Carllos Eduardo Holanda

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Personal

Full name: Carllos Eduardo Alves de Holanda.

Birthplace: Maceió, Alagoas, Brazil.

Education

2018-2022: Ph.D in Mathematics (with distinction) at Instituto Superior Técnico, University of Lisbon, under the supervision of Luís Barreira.

2016-2017: M.Sc in Mathematics at Federal University of Alagoas, under the supervision of Krerley Oliveira.

2010-2015: B.Sc in Chemical Engineering at Federal University of Alagoas.

Professional Experience

Postdoctoral researcher at College of Science, Departament of Mathematics, Shantou University, Shantou, China, from 06-2023 to 06-2025.

Visiting researcher - School of Mathematical Sciences, Soochow University, Suzhou, China, from 11-11-2024 to 18-11-2024.

Visiting researcher - School of Mathematical Sciences, Fudan University, Shanghai, China, from 03-12-2023 to 13-12-2023.

Postdoctoral researcher at Institute of Mathematics and Computer Sciences (ICMC), University of São Paulo, São Paulo, Brazil, from 09-2022 to 06-2023.

Member of the Laboratory of Statistics and Data Science at Federal University of Alagoas, Macei, Brazil, 2022-2023.

Review services: refereed for Discrete and Continuous Dynamical Systems (Series A), Nonlinear Analysis, Journal of Mathematical Analysis and Applications, Journal of Difference Equations and Applications and reviewer for Mathematical Reviews (AMS).

Visiting student - Summer School at Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil, 2017.

Visiting student - Colorado State University (CSU), Science without Borders Scholarship, Fort Collins, United States of America, 2014-2015.

Visiting student - Summer School at Institute for Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil, 2014.

Scientific initiation scholarship in Mathematics at Federal University of Alagoas, Maceió, Brazil. Project: *Numbers and Ergodic Theory*, under the direction of Krerley Oliveira, 2013.

Teaching Assistant of the course Trasport Phenomena 2 (Chemical Engineering) at Federal University of Alagoas, Maceió, Brazil, 2013.

Scientific initiation scholarship in Mathematics at Federal University of Alagoas, Maceió, Brazil. Project: *Ergodic Theory of Number Expansions*, under the direction of Krerley Oliveira, 2012.

Teaching Assistant of the course Physics 2 at Federal University of Alagoas, Maceió, Brazil, 2012.

Talks and Participation in Events

Attendance to the Topological Dynamical Systems Conference at Shantou University, Shantou, China, from 13-01-2025 to 18-01-2025.

Nonlinear spectra, ergodic full measures and nontypical points, presented in the Random Dynamical Systems Conference at Shantou University, Shantou, China, 11-01-2025.

Nonlinear spectra, nontypical points and ergodic full measures, presented in the Dynamical Systems Conference at Soochow University, Suzhou, China, 17-11-2024.

Attendance to the conference Advances in Dynamics at Southern University of Science and Technology (SusTech), Shenzhen, China, from 12-08-2024 to 17-08-2024.

Additive and asymptotically additive sequences of potentials are physically equivalent, presented in the Topological Dynamical Systems Conference at Shantou University, Shantou, China, 24-01-2024.

Some relations between additive and asymptotically additive sequences of potentials with respect to maps and flows, presented in the Dynamical Systems Seminar at Fudan University, Shanghai, China, 07-12-2023.

Additive and nonadditive sequences of potentials I and II, presented in the Dynamical Systems Seminar at Shantou University, Shantou, China, 23-11-2023 and 30-11-2-2023.

Some relations between additive and nonadditive sequences of potentials, presented in the Zoominar in Dynamical Systems at University of Porto, Portugal, held online on 31-03-2023.

Nonlinear thermodynamic formalism, presented in the Dynamical Systems Seminar at Federal University of Alagoas, Maceió, Brazil, 06-05-2022.

Nonadditive thermodynamic formalism and multifractal analysis for flows, presented in the Lismath Seminar, Instituto Superior Técnico, University of Lisbon, Portugal, held online on 21-04-2022.

Attendance to the Encontro Nacional da Sociedade Portuguesa de Matemática 2021 (ENSPM2021), Portugal, held online from 12-07-2021 to 16-07-2021.

Multifractal analysis for flows presented in the Lisbon Young Mathematicians Conference, Portugal, held online on 24-4-2021.

Nonadditive thermodynamic formalism and multifractal analysis for flows presented in Matfest, Federal University of Alagoas, Brazil, held online on 04-12-2020.

Attendance to the workshop Thermodynamical Formalism, Ergodic Theory and Geometry at University of Warwick, Coventry, United Kingdom, from 22-07-2019 to 26-07-2019.

Applications of ergodic theory to number theory, presented in the Lismath Seminar, Instituto Superior Técnico, University of Lisbon, Lisbon, Portugal, 10-10-2018.

Van der Waerden's theorem via Birkhoff's multiple recurrence, presented in the Dynamical Systems Seminar at Federal University of Alagoas, Maceió, Brazil, 15-12-2016.

Perron-Frobenius Theorem with Hyperbolic Metric and Applications in Cycling Strategy presented in the Annual Academic Congress at Federal University of Alagoas, Maceió, Brazil, 2013.

Numbers and Ergodic Theory presented in the Annual Academic Congress at Federal University of Alagoas, Maceió, Brazil, 2012.

Publications and preprints

1. *Nonlinear dimension spectra, full measures and nontypical points*, submitted (2025).
   (L. Barreira, C. E. Holanda, X. Hou and X. Tian)

2. *On cohomology, Gibbs properties and regularity of some nonadditive families of potentials*, submitted (2024).
   (C. E. Holanda).

3. *Asymptotically additive families of functions and a physical equivalence problem for flows*, Journal of Differential Equations **418** (2024), 142–177.
   (C. E. Holanda).

4. *A Livšic-type theorem and some regularity properties for nonadditive sequences of potentials*, Journal of Mathematical Physics **65** (2024), 082703.
   (C. E. Holanda and E. Santana)

5. *Nonlinear thermodynamic formalism for flows*, Dynamical Systems **37** (2022), 603-629.
   (L. Barreira and C. E. Holanda).

6. *Higher-dimensional nonlinear thermodynamic formalism*, Journal of Statistical Physics **187**, 18 (2022).
   (L. Barreira and C. E. Holanda).

7. *Dimension spectra for flows: future and past*, Nonlinear Analysis: Real World Applications **65** (2022), 103497.
   (L. Barreira and C. E. Holanda).

8. *Almost additive multifractal analysis for flows*, Nonlinearity **34** (2021), 4283-4314.
   (L. Barreira and C. E. Holanda).

9. *Hyperbolicity of delay equations via cocycles*, Journal of Difference Equations and Applications **27** (2021), 1-24.
   (L. Barreira, C. E. Holanda and C. Valls).

10. *Equilibrium and Gibbs measures for flows*, Pure and Applied Functional Analysis **6** (2021), 37-56.
    (L. Barreira and C. E. Holanda).

11. *Nonadditive topological pressure for flows*, Nonlinearity **33** (2020), 3370-3394.
    (L. Barreira and C. E. Holanda).

Ongoing and future projects

1. *Nonlinear phenomena: thermodynamics, multifractal analysis and ergodic optimization for maps, flows and group actions.*

2. *On the dimension of some types of hyperbolic sets for nonconformal maps and flows.*

3. *Relations between additive and nonadditive sequences and families of potentials.*

4. *Symbolic dynamics and word embeddings: learning structure of orbits.*

Awards and titles

FAPESP Postdoctoral grant, 2022-2023.

FCT PhD grant, 2018-2022.

CNPq fellowship - Master degree, 2016-2017.

CNPq fellowship - Scientific Initiation, 2013.

CNPq fellowship - Scientific Initiation, 2012.

1st place on the Chemical Engineering entrance examination for Federal University of Alagoas, 2010.

Languages

Portuguese: native speaker.

English: proficient.

Last updated: January 20, 2025