Inmaculada Baldomá **Barraca**

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Personal Data and current position

Inmaculada Baldomá Barraca *Barcelona*

Associate Professor of Universitat Politècnica de Catalunya (UPC) *Date of birth: February 12th, 1971*

2008-PRESENT

PhDegree in Dynamical Systems *Advisor: Ernest Fontich*

Universtitat de Barcelona *July, 2001*

Research Statement

Research field *Dynamical systems*

Research lines

- Study of invariant manifolds associated to non normally hyperbolic objects: existence, regularity and persistence on perturbations. This is a joint project with E. Fontich (UB) and P. Martín (UPC).
- Singular perturbation theory and beyond all orders phenomenon. The purpose is twofold: to provide rigorous proofs and to find new scenarios where this phenomenon occurs. This project involves M. Aguareles (UdG), M. Guàrdia, T.M. Seara and Heinz Hanβmann from Universiteit Utrecht.
- Arnold's diffusion by means of resonances in the classical Arnold's example. This project involves Jean Pierre Marco of Sorbonne Université, R. Moreno (PhD student) and T.M. Seara.
- Applications of the previous explained theoretical frameworks to physical problems: spiral waves, celestial mechanics with special interest in some instances of the n-body problem, etc.

Academic trajectory

Invited talks and courses

In the last 5 years:

- Invited talk in Barcelona Mathematical Days, online talk, October, 2020
- Plenary conference in Join meeting of the Csech, Solvenian, Austrian, Slovak and Catalan mathematical societies, CSASC2010, Bratislava, Slovaquia, 2018.
- Invited talk in Connections for women: Hamiltonian systems, from topology to applications through analysis, Berkeley, California, 2018.
- Invited talk in MURPHYS-HSFS: Interdisciplinary workshop on multiple scale systems, systems with hysteresis and trends in dynamical systems, Bellaterra, Barcelona, 2018.

Postposed by Covid-19

- Invited talk in AIMS Conference, Atlanta 2020, postposed.
- Advanced Course: School on Applied Dynamical Systems to Synthetic and Systems Biology, CRM 2020, postposed.

Organizing comittes

I have participated in the organizing committees of :

- International Congress "A broad perspective of finite and infinite dimensional dynamical systems (FIDDS17-Llavefest). Barcelona, from 12/06/2017 to 16/06/2017.
- *Jornades SCM Matemàtiques i Covid-19*, from 13/07/2020 to 14/07/2020.

Selected Publications

5 selected publications *2017-2020*

FOUR OF THEM IN Q1, TWO OF THE PUBLICATIONS HAVE COMPANION PAPER, ALSO LISTED *Published pages: 1830*

- I. B.; Fontich E.; Martín P., *Whiskered parabolic tori in the planar $(n+1)$-body problem*, Comm. Math. Phys. 374 (2020), 1, 63-110
- I. B.; Fontich, E.; Martín, P., *Invariant manifolds of parabolic fixed points (I). Existence and dependence on parameters*, J. Differential Equations 268 (2020), no. 9, 5516–5573.
  The companion paper *Invariant manifolds of parabolic fixed points (II). Approximations by sums of homogeneous functions*, J. Differential Equations 268 (2020), no. 9, 5574–5627.
- I. B.; Ibáñez, S.; Seara, T. M., *Hopf-zero singularities truly unfold chaos*, Commun. Nonlinear Sci. Numer. Simul. 84 (2020), 105162, 19 pp
- I. B.; Castejón, O.; Seara, T. M., *Breakdown of a 2D heteroclinic connection in the Hopf-zero singularity (I)*, J. Nonlinear Sci. 28 (2018), no. 5, 1551–1627.
  The companion paper *Breakdown of a 2D heteroclinic connection in the Hopf-zero singularity (II): the generic case*, J. Nonlinear Sci. 28 (2018), no. 4, 1489–1549.
- Aguareles, M.; I. B.; Seara, T.M., *On the asymptotic wavenumber of spiral waves in λ–ω systems*, Nonlinearity 30 (2017), no. 1, 90–114.

Main funded research projects

Investigator of the funded projects *Five last years*

T.M. Seara, main investigator

- MTM2016-81902-REDT funded by the MINECO-FEDER, 2018-2021. Main investigator Gemma Huguet, 135 000 euros.
- MTM2016-81902-REDT (a 18 Spanish Universities network) funded by the MECC , 2017-2018, 11 000 euros
- 2017SGR-1049 funded by the AGAUR, 2017-2019, 44 480 euros.
- MTM2015-65715-P funded by the MINECO-FEDER, 2016-2018, 167 200 euros.
- 2014SGR-504 funded by the AGAUR,: 2014-2016, 63 000 euros.

Activities of knowledge and technology transfer

Supervision of master and Ph.D. students

PhD Students

2015	**Oriol Castejón**, Study of invariant manifolds in two different problems: the Hopf-zero singularity and neural synchrony	*Coadvisor*
2022	**Mar Giralt**, Homoclinic and chaotic phenomena around L_3 in the restricted 3-body problem	*Coadvisor*
2024	**Román Moreno**, The role of the resonances in the Arnold's diffusion	*Coadvisor*

Master Students

2017	**Jordi Font**, Computation of the invariant manifolds of infinity in the restricted circular planar three body problem with the parametrization method	*Coadvisor*
2020	**Pol Delofoeu**, A Study on the Generation of Chaos due to the Presence of Smale Horseshoes in Dynamical Systems with a Homoclinic Orbit	*Coadvisor*
2021	**Dídac Gil**, To begin on January, 2021	*Coadvisor*

Other Merits

Responsabilities in the mathematical community

POSITIONS I HOLD:

- Academic Secretary of the Executive Committee of the Catalan Mathematical Society (in catalan, *Junta directiva de la Societat Catalana de Matemàtiques (SCM)*.
- A member of the Directive Board of the Department of Mathematics of the UPC: Vicechair of Research (in catalan, *Sotsdirectora de Recerca del Departament de Matemàtiques de la UPC*).

Anonymous Referee

I HAVE BEEN ANONYMOUS REFEREE OF THE FOLLOWING JOURNALS:

- Memoirs of the AMS, Nonlinearity, Journal of Differential Equations, Discrete and Continuous Dynamical Systems-A, SIADS, Journal of Difference Equations and Applications, Bulletin of the Belgian Mathematical Society Simon Stevin, Journal of Differential Equations, Electronic Journal of Qualitative Theory of Differential Equations.