

**Emanuel A.S. Carneiro**

Ph.D. in Mathematics

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**PERSONAL**

**Citizenship** Brazilian. Born in October 30, 1980.

**EDUCATION**

**Ph.D. in Mathematics.** 2005 - 2009.

The University of Texas at Austin.

Thesis: Extremality, symmetry and regularity issues in harmonic analysis.

Advisors: William Beckner and Jeffrey Vaaler.

**Master of Sciences in Mathematics.** 2002 - 2004.

Universidade Federal do Ceará - Brazil.

**Bachelor Degree in Mathematics** (Summa Cum Laude). 1999 - 2002.

Universidade Federal do Ceará - Brazil.

**APPOINTMENTS**

**ICTP - Trieste**, Research Scientist, 2018 - present.

**IMPA - Rio de Janeiro**, Associate Professor (tenured), 2016 - present (on leave).

*Chief of Scientific Information, 2017 - 2018.*

**IMPA - Rio de Janeiro**, Assistant Professor, 2011 - 2016.

**McKinsey and Company**, Associate Consultant, 2010 - 2011.

**Institute for Advanced Study, Princeton**, Member, 2009 - 2010.

**RESEARCH PUBLICATIONS**

32. *Extremizers for adjoint Fourier restriction on hyperboloids: the higher dimensional case* (with D. Oliveira e Silva, M. Sousa and B. Stovall), preprint.
31. *Sharp mixed norm spherical restriction* (with D. Oliveira e Silva and M. Sousa), *Adv. Math.*, to appear.
30. *Fourier optimization and prime gaps* (with M. Milinovich and K. Soundararajan), *Comment. Math. Helv.*, to appear.
29. *Extremizers for Fourier restriction on hyperboloids* (with D. Oliveira e Silva and M. Sousa), *Ann. Inst. H. Poincaré Anal. Non Linéaire*, to appear.
28. *Bandlimited approximations and estimates for the Riemann zeta-function* (with A. Chirre and M. Milinovich), *Publ. Mat.*, to appear.
27. *On the variation of maximal operators of convolution type, II* (with R. Finder and M. Sousa), *Rev. Mat. Iberoam.* 34 (2018), 739–766.
26. *Bounding  $S_n(t)$  on the Riemann hypothesis* (with A. Chirre), *Math. Proc. Cambridge Philos. Soc.* 164 (2018), 259–283.

25. *A sharp trilinear inequality related to Fourier restriction on the circle* (with D. Foschi, D. Oliveira e Silva and C. Thiele), *Rev. Mat. Iberoam.* 33 (2017), 1463–1486.
24. *Endpoint Sobolev and BV continuity for maximal operators* (with J. Madrid and L. Pierce), *J. Funct. Anal.* 273 (2017), 3262–3294.
23. *Extremal functions in de Branges and Euclidean spaces, II* (with F. Littmann), *Amer. J. Math.* 139, no. 2 (2017), 525–566.
22. *Hilbert spaces and the pair correlation of zeros of the Riemann zeta-function* (with V. Chandee, F. Littmann and M. Milinovich), *J. Reine Angew. Math.* 725 (2017), 143–182.
21. *Derivative bounds for fractional maximal functions* (with J. Madrid), *Trans. Amer. Math. Soc.* 369 (2017), 4063–4092.
20. *On the argument of L-functions* (with R. Finder), *Bull. Braz. Math. Soc.* 46, No. 4 (2015), 601–620.
19. *A note on the zeros of zeta and L-functions* (with V. Chandee and M. Milinovich), *Math. Z.* 281 (2015), 315–332.
18. *Some sharp restriction inequalities on the sphere* (with D. Oliveira e Silva), *Int. Math. Res. Not. IMRN* vol. 2015 (2015), 8233–8267.
17. *Extremal problems in de Branges spaces: the case of truncated and odd functions* (with F. Gonçalves), *Math. Z.* 280 (2015), 17–45.
16. *Extremal functions in de Branges and Euclidean spaces* (with F. Littmann), *Adv. Math.* 260 (2014), 281–349.
15. *Entire approximations for a class of truncated and odd functions* (with F. Littmann), *J. Fourier Anal. Appl.* 19 (2013), 967–996.
14. *Bandlimited approximations to the truncated Gaussian and applications* (with F. Littmann), *Const. Approx.* 38, No. 1 (2013), 19–57.
13. *Bounding  $S(t)$  and  $S_1(t)$  on the Riemann hypothesis* (with V. Chandee and M. Milinovich), *Math. Ann.* 356, No. 3 (2013), 939–968.
12. *On the variation of maximal operators of convolution type* (with B. F. Svaiter), *J. Funct. Anal.* 265 (2013), 837–865.
11. *Gaussian subordination for the Beurling-Selberg extremal problem* (with F. Littmann and J. D. Vaaler), *Trans. Amer. Math. Soc.* 365 (2013), 3493–3534.
10. *On the endpoint regularity of discrete maximal operators* (with K. Hughes), *Math. Res. Lett.* 19, No. 6 (2012), 1245–1262.
9. *On a discrete version of Tanaka’s theorem for maximal functions* (with J. Bober, K. Hughes and L. Pierce), *Proc. Amer. Math. Soc.* 140 (2012), 1669–1680.
8. *Bounding  $\zeta(s)$  in the critical strip* (with V. Chandee), *J. Number Theory* 131 (2011), 363–384.
7. *Convolution inequalities for the Boltzmann collision operator* (with R. J. Alonso and I. M. Gamba), *Comm. Math. Phys.* 298, No. 2 (2010), 293–322.
6. *Sharp estimates for the Boltzmann collision operator via radial symmetry and Fourier transform* (with R. Alonso), *Adv. Math.* 233, No. 2 (2010), 511–528.
5. *Some extremal functions in Fourier analysis, III* (with J. D. Vaaler), *Const. Approx.* 31, No. 2 (2010), 259–288.
4. *Some extremal functions in Fourier analysis, II* (with J. D. Vaaler), *Trans. Amer. Math. Soc.* 362 (2010), 5803–5843.
3. *A sharp inequality for the Strichartz norm*, *Int. Math. Res. Not. IMRN* 16 (2009), 3127–3145.
2. *Sharp approximations to the Bernoulli periodic functions by trigonometric polynomials*, *J. Approx. Theory* 154 (2008), 90–104.
1. *On the regularity of maximal operators* (with D. Moreira), *Proc. Amer. Math. Soc.* 136 (2008), 4395–4404.

## **AWARDS AND HONORS**

- 2017 CAPES Thesis Prize (Advisor).
- 2017 Carlos Gutierrez Thesis Prize (Advisor), USP - São Carlos.
- 2017 Fulbright Visiting Associate Professor at Stanford University.
- 2015 Simons Associate Fellow of ICTP - Trieste (2015 - 2020).
- 2014 Elected Affiliated Member of the Brazilian Academy of Sciences (2014 - 2018).
- 2009 Member of the Institute for Advanced Study, Princeton.
- 2009 Frank Gerth III Outstanding Dissertation Award - The University of Texas at Austin
- 2007 Frank Gerth III Teaching Award - The University of Texas at Austin.
- 2006 Frank Gerth III Graduate Excellence Award - The University of Texas at Austin.

## **GRANTS AND FELLOWSHIPS**

- 2017 Fulbright Junior Faculty Award - USD 16,000.
- 2015 Simons Associate Fellow of ICTP - Trieste (2015 - 2020) - EUR 15,500.
- 2015 Faperj Junior Scientist (2015 - 2018) - BRL 79,200.
- 2015 CNPq Resarcher - Level 1D (2015 - 2019) - BRL 105,600.
- 2014 Edital Universal CNPq - BRL 14,700.
- 2012 Faperj Junior Scientist (2012 -2015) - BRL 79,200.
- 2012 CNPq Resarcher (2012 - 2015) - Level 2 - BRL 39,600.
- 2011 Edital Universal - CNPq - BRL 14,000.
- 2011 J. T. Oden Faculty Fellow, ICES - The University of Texas at Austin - USD 5,000.
- 2008 Homer Lindsey Bruce Endowed Fellow - The University of Texas at Austin - USD 30,000.
- 2005 CAPES/Fulbright Ph.D. Fellow (2005 - 2009) - USD 105,000.

## **VISITING SCHOLAR POSITIONS (>1 MONTH)**

- 2017 ICTP - Trieste, Italy.
- 2017 Stanford University, USA.
- 2016 ICTP - Trieste, Italy.
- 2014 Hausdorff Institute für Mathematik, Bonn, Germany.
- 2013 Oxford University, UK.
- 2012 The University of Texas at Austin, USA.
- 2011 The University of Texas at Austin, USA.

## **PLENARY ADDRESSES**

### INTERNATIONAL EVENTS:

- 2018 ICM 2018 Satellite Conference in Harmonic Analysis - Porto Alegre, Brazil.
- 2018 UFSCar International Workshop on Partial Differential Equations and Complex Analysis - São Carlos, Brazil.
- 2018 Symposium in Harmonic Analysis and Geometric Measure Theory - Ribeirão Preto, São Paulo, Brazil.
- 2017 CIMPA Research School - IX Escuela Santaló - Harmonic Analysis, Geometric Measure Theory and Applications - Buenos Aires, Argentina.
- 2015 1st Joint Meeting Brazil - Spain in Mathematics - Fortaleza, Brazil.

- 2014 Workshop on Real Analysis, Hausdorff Institute of Mathematics - Bonn, Germany.
- 2013 CIMPA Research School New Trends in Applied Harmonic Analysis - Mar del Plata, Argentina.
- 2013 XXXVII Symposium on Real Analysis - São Carlos, Brazil.
- 2011 International Meeting on Differential Geometry and Partial Differential Equations - Fortaleza, Brazil.

NATIONAL EVENTS (IN BRAZIL):

- 2017 5th Workshop on Analysis and PDEs - Aracaju, Brazil.
- 2015 IX EMED - Encontro Mineiro de Equações Diferenciais - Minas Gerais, Brazil.
- 2014 III Colóquio de Matemática da Região Nordeste - Fortaleza, Brazil.
- 2013 II Colóquio de Matemática da Região Norte - Santarém, Brazil.
- 2012 VI ENAMA - Aracaju, Brazil.

**DEPARTMENT COLLOQUIA**

- 2017 Basic Notions Colloquium, ICTP - Trieste, Italy.
- 2017 UFJF - Juiz de Fora, Brazil.
- 2015 PUC - Rio de Janeiro, Brazil.
- 2014 University of Oregon, USA.
- 2014 USP - São Paulo, Brazil.
- 2014 UFGRS - Porto Alegre, Brazil.
- 2014 Universidad de Costa Rica.
- 2014 IMCA - Lima, Peru.
- 2014 UFC - Fortaleza, Brazil.
- 2012 USP - São Carlos, Brazil.
- 2012 UFSC - Florianópolis, Brazil.
- 2012 North Dakota State University, USA.
- 2011 UFMG - Belo Horizonte, Brazil.

**INVITED SEMINARS**

- 2018 AMS Special Session on Diophantine Approximation and Analytic Number Theory - in honor of Jeffrey Vaaler - AMS/MAA Joint Meetings - San Diego, USA.
- 2018 Caltech Analysis Seminar, Pasadena, USA.
- 2017 Analysis/PDE Seminar, Universität Bonn, Germany.
- 2017 Number Theory Seminar, ICTP - Trieste, Italy.
- 2017 Number Theory Seminar, EPFL - Lausanne, Switzerland.
- 2017 II Mathematical Congress of Americas, Analysis & Number Theory Session / Advances in Algebraic and Analytic Number Theory Session - Montreal, Canada.
- 2017 Joint Analytic Number Theory/Harmonic Analysis Seminar, MSRI - Berkeley, USA.
- 2017 Number Theory Seminar, Stanford University, USA.
- 2016 Analysis Seminar, ICTP - Trieste, Italy.
- 2016 Number Theory Session of the XXI Coloquio Latinoamericano de Algebra - Buenos Aires, Argentina.
- 2016 Nonlinear PDE's at IMPA, Brazil.

2016 Analysis/PDE Seminar, UFRJ - Rio de Janeiro, Brazil.

2015 Workshop on Geometry, Algebra and Analysis of Algebraic Numbers - Banff, Canada.

2015 Analysis Seminar, Universidade de Coimbra, Portugal.

2015 Geometric Aspects of Harmonic Analysis - AMS/EMS/SPM Meeting - Porto, Portugal.

2015 Number Theory Seminar, University of Michigan - Ann Arbor, USA.

2015 Number Theory Seminar, UnB - Brasilia, Brazil.

2015 COLGA (Colóquio de Geometria e Aritmética do Rio de Janeiro), UFF - Niterói, Brazil.

2014 Oberseminar Analysis, Universität Bonn, Germany.

2014 Real and Harmonic Analysis, Oberwolfach, Germany.

2014 Number Theory at Illinois, *in honor of the Batemans and H. Halberstam*, USA.

2014 Number Theory Seminar, University of Mississippi, USA.

2014 V Intl. Conf. in Computational and Applied Harmonic Analysis, Vanderbilt Univ., USA.

2014 Number Theory Seminar, University of Oregon, USA.

2014 Analysis Seminar, University of Oregon, USA.

2014 Analysis/PDE Seminar, Oregon State University, USA.

2013 I Mathematical Congress of Americas, Number Theory Session - Guanajuato, Mexico.

2013 XXIX Brazilian Colloquium of Mathematics, PDE Session - Rio de Janeiro, Brazil.

2013 Analysis/PDE Seminar UNICAMP - Campinas, Brazil.

2013 Analysis Seminar, Université Pierre et Marie Curie, Paris VI - Jussieu - Paris, France.

2013 Analysis Seminar, University of Edinburgh, UK.

2013 Number Theory Seminar, Oxford University, UK.

2013 Number Theory Seminar, UnB - Brasilia, Brazil.

2012 Number Theory Seminar, The University of Texas at Austin, USA.

2012 Analysis/PDE Seminar, The University of Texas at Austin, USA.

2011 MathAmSud Seminar, Assunción, Paraguai.

2010 Number Theory Seminar, The University of Texas at Austin, USA.

2010 Analysis Seminar, Univ. of Pennsylvania, USA.

2010 Analysis/Math Physics Seminar, Institute for Advanced Study, Princeton, USA.

2010 PDE/Applied Math Seminar, University of Maryland, USA.

2009 PDE/ Applied Math Seminar, Brown University, USA.

2009 Analysis Seminar, The University of Texas at Austin, USA.

2009 Analysis/PDE Seminar, University of Iowa, USA.

2008 II Workshop on Harmonic Analysis and Partial Differential Equations - Merida, Mexico.

2008 24th Southeastern Analysis Meeting, Vanderbilt Univ., USA.

## GRADUATE STUDENTS

### Ph.D.

8. Oscar Emilio Quesada Herrera, Ph.D. IMPA, 2022 (expected).
7. Daniel da Silva Nunes, Ph.D. IMPA, 2021 (expected).
6. Cristian Andres Gonzalez Riquelme, Ph.D. IMPA, 2021 (expected).
5. Carlos Andrés Chirre Chavez, Ph.D. IMPA, 2019 (expected).

4. Mateus Sousa, Ph.D. IMPA, 2017.  
Thesis: *Some sharp inequalities in harmonic analysis*.  
Post-doctoral placement: Univ. of Buenos Aires (2018) and LMU Munich (2018 - 2021).
3. Renan Finder, Ph.D. IMPA, 2016.  
Thesis: *Variation-diminishing maximal operators and the argument of L-functions*.  
Post-doctoral placement: Univ. Göttingen - Germany (2016 - 2019).
2. Jose Ramon Madrid Padilla, Ph.D. IMPA, 2016.  
Thesis: *Regularity of fractional maximal functions and extremal functions of exponential type*  
Post-doctoral placement: Aalto Univ.-Helsinki (2016 - 2017) and ICTP - Trieste (2017 - 2018).  
Currently at: UCLA (2018 - 2021).
1. Felipe Gonçalves, Ph.D. IMPA, 2016.  
Thesis: *Extremal problems, reconstruction formulas and approximations of Gaussian kernels*.  
Carlos Gutierrez Thesis Prize, USP - São Carlos, 2017.  
IMPA Best Thesis Prize, 2017.  
CAPES Thesis Prize, 2017.  
Post-doctoral placement: Univ. of Alberta - Canada (2016 - 2018).  
Currently at: Universität Bonn (2018 - 2023).

### **M.Sc.**

6. Tainara Gobetti Borges, M.Sc. IMPA, 2020 (expected).
5. Cynthia Bortolotto, M.Sc. IMPA, 2020 (expected).
4. Gerardo Sigfredo Fisch Paredes, M.Sc. IMPA, 2019 (expected).
3. Alvaro Almeida Gomez, M.Sc. IMPA, 2017.
2. Itamar Sales de Oliveira, M.Sc. UFC, 2016 (co-advised with Diego Moreira - UFC).
1. Renan Finder, M.Sc. IMPA, 2012.

### **(CO)-ORGANIZATION OF EVENTS**

- 2018 Member of the Executive Committee of the International Congress of Mathematicians  
Chair of the Scientific Program Subcommittee - Rio de Janeiro.
- 2017 Harmonic Analysis Session - Brazilian Colloquium of Mathematics - IMPA.
- 2016 Special Session "Harmonic Analysis and Geometric Measure Theory" at the V Latin American Congress of Mathematicians, Colombia.
- 2015 International Conference in Number Theory and Physics - IMPA.
- 2015 Thematic Program Current Trends in Analysis and Partial Differential Equations - IMPA.
- 2015 School of High Studies CAPES - featuring Luis Caffarelli - IMPA.
- 2015 International Conference on Current Trends in Analysis and Partial Differential Equations - IMPA.
- 2015 International Workshop on Elliptic and Kinetic PDEs - IMPA.
- 2015 Harmonic Analysis Session - Brazilian Colloquium of Mathematics - IMPA.
- 2011 Analysis/PDE Session - Brazilian Colloquium of Mathematics - IMPA.
- 2011 Co-organizer of the Analysis/PDE Seminar at IMPA (2011 - 2018).

### **TEACHING AT IMPA**

- 2018 Topics in Analysis: Sphere packings, Fourier analysis and beyond
- 2018 Analytic Number Theory
- 2018 Elements of Analysis
- 2016 Partial Differential Equations II

2016 Linear Algebra  
2015 Harmonic Analysis  
2015 Analytic Number Theory  
2014 Spectral Theory  
2014 Functional Analysis  
2013 Topics in Analysis: Hilbert spaces of entire functions  
2013 Analytic Number Theory  
2012 Harmonic Analysis  
2012 Functional Analysis  
2011 Partial Differential Equations I

### **EDITORIAL SERVICE**

2017 Chief of Scientific Information - IMPA (2017 - 2018)  
(*overseeing 10 staff members in 3 divisions: IMPA Library, IMPA Publications and IMPA Videos / Multimedia*).  
2014 Member of Editorial Board of IMPA Monographs - Springer (2014 - present).

### **DISSEMINATION AND OUTREACH WORK**

As part of the dissemination effort, over the last years I had five of my courses at IMPA entirely recorded, in a total more than 100 lectures of 1:30h to 2h each. These are on the IMPA channel at youtube.com (<https://www.youtube.com/user/impabr>), available for free to the general public.

2018 Sphere packings, Fourier analysis and beyond (Ph.D.) - with Felipe Gonçalves - 25 lectures.  
2015 Harmonic Analysis (Ph.D.) - 30 lectures.  
2015 Analytic Number Theory (Ph.D.) - 20 lectures.  
2013 Hilbert Spaces of Entire Functions (Ph.D.) - 25 lectures.  
2011 Partial Differential Equations (M.Sc.) - 25 lectures.

Before going to the U.S. for my Ph.D., I was a high school teacher for almost seven years in my hometown of Fortaleza, Brazil. I served at the Brazilian Mathematical Olympiad Executive Board (from 2000 - 2016) and I was a member of IMO 2017 Problem Coordination. Every year I deliver several lectures aimed at undergrads, high school and middle school students.

### **COMMITTEE SERVICE**

2011 Graduate School Committee at IMPA (2011 - present).  
2015 Planning and Projects Committee at IMPA (2015 - present).