

Curriculum Vitae

Xavier Jarque i Ribera



Personal

Place of birth: Barcelona, Catalonia
Date of birth: November 22, 1966
Marital Status: Married, four children
Citizenship: Catalan
Languages: Catalan (Native), Spanish (Native), English (Satisfactory)

Professional Address

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Research Group web page(s): <http://www.gsd.uab.cat>, <http://www.maia.ub.es/holodyn/>

Education

- Postdoc
Department of Mathematics and Statistics, Boston University, Boston, 1995-1997.
- Ph. D. Mathematics (Dynamical Systems)
Universitat Autònoma de Barcelona, Bellaterra (Barcelona), 1991-95.
- Graduate Studies (BA) in Mathematics
Universitat Autònoma de Barcelona, Bellaterra (Barcelona), 1985-1990.
- Obligatory education and High School
Col·legi La Farga, Sant Cugat Vallès (Barcelona), 1973-1985.

Academic Positions held (permanent and temporary)

- Professor (permanent)
Departament de Matemàtiques i Informàtica, Universitat de Barcelona, 2020–
- Associate Professor (permanent)
Departament de Matemàtiques i Informàtica, Universitat de Barcelona, 2003-08 and 2011-2020.
- Associate Professor (permanent)
Departament de Enginyeria Informàtica i Matemàtiques (DEIM), Universitat Rovira i Virgili (Tarragona), 2008–2011.
- Associate Professor (temporary)
Departament d'Economia i d'Història Econòmica, Universitat Autònoma de Barcelona, 1997–2003.
- Assistance Professor (Lecturer in Mathematics, temporary)
Universitat Oberta de Catalunya (Catalan Open University), 2000–2010.
- Assistance Professor (Lecturer in Mathematics, temporary)
Universitat Ramon Llull (Institut Químic de Sarrià), 1993–1995.

Institutional and Professional Service

- Director of the Department of Mathematics and Informatics (Universitat de Barcelona), 2025–
- Director of the Fundació Ferran Sunyer i Balaguer (Insititut d'Estudis Catalans), 2020–.
- Director of the Institute of Mathematics at Universitat de Barcelona (IMUB), 2022–2025.
- Coordinator of the Master in Advance Mathematics, Facultat de Matemàtiques i Informàtica, Universitat de Barcelona, 2018–2022.
- President of the Catalan Mathematical Society (SCM), November 2014 – February 2019.
- Vice-director (the official name is *Secretary*) of the Facultat d'Economia i Empresa, (Campus Sabadell), 1999–2002.

Teaching experience

- Master degree
 - Dynamical systems (Advanced Mathematics, Universitat de Barcelona)
 - Optimization (Foundations of Data Science, Universitat de Barcelona)
 - Quantitative Methods (Applied Economics, Universitat Autònoma de Barcelona)
 - Final Master projectes
- Bachelor degree
 - Numerical analysis
 - Introduction to mathematics (Vectorial Calculus and Linear Algebra)
 - Differential equations
 - Introduction to dynamical systems
 - Final Degree (Bachelor) projectes
 - Microeconomics intermedia
 - Introduction to industrial organization

Publications and preprints

- *Boundedness and simple connectivity of the basins of attraction for some numerical methods* (with J. Canela and A. Garijo), ArXiv:2507.22704.
- *On the basin of attraction of a critical three-cycle of a model for the secant map* (with E. Fontich and A. Garijo), Discrete and Continuous Dynamical Systems, 45(4), 1045-1078, 2025.
- *Local connectivity of boundaries of tame Fatou components of meromorphic functions* (with K. Baranski, N. Fagella and B. Karpinska), Mathematische Annalen 391(2), 1779-1843, 2025.
- *Chaotic dynamics at the boundary of a basin of attraction via non-transversal intersections for a non-global smooth diffeomorphism* (with E. Fontich and A. Garijo), J. Nonlinear Sci. 34, 102, 2024.
- *On the basins of attraction of a one-dimensional family of root finding algorithms: from Newton to Traub* (with J. Canela, V. Evdoridou and A. Garijo), Math. Z., 303(55), 1-22 (2023).
- *Dynamics of the secant map near infinity* (with A. Garijo), J. Difference Equ. Appl., 28(10), 1334-1347 (2023).

- *Achievable connectivities of Fatou components for a family of singular perturbations* (with J. Canela and D. A. Paraschiv), *Discrete Contin. Dyn. Syst.*, **42**(9), 4237-4261 (2022).
- *Topological properties of the immediate basins of attraction for the secant method* (with A. Garijo and L. Gardini), *Mediterranean J. Math.* **18**(5), pp. 1-27 (2021)
- *Fatou components and singularities of meromorphic functions* (with K. Baranski, N. Fagella and B. Karpinska), *Proc. Roy. Soc. Edinburgh Sect. A*, **150** (2020), pp. 633-654.
- *The secant map applied to a real polynomial with multiple roots* (with A. Garijo), *Discrete Contin. Dyn. Syst.*, **40**(12) (2020), 6783 - 6794.
- *Singularities of inner functions associated with hyperbolic maps* (with V. Evdoridou, N. Fagella and D. J. Sixsmith), *J. Math. Anal. Appl.*, **477** (2019), pp. 536 - 550.
- *Global dynamics of the real secant method* (with A. Garijo) *Nonlinearity*, **32**(11) (2019), pp. 4557 - 4578.
- *Univalent wandering domains in the Eremenko-Lyubich class* (with N. Fagella and K. Lazebnik), *J. Anal. Math.* **139** (2019), pp. 369 - 395.
- *Escaping points in the boundaries of baker domains* (with K. Baranski, N. Fagella and B. Karpinska), *J. Anal. Math.* **137**(2) (2019), pp. 679 - 706.
- *Connectivity of Julia sets of Newton maps: a unified approach* (with K. Baranski, N. Fagella and B. Karpinska), *Revista Matematica Iberoamericana*, **34**(3) (2018), pp. 1211 - 1228.
- *Accesses to infinity from Fatou components* (with K. Baranski, N. Fagella and B. Karpinska), *Trans. Amer. Math. Soc.* **369**(3) (2017), pp. 1835 - 1867
- *An effective algorithm to compute Mandelbrot sets in parameter planes* (with T. Garijo and J. Villadelprat), *J. Numerical Algorithms.* **76** (2017), pp. 555 - 571.
- *Newton's method for symmetric quartic polynomials* (with B. Campos, A. Garijo and P. Vindel), *Appl. Math. Comput.*, **290** (2016), 326-335.
- *Wandering domains for composition of entire functions* (with N. Fagella and S. Godillon), *J. Math. Anal. Appl.*, **429** (2015), 478-496.
- *Absorbing sets and baker domains for holomorphic maps* (with K. Barański, N. Fagella and B. Karpińska), to appear in *J. London Math. Soc. (2)*. **92**(1) (2014),144-162.
- *On the connectivity of the Julia sets of meromorphic functions* (with K. Barański, N. Fagella and B. Karpińska), *Inventiones Mathematicae*, **198**(3) (2014), 591-636.
- *Sierpinski curve Julia sets for quadratic rational maps* (with R. L. Devaney, N. Fagella and A. Garijo), *Ann. Acad. Sci. Fenn. Ser. A I Math.*, **39** (2014), 3-22.
- *Brushing the hairs of transcendental entire functions* (with K. Barański and L. Rempe), *Topology and its Applications*, **159**(8) (2012), 2102–2014.

- *On Newton's method applied to real polynomials* (with F. Çilingir), *Journal of Difference Equations and Applications*, **18(6)** (2012), 1067–1076.
- *A survey on the blow-up technique* (with M. Jesús Álvarez and A. Ferragut), *International Journal of Bifurcation and Chaos*, **21(11)** (2012), 3103–3018.
- *On the connectivity of the escaping set for complex exponential Misiurewicz parameters*, *Proceedings of the American Mathematical Society*, **139(6)** (2011), 2057–2065.
- *Non-landing hairs in Sierpinski curve Julia sets of transcendental entire maps* (with A. Garijo and M. Moreno–Rocha), *Fundamenta Mathematicae*, **214(2)** (2011), 135–160.
- *On connectivity of Julia sets of transcendental meromorphic maps and weakly repelling fixed points II* (with N. Fagella and J. Taixés), *Fundamenta Mathematicae*, **215(2)** (2011), 177–202.
- *A note on the period function for certain planar vector fields* (with A. Garijo and A. Gasull), *Journal of Difference Equations and Applications*, **16(5–6)** (2010), 135–160.
- *Joining polynomial and exponential combinatorics for some entire maps* (with A. Garijo and M. Moreno–Rocha), *Publicacions Matemàtiques*, **54(1)** (2010), 116–136.
- *Simultaneous bifurcation of limit cycles from two nests of periodic orbits*, (with A. Garijo and A. Gasull), *Journal of Mathematical Analysis and Applications*, **341(2)** (2008), 813–824
- *On connectivity of Julia sets of transcendental meromorphic maps and weakly repelling fixed points I* (with N. Fagella and J. Taixés), *Proc. London Math. Soc.*, **97** (2008), 599–622.
- *Quadratic planar foliations*, *Rocky Mountain Journal of Mathematics* (with J. Llibre and D. S. Shafer), **38(2)** (2008), 489–530.
- *Global injectivity of C^1 maps of the real plane, inseparable leaves and the palais–smale condition* (with C. Gutierrez, J. Llibre and M. Teixeira), *Canadian Math. Bull.* **50** (2008), 377–389.
- *Auctions with asymmetric common-values: The first-price format* (with M. A. de Frutos), *Journal of Mathematical Economics*, **43** (2007), 795–817.
- *Chaotic dynamics in credit constrained emerging economies* (with J. Caballé and E. Michetti), *Journal of Economic Dynamics and Control*, **30(8)** (2006), 1261–1275.
- *Structural stability of planar polynomial foliations* (with J. Llibre and D. S. Shafer), *Journal of Dynamics and Differential Equations*, **30(8)** (2006), 1261–1275.
- *Indecomposable continua and Misiurewicz points in exponential dynamics* (with R. L. Devaney and M. Moreno-Rocha), *J. Bifur. Chaos Appl. Sci. Engrg.*, **15** (2005), 3281–3294.
- *Normal forms for singularities of one dimensional holomorphic vector fields* (with A. Garijo and A. Gasull), *Electronic Journal of Differential Equations*, **2004** (2004), 1–7.

- *Mediation: Incomplete information bargaining with filtered communication* (with C. Ponsatí and J. Sákovics), *Journal of Mathematical Economics*, **39** (2003), 803–830.
- *Indecomposable Continua in complex exponentials* (with R.L. Devaney), *Conformal Geometry and Dynamics*, **6** (2002), 1–12.
- *Hyperbolic components of the complex exponential family* (with N. Fagella and R.L. Devaney), *Fundamenta Mathematicae*, **174** (2002), 193–215.
- *Spatial competition with concave transport cost* (with M. A. de Frutos and H. Hamoudi), *Regional Science and Economics*, **32** (2002), 531–540.
- *Non Existence of Isochronous Centers in Planar Polynomial Hamiltonian Systems of Degree Four* (with J. Villadelprat), *Journal Differential Equations*, **180** (2002), 334–273.
- *On the Period Function of Centers in Planar Polynomial Systems of Degree Four* (with J. Villadelprat), *Qualitative Theory of Dynamical Systems*, **3** (2002), 157–180.
- *Polynomial foliations of R^2* (with J. Llibre), *Pacific Journal of Mathematics*, **197** (2001), 53–72.
- *Hamiltonian stability on the plane* (with Z. Nitecki), *Ergodic Theory and Dynamical Systems*, **20** (2000), 775–799.
- *Equilibrium existence in the circle model with linear quadratic transportation cost* (with M. A. de Frutos and H. Hamoudi), *Regional Science and Urban Economics*, **29** (1999), 605–615.
- *Misiurewicz points on complex exponential* (with R. L. Devaney), *International Journal of Bifurcation and Chaos*, **7** (1997), 1599–1615.
- *Periods for transversal maps via Lefschetz numbers for periodic points* (with A. Guillamon, J. Llibre, J. Ortega and J. Torregrosa), *Trans. AMS* **347** (1995), 4779–4805.
- *Structural stability of planar hamiltonian polynomial vector fields* (with J. Llibre), *Proc. London Math. Soc.* **68** (1994), 617–640.

Selected Research Projects

- *Dinámica de métodos iterativos de búsqueda de ceros*
CIGE/2023/102 (IP: Jordi Canela), Period 01/01/2024 to 31/12/2025.
- *Wandering domains, rigidity, and root finding in holomorphic dynamics*
PID PID2023-147252NB-I00 (IP: Núria Fagella), Period: 2025–27.
- *Maria de Maeztu (CRM)*
Ministerio (IP: Marcel Guardia), Period: 2022–25.
- *Estabilidad y caos en iteración holomorfa*
PID (IP: Núria Fagella), Period: 2021–24.

- *Sistemas dinámicos holomorfos*
MTM (IP: Núria Fagella), Period: 2018–20.
- *Grup de sistmes dinàmics de la UB*
SGR (IP: Àngel Jorba), Period: 2017–20.
- *Maria de Maeztu (BGSM/CRM)*
Ministerio (IP: Marcos Noy), Period: 2015–19.
- *Sistemes dinàmics reals i complexes amb aplicacions*
SGR (IP: Xavier Jarque), Period: 2014–17.
- *Topological properties of invariant sets in transcendental dynamics (HARMONIA)*
National Science Center Kraków (IP: Krzysztof Barański), Period: 2013–16.
- Contribución al estudio de las órbitas periódicas en los sistemas dinámicos
MTM (IP: Jaume Llibre), Period: 1991–93 (my first project).

Research Visitings Abroad (since 2000)

- Faculty of Mathematics, University of Ljubljana, Slovenia, December 2024 (8 days)
- MSRI-Berkeley (Simons Laufer Mathematical Sciences Institute), May 2022 (10 days)
- Banach Institute, IMPAN (Warsaw, Poland), January 2019 (1 week)
- Departament of Mathematics, CalTech, March 2018 (two weeks)
- CIRM (Centro Internazionale per la Ricerca Matematica), Trento (Italy), November 2016 (1 week)
- January 2016 (2 weeks)
- Banach Institute, IMPAN (Warsaw, Poland), January 2015 (2 weeks)
- Departament of Mathematics, Warsaw University, January 2014 (2 weeks)
- Departament of Mathematics and Statistics, Boston University, May–August 2009 (4 months)
- CIMAT, Guanajuato, Mexico, September 2008 (2 weeks)
- Department of Mathematics, Rochester University, July 2007 (1 month)
- Departamento de Matematica, Universidade de Campinas, Brazil, September 2004 (6 weeks)
- Mathematics Department, Beijing University, China, November 2003 (2 weeks)
- Department of Mathematics and Statistics, Boston University, April 2001 (2 weeks)

Ph. D. Students

- Beno Učakar, *Holomorphic dynamics in one and several complex variables (tentative)*. First year (co-advised with Luka Boc Thaler).
- Dan A. Paraschiv, 2023 *About the connectivity of Fatou components for some families of rational maps* (co-advised with Jordi Canela).
- Jordi Taixés, 2011, *On the connectivity of the Julia set for transcendental meromorphic functions* (co-advised with Núria Fagella).
- Antonio Garijo, 2006, *Iteration of certain families of transcendental maps and phase portraits of complex differential equations* (co-advised with Núria Fagella).

Talks in Conferences and Congresses

- *A toy model for the (real) secant map*, CSASC2026, Pilsen, Czech Republic, 2-6 February, 2025.
- *A brief introduction to the secant map as a dynamical system*, On the dynamics of root-finding algorithms (and related topics, Castelló de la Plana, Spain, June 30 to July 2, 2025.
- *On the topological properties of the basins of attraction of some root finding algorithms*, On geometric complexity of Julia sets VI, Bedlewo, Poland, July 2-7, 2025.
- *Chaotic dynamics at the boundary of a basin of attraction via non-transversal intersections for a non-global smooth diffeomorphism*, On geometric complexity of Julia sets V, Poland, July 22-26, 2024.
- *Connectivity of the basin of attraction of fixed points for some root finding algorithms*, Catalan, Spanish and Poland Joint Mathematical Societies Meeting, Lodz, Poland, September 4-8, 2023.
- *Dynamics of the secant map near a critical 3-cycle*, Complex dynamics and connections to other fields, Cheçiny, Poland, March 27-31, 2023.
- *On the boundary of the basins of attraction for the secant method*, ICDEA2021 (Online), Sarajevo, Bosnia-Herzegovina, July 2021.
- *On the boundary of the basins of attraction for the secant method*, 8ECM (Online), Protoroz, Eslovenia, June 2021.
- *Univalent wandering domains*, DEA2019, Krakow, 16-20 September, 2019.
- *Wandering domains and post-singular values*, ICM2018, Rio de Janeiro, 1-9 August, 2018.
- *Wandering domains and (post)-singular values*, New developments in complex analysis and function theory, Crete, Grece, July 2-6 (2018)

- *Connectivity of the Julia set of Newton maps: A unified approach*, 7ECM, Berlin, 18-22 July, 2016.
- *Wandering domains for composition of entire functions*, Ergodic Theory and Dynamical System, Erwing Schrödinger Institute, Vienna, Austria, October 2015.
- *Absorbing domains and Baker domains for holomorphic maps*, Janina's birthday conference, Warsaw, Poland May 22, 2015.
- *Wandering domains in Eremenko-Lyubich's class and Bishop's example*, Perspective in Modern Complex Analysis (in honor to Professor Alexandre Eremenko's 60th birthday)", Bedlewo, Poland, July 2014.
- *Bishop's quasiconformal folding and wandering domains in Eremenko-Lyubich class*, The role of complex analysis in complex dynamics, ICMS, Edinburgh, Scotland, May 2013.
- *On the existence of absorbing domains and Baker domains*, Ergodic Methods in Dynamics, Banach Center Conferences at Bedlewo, Poland, April 22-28, 2012.
- *On the connectivity of the escaping set for complex exponential Misiurewicz parameters*, New trends in complex dynamics, Clay Institute, Cambridge, USA, May 2011.
- *Non-landing hairs in Sierpiński Julia sets of transcendental entire maps*, Transcendental dynamics, Warsaw, Poland, October 2010.
- *Transcendental entire maps and complex dynamics. The complex exponential family*, Joint Mathematical Conference CSASC, Prague, Czech Republic, January 2010.
- *On the connectivity of the escaping set for complex exponential Misiurewicz parameters*, The escaping set in transcendental dynamics, Oberwolfach, Germany, December 2009.
- *Joining polynomial and exponential combinatorics for some entire maps*, Aspects of transcendental dynamics (CODY-meeting), Bremen, Germany, May 2008.
- *Dynamical hairs as external rays for some entire maps*, PTM-AMS first joint meeting, Warsaw, Poland, 2007.
- *A criteria for at most one critical point of the period function for planar vector fields*, Barcelona conference on planar vector fields, Barcelona, Catalunya, Spain, 2006.
- *On the local and global phase portrait of holomorphic equations*, Geometric and Ergodic Theory in Dynamical Systems, Sao Carlos, Brazil, September 2004.
- *On the local and global phase portrait of holomorphic equations*, Families of Polynomial Vector Fields on the Plane, Institute H. Poincaré, Paris, 2003.
- *Mediation: Incomplete information bargaining with filtered communication*, First Brazilian Workshop of the Game Theory Society, Sao Paulo, Brazil, June 2002.
- *Isochronicity for a family of Hamiltonian polynomial vector fields*, Conference in Honor of Professor Oliva, Lisboa, Portugal, 2000.

Co-organization of Schools, Conferences and Special Sessions

- *Topics in Complex Dynamics*, Summer School, Barcelona, June 2025.
- *Topics in Complex Dynamics*, Summer School, Barcelona, June 2023.
- *Topics in Complex Dynamics*, Spring School, Barcelona, April 2021.
- *Intensevie Research Progrma in Low dimensional dynamical systems and applications*, Centre de Recerca Matemàtica, February-May 2020 (partially cancelled because of the pandemic).
- *Topics in Complex dynamics 2019*, Barcelona, Catalonia, 25-29 March, 2019.
- *Barcelona Mathematical Days (BMD2017)*, Barcelona, Catalonia, 27-28 April, 2017.
- *Joint meeting of the Catalan, Spanish and Swedish mathematical societies*, Umeo, Sweden, 12-15 June 2017.
- *Joint meeting of the Czeck, Slovenian, Austrian, Slovakian and Catalan Mathematical Societies (CSASC2016)*, Barcelona, September 2016.
- *Joint meeting of the Edinburgh Mathematical Society and the Catalan Mathematical Society*, ICMS, Edinburgh, 28-30 May, 2015.
- *Topics in Complex Dynamics*, Spring School, Barcelona, November 2015.
- *New Perspectives in Discrete Dynamical Systems*, Tossa de Mar, Catalonia, Spain, October 2-4, 2014.
- *Topics in Complex Dynamics*, Spring School, Barcelona, June 2013.
- *New Trends in Dynamical Systems*, Salou, Catalunya, October 2012.
- *18th International Conference in Difference Equations and Applications*, Special session on Complex Dynamics, Barcelona, July 2012.
- *Topics in Complex Dynamics*, Spring school, Barcelona, June 2011.
- *8th AIMS Conference on Dynamical Systems, Differential Equations and Applications*, Special session on Complex Dynamical Systems, Dresden, May 2010.
- *Topics in Complex Dynamics*, Fall school, Barcelona, December 2009.
- *Dynamical Systems and Topology (in honor to Professor Robert L. Devaney)*, Tossa de Mar, Catalunya, April 2008.
- *Topics in Complex Dynamics*, Fall School, Barcelona, November 2007.
- *Topics in Complex Dynamics*, Spring School, Barcelona, April 2005.

- *First meeting of the AMS and the RSEM*, Special Session in Dynamical Systems, Sevilla, Spain, June 2003.
- *Complex analysis and holomorphic dynamics*, Ph. D. euroconference, Platja d'Aro, Catalunya, July 2000.

Editorial boards

- Qualitative theory of Differential Equations, Editor in board, 2018–2025.
- Journal of Difference Equations and Applications, Editor in board, 2012–2025.
- Notícies de la Societat Catalana de Matemàtiques (in catalan), Editor in chief, 2013–2015.