EDSON DE FARIA

Instituto de Matemática e Estatística da Universidade de São Paulo
Rua do Matão 1010 – Cidade Universitária
São Paulo, SP – CEP 05508-090
edson@ime.usp.br

Personal Information

Date of Birth: October 23rd 1962.
Place of Birth: São Paulo, Brazil.
Nationality: Brazilian.

Education

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

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.

Teaching Experience

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)

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)

Publications   Dimensão Fracionária e Conjuntos de Cantor, Master Thesis (in Portuguese), University of São Paulo, 1985. (Advisor: Ângelo Barone Neto)

Proof of Universality for Critical Circle Mappings, Ph. D. Thesis, City University of New York, 1992. (Advisor: Dennis Sullivan)

A-priori bounds for C^2 homeomorphisms of the circle, *Resenhas do IME-USP* **1**, # 4 (1995), 487–493.

Limit laws of entrance times for homeomorphisms of the circle (jointly with Zaqueu Coelho), *Israel Journal of Mathematics* **93** (1996), 93–112.

Quasisymmetric distortion and rigidity of expanding endomorphisms of S^1, *Proceedings of the American Mathematical Society* **124** (1996), 1949–1956.

On conformal distortion and Sullivan's sector theorem, *Proceedings of the American Mathematical Society* **126** (1998), 67–74.

Asymptotic rigidity of scaling ratios for critical circle mappings, *Ergodic Theory & Dynamical Systems* **19** (1999), 995–1035.

Rigidity of critical circle mappings I (jointly with Welington de Melo), *Journal of the European Mathematical Society* **1** (1999), 339–392.

Rigidity of critical circle mappings II (jointly with Welington de Melo), *Journal of the American Mathematical Society* **13** (2000), 343–370.

One-dimensional dynamics: the mathematical tools (jointly with Welington de Melo), *23º Colóquio Brasileiro de Matemática*, IMPA Mathematical Publications, 2001 (book).

Aspects of rigidity and universality in one-dimensional dynamics, *Fields Institute Communications* **31** (2002), 113–123.

Thompson's group as a Teichmüller mapping class group (jointly with Frederick Gardiner and William Harvey), *Contemporary Mathematics* **355** (2004), 165–185.

Global hyperbolicity of renormalization for C^r unimodal maps (jointly with Welington de Melo and Alberto Pinto), *Annals of Mathematics* **164** (2006), 724–831.

Mathematical Tools for One-dimensional Dynamics (jointly with Welington de Melo), Cambridge Studies in Advanced Mathematics **115**, Cambridge University Press, 2008 (book).

An introduction to the thermodynamics of conformal repellers, *São Paulo Journal of Mathematical Sciences* **4** (2010), 65–91.

Mathematical Aspects of Quantum Field Theory (jointly with Welington de Melo), Cambridge Studies in Advanced Mathematics **127**, Cambridge University Press, 2010 (book).

Thompson's group, Teichmüller spaces, and dual Riemann surfaces, *Dynamics, Games and Science* **1** (2011), 323–338.

David homeomorphisms via Carleson boxes, *Annales Academiæ Scientiarum Fennicæ* **36** (2011), 215–229.

Bell inequality violations under reasonable and under weak hypotheses (jointly with Charles Tresser), *Physical Review Letters* **110** (2013), 260409 [4 pages].

Period doubling bifurcations (jointly with Pierre Coullet, and Charles Tresser), *Scholarpedia* **9** (6) (2014), 3958.

On Sloane's persistence problem (jointly with Charles Tresser), *Experimental Mathematics* **23** (2014), 363–382.

Differentiability of correlations in Realistic Quantum Mechanics (jointly with A. Cabrera, E. Pujals, C. Tresser), *Journal of Mathematical Physics*, **56** (2015), 092104 [10 pages].

Real bounds and Lyapunov exponents (jointly with Pablo Guarino), *Discrete and Continuous Dynamical Systems A* **36**(4) (2016), 1957–1982.

Infinite entropy is generic in Hölder and Sobolev spaces (jointly with Peter Hazard and Charles Tresser), *Comptes Rendus de l'Académie des Sciences de Paris Serie I* **355** *(2017), 1185–1189*.

Real bounds and quasisymmetric rigidity of multicritical circle maps (jointly with Gabriela Estevez), *Transactions of the American Mathematical Society* **370** (2018), 5583–5616.

Beau bounds for multicritical circle maps (jointly with Gabriela Estevez and Pablo Guarino), *Indagationes Mathematicæ* **29** (2018), 842–859.

Welington de Melo (1946–2016) (jointly with Sebastian van Strien), in *New Trends in One-dimensional Dynamics, Springer Proceedings in Mathematics & Statistics* **285** (2019), 7–20, (P. Guarino and M.J. Pacífico, eds.), Springer Verlag.

On slow growth and entropy-type invariants (jointly with Peter Hazard and Charles Tresser), in *New Trends in One-dimensional Dynamics, Springer Proceedings in Mathematics & Statistics* **285** (2019), 165–181, (P. Guarino and M.J. Pacífico, eds.), Springer Verlag.

Genericity of infinite entropy for maps with low regularity (jointly with Peter Hazard and Charles Tresser), *Annali della Scuola Normale Superiore di Pisa, Classe di Scienze* (5) **XXII** (2021), 601–664.

Generalized Whitney topologies are Baire (jointly with Peter Hazard), *Proceedings of the American Mathematical Society* **148** (2020), 5441–5455.

On the Erdős-Sloane and shifted Sloane persistence problems (jointly with Gabriel Bonuccelli and Lucas Colucci), *Journal of Integer Sequences* **23** (2020), Article 20.10.7.

There are no σ-finite invariant measures for multicritical circle maps (jointly with Pablo Guarino), *Nonlinearity* **34** (2021), 6727–6749.

Dynamics of Circle Mappings (jointly with P. Guarino), *33º Colóquio Brasileiro de Matemática*, *IMPA Mathematical Publications*, 2021 (book).

Dynamics of multicritical circle maps (jointly with Pablo Guarino), *São Paulo Journal of Mathematical Sciences* **16** (2022), 340–395.

Quasisymmetric orbit-flexibility of multicritical circle maps (jointly with Pablo Guarino), to appear in *Ergodic Theory and Dynamical Systems* (2022); available at `arXiv:1911.04375`.

Asymptotically holomorphic methods for infinitely renormalizable C^r unimodal maps (jointly with Trevor Clark and Sebastian van Strien), to appear in *Ergodic Theory and Dynamical Systems* (2022); available at `arXiv:1804.06122v1 [math.DS]`.

Growth, entropy-type invariants and regularity (Parts I and II) (jointly with P. Hazard and C. Tresser), in preparation.

Doctoral Students   Aldo Portela (2004)

Arlane Manoel S. Vieira (2015)

Gabriela Estevez (2017)

Selected Invited Talks   *Proof of universality for critical circle mappings*, *Workshop on Renormalisation in Dynamical Systems*, University of Warwick, Coventry, England, April 1992.

Renormalization of critical circle mappings, *Members Seminar*, Institute for Advanced Study, Princeton, October 1992.

Asymptotic rigidity of scaling ratios for critical circle mappings, *892nd Meeting of the American Mathematical Society*, Brooklyn NY, April 9th 1994.

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.

Hyperbolicity of the renormalization operator for homeomorphisms of the circle, *20th Brazilian Math Colloquium*, IMPA, Rio de Janeiro, July 1995.

Renormalization and rigidity of critical circle maps, *Dynamical Systems Seminar*, ETH-Zürich, Switzerland, November 1995.

Rigidity of critical circle maps, *International Workshop on Dynamical Systems and Geometry*, Catholic University, Rio de Janeiro, August 1996.

Rigidity of critical circle maps, *4$^{th.}$ Quadriennial International Conference on Dynamical Systems*, IMPA, Rio de Janeiro, August 1997.

Global hyperbolicity of renormalization for C^r unimodal maps, *Workshop on Dynamical Systems*, International Centre for Theoretical Physics (ICTP), Trieste, September 1998.

Hyperbolicity of renormalization for C^r unimodal maps, *International Workshop on Dynamical Systems*, FCUP, Porto, Portugal, May 2000.

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`.

One-dimensional dynamics: the mathematical tools, *23rd Brazilian Math Colloquium*, IMPA, Rio de Janeiro, July 2001.

Dual holomorphic dynamical systems, *Complex Analysis Seminar*, Graduate Center of CUNY, September 2002.

Thompson's group, Cantor repellers and Teichmüller spaces, *Complex Analysis Seminar*, Graduate Center of CUNY, December 2003.

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.

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.

Boundary values of trans-quasiconformal mappings, *Final CODY Meeting*, University of Warwick, Coventry, England, December 2010.

Thompson group actions in Teichmüller spaces, *Barone 75 Anos*, conference in honour of A. Barone Netto, IME-USP, August 2011.

On Sloane's persistence problem, *Mathematics Colloquium*, City College of CUNY, 09/19/2013

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`).

The persistence problem of Sloane, *Ergodic Optimization and Related Fields*, IME-USP, December 2013 (see `http://ergodicoptimization.ime.usp.br/`).

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.

Quasi-symmetric rigidity of multicritical circle maps, *New Trends in One-dimensional Dynamics* – conference celebrating the 70th birthday of Welington de Melo, IMPA,Rio de Janeiro, November 2016.

Dynamics of Asymptotically Conformal Polynomial-like Maps, *31st Brazilian Math Colloquium*, IMPA, Rio de Janeiro, August 2017.

Dynamics of Asymptotically Conformal Polynomial-like Maps, *Dynamical Systems and Related Topics*, ICM 2018 Satellite Conference, Universidade Federal da Bahia, Bahia, from August 13–17.

Dynamics of Circle Mappings, mini-course for *33º Colóquio Brasileiro de Matemática* IMPA-RJ, August 2021 (in collaboration with P. Guarino).