

Curriculum Vitae

Ewerton Rocha Vieira

Education

- September 2020– : Post-Doctoral in the Center for Discrete Mathematics and Theoretical Computer Science (DIMACS) at Rutgers University (Data Inspire Institute).
- March 2015: PhD from Universidade de Campinas (advisor: Ketty Abaroa de Rezende).
- October 2014: International PhD internship for one year at Northwestern University (advisor: John Franks).
- February 2011: Master's degree from Universidade de Campinas.
- January 2009: BA degree with honors at Universidade de Brasília.

Research Interests

- Data Science, Robot Control, Dynamics, Combinatorial Dynamics and Topology.

Academic Positions

- 2020– : Post-Doctoral associated in the DIMACS (the Center for Discrete Mathematics and Theoretical Computer Science) Rutgers University.
- 2015–: Adjunct Professor of Mathematics, Universidade Federal de Goiás.

Visiting Positions

- 2020 February - : Visiting Professor at Rutgers University.
- 2016 January - 2016 February: Visiting Professor at Universidade de Brasília.
- 2015 February: Visiting Professor at University of Maine.
- 2014 October- 2015 October: Visiting Scholar at Northwestern University.

Teaching Experience

- 2022: Bootcamp: Dynamics, Data Analysis, and Robotic Control.
- 2015-2019: Taught undergraduate and graduate courses at Universidade Federal de Goiás.
- 2016: Taught graduate course at Universidade de Brasília.

Conference Talks

- Workshop on the Algorithmic Foundations of Robotics (WAFR) 2022. *Morse Graphs: Topological Tools for Analyzing the Global Dynamics of Robot Controllers*. University of Maryland, College Park, USA.
- International Conference on Robotics and Automation (ICRA) 2022. *Persistent Homology for Effective Non-Prehensile Manipulation*. Philadelphia, PA, USA
- Workshop on Dynamics, Topology, and Robotic Control. Learning Global Dynamics from Data. 2021
- TRIPODS seminars (DIMACS-Rutgers). Combinatorial Description of Global Dynamics (an approach to solve ODE). 2021
- ICMC Summer Meeting on Differential Equations. Transition Matrix 2019
- XXI Brazilian Topology Meeting 2018, Satellite conference of ICM. Transition Matrix. 2018
- Mathematical Congress of the Americas. Detecting Bifurcations via Transition Matrix. 2017
- VIII Workshop of Dynamical Systems, July 3–6, 2016.
- Semana do IME, October 18–21, 2016.
- Dynamics, Topology and Computations. Będlewo, Poland. June 15 - 20, 2015.
- Matematyka Obliczeniowa, Uniwersytet Jagiellonski, Krakow. June 11, 2015.
- Department of Mathematics & Statistics Colloquium Series, University of Maine. February, 2015.

Publications

Papers:

- (1) **E. R. Vieira**, A. Sivaramakrishnan, Y. Song, E. Granados, M. Gameiro, K. Mischaikow, Y. Hung and K. E. Bekris. *Data-Efficient Characterization of the Global Dynamics of Robot Controllers with Confidence Guarantees*. Submitted to ICRA-2023 (International Conference on Robotics and Automation 2023), arXiv:2210.01292
- (2) **E. R. Vieira**, K. Gao, D. Nakhimovich, K. E. Bekris and J. Yu. *Persistent Homology Guided Monte-Carlo Three Search for Effective Non-Prehensile Manipulation*. Submitted to ICRA-2023 (International Conference on Robotics and Automation 2023), arXiv:2210.01283
- (3) B. Batko, M. Gameiro, Y. Hung, W. Kalies, K. Mischaikow and **E. R. Vieira**, *Identifying Nonlinear Dynamics with High Confidence from Sparse Data*, arXiv 2022, arXiv:2206.13779
- (4) **E. R. Vieira**, E. Granados, A. Sivaramakrishnan, M. Gameiro, K. Mischaikow and K. E. Bekris. *Morse Graphs: Topological Tools for Analyzing the Global Dynamics of Robot Controllers*. Workshop on the Algorithmic Foundations of Robotics 2022, WAFR-22.
- (5) **E. R. Vieira**, D. Nakhimovich, K. Gao, R. Wang, J. Yu and K. E. Bekris. *Persistent Homology for Effective Non-Prehensile Manipulation*. International Conference on Robotics and Automation (ICRA) 2022, pp. 1918–1924.
- (6) D. Lima, M. Silveira, **E. R. Vieira**. *Covering action on Conley index theory*. Ergodic Theory and Dynamical Systems, 1-33, 2022. doi:10.1017/etds.2022.13
- (7) A. Romero and **E. R. Vieira** *Existence of Periodic Orbits for Piecewise-Smooth Vector Fields with Sliding Region via Conley Theory*, arXiv preprint, 2021.
- (8) R. Bastos, N.R. Rocco and **E. R. Vieira**, *Finiteness of homotopy groups related to the non-abelian tensor product* Annali di Matematica (2019) No 1, 1–11.
- (9) R. Franzosa, **E. R. Vieira**. *Transition Matrix Theory*, Transactions of the American Mathematical Society 369 (2017) 11 7737–7764.
- (10) R. Franzosa, K. A. de Rezende, **E. R. Vieira**. *Generalized topological transition matrix*, Topological Methods in Nonlinear Analysis 48 No 1 (2016), 183–212.

Graduate Students Supervised

Ph.D:

- Angie Romero (co-advisor).

Masters:

- Cícero R. G. de Sousa Junior
- Thiago dos Santos Vieira.
- Jose Alex Lima
- Lenison Alves de Queiroz
- Celso Faria de Souza
- Theófilo Machado de Souza Neto
- Marcio Vaiz dos Reis.
- Wesley da Silva Carvalho
- Messias H. V. Silva

Undergraduate Students Supervised

- Sarah Catovic (Rutgers University)
- Daniel Gameiro (Rutgers University)
- Yousef Sayes (New Jersey Institute of Technology)
- Anna Cusenza (University of California)
- Vitória Chaves Fernandes (Federal University of Goias)
- Cícero R. G. de Sousa Junior (Federal University of Goias)

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