

# Reinaldo Resende

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 Portuguese (Native)

 English (fluent)

 Italian (intermediate)



## Academic appointments

### Employment history

Sep/23 - Jul/26  Posdoctoral Associate at Carnegie Mellon University (CMU).  
Mentor: *Robin Neumayer*.

### Education

Ago/19 - Jul/23  Ph.D. in Mathematics at University of São Paulo (USP).  
Scholarship: *CAPES - 88882.377954/2019-01*.  
Advisors: *Stefano Nardulli and Camillo De Lellis*.

Ago/17 - Jul/19  Master Degree in Sciences at University of São Paulo (USP).  
Scholarship: *CNPq - 166204/2017-0*.  
Advisors: *Stefano Nardulli and Gláucio Terra*.

Jan/14 - Jul/17  Bachelor Degree in Mathematics at University of São Paulo (USP).  
Advisor: *Gláucio Terra*.

### Research visits

Apr/24 and Dec/24  Visiting Scholar. Institute for Advanced Study (IAS).

Jan/23-May/23  Visiting Student Research Collaborators (VSRC). Princeton University.

Sep/22-Dec/22  Thematic Program on Nonsmooth Riemannian and Lorentzian Geometry, Visiting Research. Fields Institute.

## Funding and Awards

### Awards

Oct/24  USP 2024 Thesis of Distinction in STEM fields ( $\approx$  \$2300).

Sep/24  Gutierrez Prize 2024 ( $\approx$  \$500).

 Honorable mention in the CAPES Thesis Prize.

### Grants

Jan/24-Dec/25  Co-PI: CNPq - 441922/2023-6 ( $\approx$  \$20,000).

Jul/23-Oct/26  Co-PI: FAPESP - 2021/05256-0 ( $\approx$  \$300,000).

## Research publications

### Preprints

① De Rosa, A., Neumayer, R., & Resende, R. (2025). *Rigidity of critical points of hydrophobic capillary functionals*. arXiv: 2509.22532

② Fleschler, I., & Resende, R. (2024). *On the regularity of area minimizing currents at boundaries with arbitrary multiplicity*. arXiv: 2410.04566

## Peer reviewed papers

- ① Andrade, J. H., Conrado, J., Nardulli, S., Piccione, P., & Resende, R. (2024). Multiplicity of solutions to the multiphasic Allen-Cahn-Hilliard system with a small volume constraint on closed parallelizable manifolds. *Journal of Functional Analysis (JFA)*.
- ② Nardulli, S., & Resende, R. (2024a). Interior regularity of area minimizing currents within a  $C^{2,\alpha}$ -submanifold. *Accepted to Transactions of the American Mathematical Society (TAMS)*.
- ③ Nardulli, S., & Resende, R. (2024b). Density of the boundary regular set of 2d area minimizing currents with arbitrary codimension and multiplicity. *Advances in Mathematics (AiM)*.
- ④ De Rosa, A., & Resende, R. (2023). Boundary regularity for anisotropic minimal Lipschitz graphs. *Communications in Partial Differential Equations (CPDE)*.
- ⑤ Resende, R. (2023a). Lipschitz approximation for general almost area minimizing currents. *Journal of Geometric Analysis (JGEA)*.
- ⑥ Resende de Oliveira, R. (2022). On Clusters and the Multi-isoperimetric Profile in Riemannian Manifolds with Bounded Geometry. *Journal of Dynamical and Control Systems (JDCS)*.

## Academic texts

- ① Resende, R. (2023b). *Some regularity results in geometric measure theory* (PhD thesis).
- ② Resende, R. (2019). *Regularity of almost minimizing sets* (Master thesis).
- ③ Resende, R. (2017). *Minimal and maximal surfaces* (Bachelor thesis).

## Service and mentoring

### Mentoring

- Ongoing ✓ Co-advisor of the PhD students *Angélica Ponciano*, *Bruno Almeida*, and *Marcos Agnoletto*, at the Federal University of ABC.
- Summer 24 ✓ Advisor of the Summer Experiences in Mathematical Sciences (SEMS) program entitled: "One-dimensional Calculus of Variations". Also mentoring *Brian Park* and *Eden Cen* under the Summer Undergraduate Research Apprenticeship (SURA). Both programs took place at Carnegie Mellon University.

### Refereeing

- Ongoing ✓ Referee for the following journals.  
*Journal of Functional Analysis*, *Calculus of Variations and Partial Differential Equations*, *Proceedings of the International Geometry Center*, *Journal de Mathématiques Pures et Appliquées*, and *Journal für die reine und angewandte Mathematik (Crelle)*.

### Organizing Committees

- 2025 ✓ Session 3: Geometric Variational Problems in Smooth and Nonsmooth Metric Spaces, University of Miami, USA.
- 2024 ✓ Bridging Borders: International Geometric Analysis in São Paulo , University of São Paulo, Brazil.
- 2023 ✓ Thematic Session on Geometric Measure Theory, IMPA, Brazil.

## Teaching

### Carnegie Mellon University

- Fall 23 - Spring 26  21120 Differential and Integral Calculus and 21254 Linear Algebra and Vector Calculus for Engineers (Summer 26), 21-260 Differential Equations (Spring 26), 2 sections of 21-260 Differential Equations (Fall 25), 21-356 Principles of Real Analysis II (Fall23, Spring24, Fall24, and Spring25), and 21-127 Concepts of Mathematics (Summer 24).

### University of São Paulo

- 2022 and 2023  Instructor for Summer course: Linear Algebra (Jan/23-Feb/23); and Metric spaces (Jan/22-Feb/22).
- Aug/17-Feb/23  TA: Differential and integral calculus I (Mar/22-Jul/22); Differential geometry (Ago/21-Dec/21); Series and differentiable functions (Feb/21-Jul/21); Calculus of multivariable functions II (Aug/20-Dec/20); Differential and integral calculus I (Feb/20-Jul/20); Summer course: metric spaces (Jan/20-Feb/20); Analytic geometry (Feb/19-Jul/19); Summer course: Linear algebra (Jan/19-Feb/19); Measure and integration (Aug/18-Dec/18); Linear algebra II (Feb/18-Jul/18); and Introduction to linear algebra (Aug/17-Dec/17).

## Events attended

### Talks

- 2025  Geometric Measure Theory on Metric Spaces with Applications to Physics and Geometry at SCGP, Stony Brook University.
-  35º Colóquio Brasileiro de Matemática at IMPA, Rio de Janeiro, Brazil.
-  Session 3 of the Mathematical Congress of the Americas 2025 at the University of Miami.
-  International geometric analysis conference in Milan at Bocconi University.
-  School in Geometric Measure Theory and some related topics at the University of Pisa.
-  Ohio River Analysis Meeting 2025 at the University of Cincinnati.
- 2024  CRANED # 8 at PUC-Rio.
-  Gutierrez Prize 2024 Ceremony at ICMC, USP-São Carlos.
-  1st International AMS-UMI Joint Meeting, Special Session: Advances in variational methods and applications at Università degli Studi di Palermo (UniPa).
- 2023  Study Guide in Harmonic Analysis Writing Workshop at University of Pennsylvania (UPenn).
-  Conferences On Smooth and Non Smooth Geometric Analysis at Federal University of the ABC (UFABC).
- 2022  Isoperimetric Problems at University of Pisa (UniPi).

### Seminar Talks

- 2025  GAP Seminar at Penn State University.
-  Geometry Seminar at University of California San Diego (UCSD).
- 2024  Nonlinear Analysis Seminar at National Taiwan Normal University.
-  Math Seminar at Federal University of ABC (UFABC).
- 2023  Math Seminar at Federal University of ABC (UFABC).
-  CNA Seminar at Carnegie Mellon University (CMU).
-  PDE-Applied Math Seminar at University of Maryland (UMD).

### Research schools

- 2022  Hausdorff School on Geometric Analysis and Nonlinear Partial Differential Equations at Hausdorff Center for Mathematics (HCM).
-  CIMPA Research school: Singularities and Applications at University of São Paulo (USP), Campus São Carlos.

### Conferences, symposiums and workshops

- 2025  Workshop on Harmonic Analysis and PDEs at the University of Pittsburgh.
- 2024  Geometry and analysis of special structures on manifolds at SLMATH in Berkeley.
-  Geometric Measure Theory and applications at Palazzone SNS in Cortona.
- 2023  Workshop on Advising and Mentoring Graduate Students and Postdocs at Rice University.
-  Rutgers Geometric Analysis Conference at Rutgers University.
-  37th Geometry Festival at Princeton University.
-  Recent trends in nonlinear and geometric analysis at CUNY Graduate Center.
- 2022  Point Configurations: Deformations and Rigidity at University College of London (UCL).
-  Shape Optimization, related topics and applications at Roscoff Biological Center, France.
- 2019  Workshop on Submanifold Theory and Geometric Analysis at Federal University of São Carlos (UFSCAR).
- 2018  III Brazilian congress of young researches in pure and applied mathematics and statistics at Federal University of Paraná (UFPR).
-  Modern Trends in Differential Geometry at University of São Paulo (USP).
-  Symposium in Harmonic Analysis and Geometric Measure Theory at University of São Paulo (USP), Campus Ribeirão Preto.