

Edson de Faria

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EDUCATION **Ph.D.**
Ph. D. Degree in Mathematics, City University of New York, 1985-92.
M.Sc.
Master Degree in Applied Mathematics, University of São Paulo, 1984-85.
B.A.
B.A. in Physics, University of São Paulo, 1980-83.

ACADEMIC POSITIONS Lecturer (Level 1), Applied Math Department, University of São Paulo, 1984-85.
Lecturer (Level 2), on leave from Applied Math Department, University of São Paulo, 1985-92.
Lecturer, Math Department, Brooklyn College CUNY, 1990.
Assistant Professor, Applied Math Department, University of São Paulo, 1992-1997.
Associate Professor, Brooklyn College CUNY, 2004-2005.
Associate Professor, Applied Math Department, University of São Paulo, 1997-2008.
Full Professor, Math Department, University of São Paulo, 2008-present.

FELLOWSHIPS AND VISITING POSITIONS Visiting Member, Institute for Advanced Study, Princeton, 1992.
FAPESP Fellow, ETH-Zürich, Switzerland, 1995.
FAPESP Fellow, IHES-Bures-sur-Yvette, France, 1996.
FAPESP Fellow, IMS-Stony Brook, USA, 1996.
IMU Grant, International Congress of Mathematicians, Berlin, Germany, 1998.
IMU Grant, ICTP-Trieste, Italy, 1998.
Visiting Professor, Brooklyn College CUNY, 2003-2004.
Visiting Professor, Imperial College London, 2016/2017/2018/2019/2022.

Research

RESEARCH INTERESTS Dynamical Systems
Ergodic Theory
Mathematical Physics

PUBLICATIONS [37] Edson de Faria, Pablo Guarino, and Bruno Nussenzveig. Automorphic measures and invariant distributions for circle dynamics. *Mathematische Zeitschrift*, 306(2), 2024.
[36] Trevor Clark, Edson de Faria, and Sebastian van Strien. Asymptotically holomorphic methods for infinitely renormalizable C^r unimodal maps. *Ergodic Theory Dynam. Systems*, 43(11):3636–3684, 2023.

- [35] Sebastian van Strien and Edson de Faria. Dennis Sullivan is awarded the 2022 Abel Prize. *Nieuw Arch. Wiskd.* (5), 24(1):19–20, 2023.
- [34] Edson de Faria and Pablo Guarino. Quasisymmetric orbit-flexibility of multicritical circle maps. *Ergodic Theory Dynam. Systems*, 42(11):3271–3310, 2022.
- [33] Edson de Faria and Pablo Guarino. Dynamics of circle mappings. 33 o Colóquio Brasileiro de Matemática. Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, 2022.
- [32] Edson de Faria and Pablo Guarino. Dynamics of multicritical circle maps. *São Paulo J. Math. Sci.*, 16(1):340–395, 2022.
- [31] Edson de Faria and Pablo Guarino. There are no σ -finite absolutely continuous invariant measures for multicritical circle maps. *Nonlinearity*, 34(10):6727–6749, 2021.
- [30] Edson de Faria, Peter Hazard, and Charles Tresser. Genericity of infinite entropy for maps with low regularity. *Ann. Sc. Norm. Super. Pisa Cl. Sci.* (5), 22(2):601–664, 2021.
- [29] Gabriel Bonuccelli, Lucas Colucci, and Edson de Faria. On the Erdos-Sloane and shifted Sloane persistence problems. *J. Integer Seq.*, 23(10):Art. 20.10.7, 30, 2020.
- [28] Edson de Faria and Peter Hazard. Generalized Whitney topologies are Baire. *Proc. Amer. Math. Soc.*, 148(12):5441–5455, 2020.
- [27] Edson de Faria, Peter Hazard, and Charles Tresser. On slow growth and entropy-type invariants. In *New trends in one-dimensional dynamics*, volume 285 of *Springer Proc. Math. Stat.*, pages 165–181. Springer, Cham, [2019] (c)2019.
- [26] Edson de Faria and Sebastian van Strien. Welington de Melo (1946–2016). In *New trends in one-dimensional dynamics*, volume 285 of *Springer Proc. Math. Stat.*, pages 7–20. Springer, Cham, [2019] (c) 2019.
- [25] Gabriela Estevez and Edson de Faria. Real bounds and quasisymmetric rigidity of multicritical circle maps. *Trans. Amer. Math. Soc.*, 370(8):5583–5616, 2018.
- [24] Gabriela Estevez, Edson de Faria, and Pablo Guarino. Beau bounds for multicritical circle maps. *Indag. Math. (N.S.)*, 29(3):842–859, 2018.
- [23] Edson de Faria, Peter Hazard, and Charles Tresser. Infinite entropy is generic in Hölder and Sobolev spaces. *C. R. Math. Acad. Sci. Paris*, 355(11):1185–1189, 2017.
- [22] Edson de Faria and Pablo Guarino. Real bounds and Lyapunov exponents. *Discrete Contin. Dyn. Syst.*, 36(4):1957–1982, 2016.
- [21] Alejandro Cabrera, Edson de Faria, Enrique Pujals, and Charles Tresser. Differentiability of correlations in realistic quantum mechanics. *J. Math. Phys.*, 56(9):092104, 10, 2015.
- [20] Edson de Faria and Charles Tresser. On Sloane’s persistence problem. *Exp. Math.*, 23(4):363–382, 2014.
- [19] Edson de Faria and Charles Tresser. Bell inequality violations under reasonable and under weak hypotheses. *Phys. Rev. Lett.*, 110:260409, Jun 2013.
- [18] Edson de Faria. Thompson’s group, Teichmüller spaces, and dual Riemann surfaces. In *Dynamics, games and science. I*, volume 1 of *Springer Proc. Math.*, pages 323–338. Springer, Heidelberg, 2011.
- [17] Edson de Faria. David homeomorphisms via Carleson boxes. *Ann. Acad. Sci. Fenn. Math.*, 36(1):215–229, 2011.
- [16] Edson de Faria. An introduction to the thermodynamics of conformal repellers. *São Paulo J. Math. Sci.*, 4(1):65–91, 2010.
- [15] Edson de Faria and Welington de Melo. *Mathematical aspects of quantum field theory*, volume 127 of *Cambridge Studies in Advanced Mathematics*. Cambridge University Press, Cambridge, 2010. With a foreword by Dennis Sullivan.

- [14] Edson de Faria and Welington de Melo. *Mathematical tools for one-dimensional dynamics*, volume 115 of Cambridge Studies in Advanced Mathematics. Cambridge University Press, Cambridge, 2008.
- [13] Edson de Faria and Welington de Melo. *Mathematical aspects of quantum field theory*. Publicações Matemáticas do IMPA. [IMPA Mathematical Publications]. Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, 2007. With a foreword by Dennis Sullivan, 26o Colóquio Brasileiro de Matemática. [26th Brazilian Mathematics Colloquium].
- [12] Edson de Faria, Welington de Melo, and Alberto Pinto. Global hyperbolicity of renormalization for C^r unimodal mappings. *Ann. of Math. (2)*, 164(3):731–824, 2006.
- [11] E. de Faria, F. P. Gardiner, and W. J. Harvey. Thompson’s group as a Teichmüller mapping class group. In *In the tradition of Ahlfors and Bers, III*, volume 355 of *Contemp. Math.*, pages 165–185. Amer. Math. Soc., Providence, RI, 2004.
- [10] Edson de Faria. Aspects of rigidity and universality in one-dimensional dynamics. In *Differential equations and dynamical systems (Lisbon, 2000)*, volume 31 of *Fields Inst. Commun.*, pages 113–123. Amer. Math. Soc., Providence, RI, 2002.
- [9] Edson de Faria and Welington de Melo. *One dimensional dynamics*. Publicações Matemáticas do IMPA. [IMPA Mathematical Publications]. Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, 2001. The mathematical tools, 23o Colóquio Brasileiro de Matemática. [23rd Brazilian Mathematics Colloquium].
- [8] Edson de Faria and Welington de Melo. Rigidity of critical circle mappings. II. *J. Amer. Math. Soc.*, 13(2):343–370, 2000.
- [7] Edson de Faria and Welington de Melo. Rigidity of critical circle mappings. I. *J. Eur. Math. Soc. (JEMS)*, 1(4):339–392, 1999.
- [6] Edson de Faria. Asymptotic rigidity of scaling ratios for critical circle mappings. *Ergodic Theory Dynam. Systems*, 19(4):995–1035, 1999.
- [5] Edson de Faria. On conformal distortion and Sullivan’s sector theorem. *Proc. Amer. Math. Soc.*, 126(1):67–74, 1998.
- [4] Zaqueu Coelho and Edson de Faria. Limit laws of entrance times for homeomorphisms of the circle. *Israel J. Math.*, 93:93–112, 1996.
- [3] Edson de Faria. Quasisymmetric distortion and rigidity of expanding endomorphisms of S^1 . *Proc. Amer. Math. Soc.*, 124(6):1949–1957, 1996.
- [2] Edson de Faria. A priori bounds for C^2 homeomorphisms of the circle. *Resenhas do IME-USP*, 1:487–493, 1994.
- [1] Edson de Faria. *Proof of universality for critical circle mappings*. ProQuest LLC, Ann Arbor, MI, 1992. Ph.D. Thesis, City University of New York.

SELECTED
INVITED TALKS

- [1] *Proof of universality for critical circle mappings, Workshop on Renormalisation in Dynamical Systems*, University of Warwick, Coventry, England, April 1992.
- [2] *Renormalization of critical circle mappings, Members Seminar*, Institute for Advanced Study, Princeton, October 1992.
- [3] *Asymptotic rigidity of scaling ratios for critical circle mappings, 892nd Meeting of the American Mathematical Society*, Brooklyn NY, April 9th 1994.
- [4] *A-priori bounds for C^2 homeomorphisms of the circle, Workshop on Dynamical Phase Transitions (in Honour of W.M. Oliva)*, IME-USP, São Paulo, June 1994.
- [5] *Hyperbolicity of the renormalization operator for homeomorphisms of the circle, 20th Brazilian Math Colloquium*, IMPA, Rio de Janeiro, July 1995.
- [6] *Renormalization and rigidity of critical circle maps, Dynamical Systems Seminar*, ETH-Zürich, Switzerland, November 1995.

- [7] *Rigidity of critical circle maps*, *International Workshop on Dynamical Systems and Geometry*, Catholic University, Rio de Janeiro, August 1996.
- [8] *Rigidity of critical circle maps*, 4th. *Quadriennial International Conference on Dynamical Systems*, IMPA, Rio de Janeiro, August 1997.
- [9] *Global hyperbolicity of renormalization for C^r unimodal maps*, *Workshop on Dynamical Systems*, International Centre for Theoretical Physics (ICTP), Trieste, September 1998.
- [10] *Hyperbolicity of renormalization for C^r unimodal maps*, *International Workshop on Dynamical Systems*, FCUP, Porto, Portugal, May 2000.
- [11] *Hyperbolicity of renormalization for C^r unimodal maps*, *International Conference on Dynamical Systems*, IMPA, Rio de Janeiro, July 2000. For an abstract, consult the Web page <http://www.impa.br/dsconf/conf2000/Days/day24.html>.
- [12] *One-dimensional dynamics: the mathematical tools*, 23rd *Brazilian Math Colloquium*, IMPA, Rio de Janeiro, July 2001.
- [13] *Dual holomorphic dynamical systems*, *Complex Analysis Seminar*, Graduate Center of CUNY, September 2002.
- [14] *Thompson's group, Cantor repellers and Teichmüller spaces*, *Complex Analysis Seminar*, Graduate Center of CUNY, December 2003.
- [15] *Thompson's group as a Teichmüller mapping class group*, ARCC Conference *Thompson's group at 40 years*, American Institute of Mathematics, Palo Alto, January 2004.
- [16] *David homeomorphisms via Carleson boxes*, 3rd *Meeting IST-IME, Ordinary and Partial Differential Equations and Related Topics*, conference celebrating the 80th birthday of W. M. Oliva, September 2010.
- [17] *Boundary values of trans-quasiconformal mappings*, *Final CODY Meeting*, University of Warwick, Coventry, England, December 2010.
- [18] *Thompson group actions in Teichmüller spaces*, *Barone 75 Anos*, conference in honour of A. Barone Netto, IME-USP, August 2011.
- [19] *On Sloane's persistence problem*, *Mathematics Colloquium*, City College of CUNY, New York, 09/19/2013.
- [20] *On Sloane's persistence problem*, *Workshop on Low-Dimensional Dynamics – Dynamics Beyond Uniform Hyperbolicity*, IMPA, Rio de Janeiro, November 2013. (see <http://www.impa.br/opencms/pt/eventos/store/evento-1312?link=7>).
- [21] *The persistence problem of Sloane*, *Ergodic Optimization and Related Fields*, IME-USP, December 2013 (see <http://ergodicoptimization.ime.usp.br/>).
- [22] *Quasi-symmetric rigidity of multicritical circle maps*, *Parameter Problems in Analytic Dynamics – conference celebrating Sebastian van Strien's 60th Birthday*, Imperial College London, July 2016.
- [23] *Quasi-symmetric rigidity of multicritical circle maps*, *New Trends in One-dimensional Dynamics – conference celebrating the 70th birthday of Wellington de Melo*, IMPA, Rio de Janeiro, November 2016.
- [24] *Dynamics of Asymptotically Conformal Polynomial-like Maps*, 31st *Brazilian Math Colloquium*, IMPA, Rio de Janeiro, August 2017.
- [25] *Dynamics of Asymptotically Conformal Polynomial-like Maps*, *Dynamical Systems and Related Topics*, ICM 2018 Satellite Conference, Universidade Federal da Bahia, Bahia, August 2018.
- [26] *Dynamics of Circle Mappings*, mini-course for 33^o *Colóquio Brasileiro de Matemática* IMPA-RJ, August 2021 (in collaboration with P. Guarino).
- [27] *Rigidity and Orbit-Flexibility of Circle Maps*, 8th *IST-IME Meeting*, Instituto Superior

Técnico, Lisbon, September 2022.

- [28] *Asymptotic holomorphic dynamics and renormalization*, Forty Years of the Einstein Chair Seminar, CUNY Graduate Center, New York, January 2023.
- [29] *Automorphic Measures and Invariant Distributions for Circle Dynamics*, VII Escola Brasileira de Sistemas Dinâmicos, Fortaleza, October 2023.

SKILLS

Languages: Portuguese (native), English (fluent)
Programming Languages: Python, C

Teaching

Courses Taught at Graduate Level

- Probability Applied to Mathematical Finance (USP)
- PDE's Applied to Mathematical Finance (USP)
- Introduction to Ergodic Theory (USP)
- Topics in Complex Analysis (USP)
- Complex Dynamics (USP)
- Ordinary Differential Equations (USP)
- Mathematical Tools of One-dimensional Dynamics (IMPA)
- Measure Theory and Integration (USP)
- Introduction to Dynamical Systems (USP)
- Topics in Functional Analysis (USP)

Courses Taught at Undergraduate Level

- Pre-Calculus (Brooklyn College, CUNY)
- Numerical Analysis for Engineers (USP)
- Partial Differential Equations of Mathematical Physics (USP)
- Basic Complex Analysis (USP)
- Basic Ordinary Differential Equations (USP)
- Multivariable Calculus (Brooklyn College, CUNY)
- Introduction to Mathematical Finance (Brooklyn College, CUNY)
- Statistics (Brooklyn College, CUNY)
- Linear Algebra (USP)
- Calculus for Engineers (USP)

Mentoring/Supervision

DOCTORAL STUDENTS

Aldo Portela (2004)
 Arlane Manoel S. Vieira (2015)
 Gabriela Estevez (2017)

POST-DOCS

Pablo Guarino (2012-14)
 Sofia Trejo (2014-16)
 Carlos Alberto Siqueira Lima (2016-17)