.org/10.1007/s00332-018-9458-x>
- I. Baldomá, O. Castejón, T. M. Seara.
Breakdown of a 2D Heteroclinic Connection in the Hopf-Zero Singularity (II)
Journal of Nonlinear Science (JNLS) 28(4): 1489–1549, 2018
DOI:<https://doi.org/10.1007/s00332-018-9459-9>
- C. Bonet, J. Larrosa, T. M. Seara.
A Regularization around a generic codimension one fold-fold singularity
Journal of Differential Equations (JDE) 265: 1761-1838, 2018.
DOI: <https://doi.org/10.1016/j.jde.2018.04.047>
- C. Bonet, E. Fossas, M. R. Jeffrey, T. M. Seara.
A unified approach to explain contrary effects of hysteresis and smoothing in non-smooth systems.
Communications in Nonlinear Science and Numerical Simulations (CN-SNS) 50: 142–168, 2017. DOI:<http://doi.org/10.1016/j.cnsns.2017.02.014>

- M. Guardia, P. Martin, T.M. Seara, L. Sabbagh.
Oscillatory orbits in the restricted elliptic planar three body problem.
Discrete and continuous dynamical systems (DCDS) 37 (1): 229–256,
2017. DOI: 10.3934/dcds.2017009.
- M. Aguarales, I. Baldomá, T.M. Seara.
On the asymptotic wavenumber of spiral waves in $\lambda - \omega$ systems.
Nonlinearity 30: 90–114, 2017. DOI:10.1088/1361-6544/30/1/90.
- M. Guardia, P. Martin, T.M. Seara.
Oscillatory motions for the restricted planar circular three body problem.
Inventiones Mathematicae 203 (2): 417–492, 2016. DOI: 10.1007/s00222-015-0591-y.
Paper awarded with the Barcelona Dynamical Systems price 2015
- A. Delshams, R. de la Llave, T.M. Seara.
Instability of high dimensional Hamiltonian Systems: Multiple resonances do not impede diffusion.
Advances of Mathematics 294: 689–755, 2016. DOI:10.1016/j.aim.2015.11.010.
- C. Bonet-Revés, T. M-Seara.
Regularization of sliding global bifurcations derived from the local fold singularity of Filippov systems.
Discrete and continuous dynamical systems (DCDS) 36(7): 3545–3601,
2016. DOI:10.3934/dcds.2016.36.3545.
- A. Granados, S.J. Hogan, T.M. Seara.
The scattering map in two coupled piecewise-smooth systems, with numerical application to rocking blocks.
Phys. D: Nonlinear Phenomena 269: 1–20, 2014. DOI: 10.1016/j.physd.2013.11.008
- I. Baldomá, O. Castejón, T. M. Seara.
Exponentially Small Heteroclinic Breakdown in the Generic Hopf-Zero Singularity.
Journal of Dynamics and Differential equations 25(2): 335–392, 2013.
- M. Guàrdia, T. M. Seara.
Exponentially and non-exponentially small splitting of separatrices for the pendulum with a fast meromorphic perturbation.
Nonlinearity 25: 1367–1412, 2012. DOI:10.1088/0951-7715/25/5/1367
- A. Granados, S.J. Hogan, T.M. Seara.
The Melnikov method and subharmonic orbits in a piecewise smooth system.
SIAM J. App. Dyn. Sys. 11(3): 801–830,2012. DOI:10.1137/110850359
- I. Baldomá, E. Fontich, M. Guàrdia, T. M. Seara.
Exponentially small splitting of separatrices beyond Melnikov analysis: rigorous results.
Journal of Differential Equations (JDE) 253: 3304–3439, 2012. DOI:10.1016/j.jde.2012.09.003

Preprints

- O. L. Gomide, M. Guardia, T. M- Seara, Ch. Zeng
On small breathers of nonlinear Klein-Gordon equations via exponentially small homoclinic splitting.
Preprint:
<https://arxiv.org/abs/2107.14566>
- S. W. Akingbade, M.Gidea, T. M-Seara
Arnold diffusion in a model of dissipative system.
Preprint:
<https://arxiv.org/abs/2206.14878>
To appear in **Siam Journal on Applied Dynamical Systems**

- M. Guardia, P. Martín, J. Parabela, T. M-Seara
Hyperbolic dynamics and oscillatory motions in the 3 Body Problem.
Preprint:
<https://arxiv.org/abs/2207.14351>
- M. Aguarteles, I. Baldomá, T. M-Seara
A rigorous derivation of the asymptotic wavenumber of spiral wave solutions of the complex Ginzburg-Landau equation.
Preprint:
<https://arxiv.org/abs/2306.02191>
- M. Guardia, J. Parabela, T. M-Seara
A degenerate Arnold diffusion mechanism in the Restricted 3 Body Problem.
Preprint:
<https://arxiv.org/abs/2302.06973>
- I. Baldomá, R. Moreno, T. M-Seara
Splitting of separatrices for rapid degenerate perturbations of the classical pendulum.
Preprint:
<https://arxiv.org/abs/2302.07705>