

# Mateus Costa de Sousa

Ph.D. in Mathematics

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## Personal

**Citizenship** Brazilian.

## Education

- 2014–2017 **Ph.D. in Mathematics.**  
IMPA - Brazil  
Advisor: Emanuel Carneiro  
Thesis: *Some sharp inequalities in harmonic analysis*
- 2012–2014 **M.Sc. in Mathematics.**  
IMPA - Brazil  
Advisor: Felipe Linares
- 2008–2011 **Teaching Degree in Mathematics.**  
Universidade Federal do Pará - Brazil

## Appointments

- 2018 **Universidade de Buenos Aires - Argentina.**  
(Jan - Aug) Postdoctoral researcher  
Supervisor: Carlos Cabrelli
- 2018 -2021 **LMU Munich - Germany.**  
(Current) Postdoctoral researcher (Wissenschaftlicher Mitarbeiter)  
Supervisor: Rupert Frank

## Research

I am mainly interested in mathematical analysis, especially topics in harmonic analysis, such as sharp inequalities, regularity of maximal operators and the restriction theory of the Fourier transform. Recently I have also started to study existence of bases of exponential functions for  $L^2(S)$  and related topics.

## Papers and Preprints

### Submitted

- Gaussians never extremize Strichartz inequalities for hyperbolic paraboloids (with E. Carneiro and L. Oliveira), preprint available at arXiv:1911.11796. 7 pages.
- Fourier uniqueness pairs of powers of integers (with J. P. G. Ramos), preprint available at arXiv:1910.04276. 24 pages.

### Accepted

- Extremizers for adjoint Fourier restriction on hyperboloids: the higher dimensional case (with E. Carneiro, D. Oliveira e Silva, and B. Stovall), To appear in *Indiana University Mathematics Journal*. 20 pages
- Sharp mixed norm spherical restriction, (with E. Carneiro, and D. Oliveira e Silva), *Advances in Mathematics* 341 (2019), 583–608.
- Extremizers for Fourier restriction on hyperboloids (with E. Carneiro, and D. Oliveira e Silva), *Annales de l'Institut Henri Poincaré - Analyse Non Linéaire* 36 (2019), no. 2, 389–415.

- Regularity of maximal operators on Hardy-Sobolev spaces (with C. Pérez, T. Picon, and O. Saari), *Bulletin of the London Mathematical Society* 50 (2018), no. 6, 1007–1015.
- On the variation of maximal operators of convolution type, II (with E. Carneiro, and R. Finder), *Revista Matemática Iberoamericana* 34 (2018), Issue 2, pp. 739–766.

## Talks

### Conference talks

- Reconstruction of functions and the Fourier transform - Atelier d'Analyse Harmonique - Saint-Nazaire, France, 2019
- Recent progress in sharp Fourier restriction theory - Brazilian Mathematical Colloquium - IMPA, Brazil, 2019
- Recent progress in sharp Fourier restriction theory - Harmonic Analysis and PDEs - Helsinki, Finland, 2019
- Recent progress in sharp Fourier restriction theory - Congreso Bienal de la Real Sociedad Matemática Española - Santander, Brazil, 2019
- Recent progress in sharp Fourier restriction theory - Symposium in Harmonic Analysis and Geometric Measure Theory - Ribeirão Preto, Brazil, 2018
- Regularity of maximal functions on Hardy-Sobolev spaces - ICM 2018 Satellite Conference Harmonic Analysis - Porto Alegre, Brazil, 2018.
- A study about existence of extremizers for the Fourier restriction inequality on the hyperboloid - Thematic session on harmonic analysis an applications of the Brazilian colloquium of mathematics - IMPA, Brazil, 2017.
- Regularity of maximal operators - Atelier d'Analyse Harmonique - Nantes, France, 2017.
- A study about existence of extremizers for the Fourier restriction inequality on the hyperbola - 2nd Brazilian congress of young researchers in pure and applied mathematics - Unicamp, Brazil, 2016.
- Variation of maximal operators of convolution type - 10th International conference on harmonic analysis and partial differential equations - El Escorial, Spain, 2016.

### Seminar talks

- Recent progress in sharp Fourier restriction theory - Analysis graduate seminar - Universität Bonn, Germany, 2019.
- Some inequalities on the interface of harmonic analysis and differential equations - Differential equations and numerical analysis graduate seminar - UBA, Argentina, 2018.
- Existence of extremizers for Fourier restriciton on hyperboloids - Analysis and PDE seminar - IMPA, Brazil, 2017.
- Existence of extremizers for the Fourier restriction on the hyperboloid - Research Seminar - Aalto University, Finland, 2017.
- A study about existence of extremizers for the Fourier restriction inequality on the hyperboloid - Analysis graduate seminar - Universität Bonn, Germany, 2017.
- Regularity of maximal operators - Analysis graduate seminar - Universität Bonn, Germany, 2016.

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## Visits

- ICTP - Trieste, Italy, September-October 2017.
- Universität Bonn - Bonn, Germany, March-June 2017.
- ICTP - Trieste, Italy, October 2016.
- Universität Bonn - Bonn, Germany, April-June 2016.

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## Grants and Fellowships

- Faperj Ph.D. Fellowship - 2016-2018.
- CNPq Ph.D. Fellowship - 2014-2016.
- Faperj M.Sc. Fellowship - 2013-2014.
- CNPq M.Sc. Fellowship - 2012-2013.

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## Awards and Honors

- Faperj "Doutorado Nota 10" Fellowship for Excellent Students - IMPA- 2016.
- Faperj "Mestrado Nota 10" Fellowship for Excellent Students - IMPA- 2013.
- Award for Academic Distinction - Universidade Federal do Pará - 2012.

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## Teaching Experience

- Teaching Assistant for Functional Analysis - Summer 2017.
- Teaching Assistant for PDE: Linear Theory - Aug - Sep 2016.
- Teaching Assistant for Introduction to Linear Algebra - Summer 2016.
- Teaching Assistant for Measure and Integration - Aug-Nov 2015.
- Teaching Assistant for Analysis on  $R^n$  - Mar-Jun 2015.
- Teaching Assistant for Functional Analysis - Summer 2015
- Teaching Assistant for Measure and Integration - Aug-Nov 2014.
- Teaching Assistant for Probability I - Mar-Jun 2014.
- Teaching Assistant for Markov Chains - Summer 2014.

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## Organizational Service

### Conferences

- Co-organizer of special session "Harmonic analysis and geometric measure theory" at the first 1st Joint Meeting Brazil-France in Mathematics - IMPA, Brazil, 2019.

### Seminars

- Co-organizer of the IMPA student's colloquium - 2012-2016.