

**Curriculum Vitae**  
Fernando Codá Marques  
January 16<sup>th</sup>, 2019

**Personal information**

Name: Fernando Codá Marques  
Date of birth: October 8<sup>th</sup> of 1979  
Nationality: Brazilian

**Address**

Princeton University  
Fine Hall, Washington Road  
Princeton NJ 08544-1000 USA  
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**Education**

2000-2003 **Ph.D. in Mathematics**

Cornell University, C. U., Ithaca/NY USA

Thesis Advisor : José F. Escobar

Title : *Existence and compactness theorems on conformal deformations of metrics*

Scholarship from : Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

1998-1999 **Mathematics M.S.**

IMPA, Rio de Janeiro/RJ Brazil

Scholarship from : Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

1996-1999 **Mathematics B.S.**

UFAL - Universidade Federal de Alagoas

Maceió, Alagoas - Brazil

## Employment history

2003-2007	Assistant Professor, IMPA
2007-2010	Associate Professor, IMPA
2010-2014	Professor, IMPA
2014-	Professor, Princeton University

## Visiting Positions

2018	Distinguished Visitor Professor, IAS, Princeton - Special Program 2018-2019: “Variational Methods in Geometry”
2017	Dean’s Distinguished Visiting Professor, Fields Institute, Toronto, Canada
2013-2014	École Polytechnique, École Normale Supérieure and Université Paris-Est Marne la Vallée, Paris, France
2012	Institut Henri Poincaré, Paris, France (1 month)
2011	Stanford University, USA (2 months)
2011	Institut Fourier, Grenoble, France (1 month)
2010	Stanford University, USA (3 months)
2009	Stanford University, USA (1 month)
2008	Member of the Institute for Advanced Study (IAS), USA (3 months)
2008	Princeton University, USA (1 month)
2005-2006	Stanford University, USA (1 year)

## Research interests

Mathematics  
Differential Geometry  
Geometric Partial Differential Equations  
General Relativity

## **Honors and Awards**

- 2018 Fellow of the American Mathematical Society
- 2016 Oswald Veblen Prize, American Mathematical Society
- 2014 Plenary Speaker, International Congress of Mathematicians  
- ICM 2014, Seoul (Korea)
- 2014 Member of the Brazilian Academy of Sciences, Brazil
- 2012 TWAS Prize in Mathematics
- 2012 Ramanujan Prize - ICTP, Abel Memorial Fund and IMU
- 2012 UMALCA Prize, Union Matematica de America Latina y el Caribe
- 2011 TWAS-ROLAC Young Scientist Prize
- 2011 Affiliated Member of the TWAS  
- Academy of Sciences for the Developing World, TWAS
- 2010 Invited Speaker, International Congress of Mathematicians  
- ICM 2010, Hyderabad (India)
- 2001 Battig Prize, Cornell University, USA.

## **Special Lectures**

- 2018 Takagi Lectures, Mathematical Society of Japan, Tokyo, Japan
- 2017 Jane and Roland Blumberg Lecture, University of Texas at Austin, USA
- 2016 Evans Lectures, Cornell University, USA
- 2016 Zygmund-Calderón Lectures, University of Chicago, USA
- 2016 Chern Lectures, Tsinghua University, Beijing, China
- 2016 D'Atri Memorial Lectures, Rutgers University, USA
- 2015 Distinguished Lectures, University of California, Irvine, USA
- 2014 Joseph Fels Ritt Lectures, Columbia University, USA
- 2014 S. Lojasiewicz Lecture, Jagiellonian University, Krakow, Poland

- 2013 Hadamard Lectures, Institut Henri Poincaré, Paris, France
- 2013 Yamabe Lectures, Northwestern University, USA
- 2013 Barrett Memorial Lectures, University of Tennessee - Knoxville, USA

### **Editorial boards**

Annales de l'Institut Fourier  
 Annals of Mathematics  
 Bulletin of the Brazilian Mathematical Society  
 Journal of Differential Geometry  
 Journal de l'École Polytechnique  
 Mathematische Annalen

### **Scientific Committees**

- 2018 Modern Trends in Differential Geometry,  
 - ICM Satellite Conference, São Paulo, Brazil
- 2017 Special Session in Geometric Analysis,  
 - Mathematical Congress of the Americas, Montreal, Canada
- 2016 ICM 2018 - Chair of the Geometry Section Panel, Rio de Janeiro - Brazil
- 2011- 2018 Annual Workshop on Differential Geometry, Maceió, Brazil
- 2010- 2014 Scientific Activities Committee (CAC), IMPA - Rio de Janeiro, Brazil
- 2014 18th Brazilian School on Differential Geometry, Brasília, Brazil
- 2010- 2013 Technical Scientific Board (CTC), IMPA - Rio de Janeiro, Brazil
- 2013 Differential Geometry and Analysis Conference, IHP - Paris, France
- 2013 29th Brazilian Colloquium of Mathematics, IMPA - Rio de Janeiro, Brazil
- 2012 ICM 2014 - Member of the Geometry Section Panel, Seoul - Korea
- 2012 17th Brazilian School on Differential Geometry, Manaus, Brazil

## Grant Support

- 2018-        NSF Grant DMS-1811840
- 2015- 2018  NSF Grant DMS-1509027
- 2012- 2015  Universal Project, CNPq, Brazil
- 2012- 2014  Young Scientist, FAPERJ, Rio de Janeiro - Brazil
- 2007- 2013  Research Fellowship, CNPq, Brazil
- 2010- 2012  Universal Project, CNPq, Brazil
- 2009- 2011  Young Scientist, FAPERJ, Rio de Janeiro - Brazil

## Preprints

- (with Neves, A.), “Morse index of multiplicity one min-max minimal hypersurfaces”, *arXiv:1803.04273 [math.DG]*, (2018)
- (with Bessieres, L., Besson, G., and Maillot, S.) “Deforming 3-manifolds of bounded geometry and uniformly positive scalar curvature”, *arXiv:1711.02457 [math.DG]* (2017)

## Publications

- (with Neves, A. and Song, A.), “Equidistribution of minimal hypersurfaces for generic metrics”, *arXiv:1712.06238*, to appear in *Inventiones Mathematicae*
- (with Ketover, D. and Neves, A.), “The catenoid estimate and its geometric applications”, *arXiv:1601.04514 [math.DG]*, to appear in *Journal of Differential Geometry*
- (with Irie, K. and Neves, A.), “Density of minimal hypersurfaces for generic metrics”, *Annals of Mathematics* **187** 3 (2018), 963–972
- (with Liokumovich, Y. and Neves, A.), “Weyl law for the volume spectrum”, *Annals of Mathematics* **187** 3 (2018), 933–961

- (with Neves, A.), “Existence of infinitely many minimal hypersurfaces in positive Ricci curvature”, *Invent. Math.* **209** no.2 (2017) 577–616
- (with Neves, A.), “Morse index and multiplicity of min-max minimal hypersurfaces”, *Cambridge Journal of Math.* **4** no.4 (2016) 463–511
- (with Agol, I. and Neves, A.), “Min-max theory and the energy of links”, *Journal of the Amer. Math. Soc.* **29** (2016) no. 2, 561–578.
- (with Neves, A.) “Min-max theory of minimal surfaces and applications”, Mathematical Congress of the Americas, 13–25, *Contemp. Math.*, **656**, Amer. Math. Soc. (2016)
- (with Neves, A.), “The Willmore conjecture”, *Jahresber. Dtsch. Math.-Ver.*, **116** (2014) no. 4, 201–222.
- “Minimal surfaces - variational theory and applications”, *Proceedings of the International Congress of Mathematicians - Seoul, Korea* (2014)
- (with Neves, A.), “Min-max theory and the Willmore conjecture”, *Annals of Mathematics*, **179** 2 (2014), pp. 683–782.
- (with Neves, A.), “Applications of Almgren-Pitts Min-max theory”, *Current Developments in Mathematics 2013*, (2014) pp 1–71.
- (with Neves, A.), “Min-max theory, Willmore conjecture and the energy of links”, *Bull. Braz. Math. Soc. (N.S.)* **44** (2013), no. 4, 681–707.
- (with Neves, A.), “Rigidity of min-max minimal spheres in three-manifolds”, *Duke Math. J.*, **161** 14 (2012), pp. 2725–2752.
- “Deforming three-manifolds with positive scalar curvature”, *Annals of Mathematics*, **176**, (2012), pp. 815–863
- (with Brendle, S. and Neves, A.) “Deformations of the hemisphere that increase scalar curvature”, *Invent. Math.*, **185**, (2011), pp. 175–197
- (with S. Brendle), “Recent progress on the Yamabe Problem”, *Surveys in Geometric Analysis and Relativity*, book dedicated to the 60th birthday of Richard Schoen, (2011).
- (with Brendle, S.) “Scalar curvature rigidity of geodesic balls in  $S^n$ ”, *Journal of Differential Geometry*, **88**, 3, (2011), pp 379–394

- “Scalar curvature, conformal geometry, and the Ricci flow with surgery”, *Proceedings of the International Congress of Mathematicians - Hyderabad, India* (2010)
- “Uma introdução ao Fluxo de Ricci”, book published for *XVI Differential Geometry School*, São Paulo - Brazil (in Portuguese).
- “Blow-up examples for the Yamabe Problem”, *Calculus of Variations and Partial Differential Equations*, **36**, (2009), pp. 377-397
- (with Brendle, S.) “Blow-up phenomena for the Yamabe equation II”, *Journal of Differential Geometry*, **81**, (2009), pp. 225-250
- (with Khuri, M. and Schoen, R.) “A Compactness Theorem for the Yamabe Problem”, *Journal of Differential Geometry*, **81**, (2009), pp. 143-196
- “Isolated singularities of solutions to the Yamabe equation”, *Calculus of Variations and Partial Differential Equations*, **32**, (2008), pp. 349-371
- “Conformal deformations to scalar-flat metrics with constant mean curvature on the boundary”, *Communications in Analysis and Geometry*, **15**, (2007), pp. 381-405
- “On the mathematical work of José F. Escobar”, *Matemática Contemporânea*, **29**, (2005)
- “A priori estimates for the Yamabe problem in the non-locally conformally flat case”, *Journal of Differential Geometry*, **71** n. 2, (2005), pp. 315-346
- “Existence results for the Yamabe problem on manifolds with boundary”, *Indiana University Mathematics Journal*, **54** n. 6, (2005), pp. 1599-1620
- (with Alencar, H. and do Carmo, M.) “Upper bounds for the first eigenvalue of the operator  $L_r$  and some applications”, *Illinois Journal of Mathematics*, **45** n. 3, (2001), pp. 851-863.

**Current Ph.D. Students:** Daniel Stern (Princeton Univ.), Antoine Song (Princeton Univ.), Akashdeep Dey (Princeton Univ.), Yangyang Li (Princeton Univ.), Ben Lowe (Princeton Univ.), Lorenzo Sarnataro (Princeton Univ.), Sidney Donato (Brazil), Eduardo Hitomi (Brazil), Alejandra Ramirez Luna (Colombia)

### **Supervised Ph.D. Dissertations**

- 2018 Pedro Gaspar, IMPA-Brazil
- 2018 Rayssa Caju, Federal University of Paraiba (UFPB)-Brazil  
- Joint Supervision
- 2017 Jhovanny Muñoz, IMPA-Brazil
- 2016 Abraão Mendes, Federal University of Alagoas (UFAL)-Brazil  
- Joint Supervision
- 2016 Marco Guaraco, IMPA-Brazil
- 2015 Rafael Montezuma, IMPA-Brazil  
- 2016 CAPES Thesis Prize  
- 2016 Carlos Gutiérrez Thesis Prize
- 2015 Cristina Levina, IMPA-Brazil
- 2014 Lucas Ambrozio, IMPA-Brazil  
- 2015 CAPES Thesis Prize  
- 2015 Carlos Gutiérrez Thesis Prize
- 2011 Ivaldo Paz Nunes, IMPA-Brazil  
- 2012 CAPES Thesis Prize
- 2009 Almir Rogerio Silva Santos, IMPA-Brazil
- 2009 Sergio Almaraz, IMPA-Brazil.



## Invited Talks

- 2018 Taipei Conference on Geometric Invariance and Partial Differential Equations  
Academia Sinica, Taipei, Taiwan
- 2018 Members Seminar, IAS, Princeton
- 2018 Minimal Surfaces and Mean Curvature Flow, Stanford University, USA
- 2018 Department Colloquium, Princeton University, USA
- 2017 Schock Prize Symposium, Institut Mittag-Leffler, Stockholm, Sweden
- 2017 Workshop on General Relativity and AdS/CFT, Fields Institute, Canada
- 2017 Colloquium at the University of Toronto, Canada
- 2017 Colloquium at McMaster University, Canada
- 2017 Geometry of Manifolds, Simons Center, Stony Brook, USA
- 2017 Third Pacific Rim Mathematical Association (PRIMA) Conference  
Plenary Speaker, Oaxaca, Mexico
- 2017 Third Pacific Rim Mathematical Association (PRIMA) Conference  
Differential Geometry Session, Oaxaca, Mexico
- 2017 Advances in Geometric Analysis, ETH, Zürich, Switzerland
- 2017 JDG Conference 50th Birthday, Harvard University, USA
- 2017 Georgia International Topology Conference, Athens, USA
- 2017 Invited Address at AMS Sectional Meeting, CUNY, USA
- 2017 Metro Area Differential Geometry Seminar, Johns Hopkins, USA
- 2016 Department Colloquium, Princeton University, USA
- 2016 XIX Differential Geometry School, IMPA - Brazil
- 2016 Seminar at IAS, Princeton, USA
- 2016 31st Geometry Festival, Princeton University, USA
- 2015 Geometric non-linear analysis conference, ETH, Zürich, Switzerland
- 2015 WHIFF Lecture, Princeton University, USA

- 2015 Princeton-Rutgers Joint Seminar in Geometric PDEs, Rutgers
- 2015 F&F Workshop on Geometric Analysis, Frankfurt, Germany
- 2015 Congress of Real Sociedad Matematica Española, Granada, Spain
- 2015 Southern California Geometric Analysis Seminar, San Diego, USA
- 2014 XVIII Differential Geometry School, Brasilia - Brazil
- 2014 Colloquium at SUNY Stony Brook, USA
- 2014 Colloquium at Lehigh University, USA
- 2014 JDG Conference, Harvard University, USA
- 2014 ICTP 50th Anniversary Conference, Trieste, Italy
- 2014 Rutgers University, USA
- 2014 Geometric Analysis Conference, IST - Lisbon, Portugal
- 2014 ETH (mini course), Zürich, Switzerland
- 2014 Séminaire du Laboratoire Jacques-Louis Lions, Jussieu, Paris
- 2014 Colloquium at Université Lyon, Lyon, France
- 2014 Colloquium at University of Cyprus, Nicosia, Cyprus
- 2014 Colloquium at Université de Lorraine, Nancy
- 2014 ICMC Summer Meeting on Differential Equations, São Carlos, Brazil
- 2014 Séminaire Parisien d'Optimisation, Institut Henri Poincaré
- 2014 Geometry Day, Università degli Studi dell'Insubria, Como, Italy
- 2013 Special Day on Geometry and PDE, Columbia University
- 2013 TWAS 24th General Meeting, Buenos Aires, Argentina
- 2013 Analysis and Geometry Seminar, Paris 6
- 2013 Colloquium at Institut Fourier, Grenoble
- 2013 "The Willmore functional and the Willmore conjecture" Mini-workshop Oberwolfach -Germany
- 2013 Park City Mathematics Institute, Geometric Analysis (minicourse), USA
- 2013 Mathematical Congress of the Americas, Guanajuato, Mexico
- 2013 Plenary lecture, 29th Brazilian Colloquium of Mathematics, IMPA Rio de Janeiro, Brazil

- 2013 Encounters in Geometry, Cabo Frio - Brazil
- 2012 IMPA 60 Years, IMPA, Rio de Janeiro - Brazil
- 2012 Henri Poincaré Interdisciplinary Colloquium, IMPA, Rio de Janeiro - Brazil
- 2012 3rd Indo-Brazilian Symposium in Mathematics, IMPA, Rio de Janeiro - Brazil
- 2012 Geometric PDEs Conference, IHP - Paris, France
- 2012 Conformal and Kahler Geometry Program, minicourse, IHP - Paris, France
- 2012 Ramanujan Prize Lecture, ICTP - Trieste, Italy
- 2012 Workshop on the Willmore conjecture, University of Granada, Spain
- 2012 Conference Geometric Measure Theory, Albert Einstein Institute  
Potsdam, Germany
- 2012 ICTP-ESF Conference on Geometric Analysis, ICTP-Trieste, Italy
- 2012 Geometrie Workshop, Oberwolfach - Germany
- 2012 University of Zurich, Switzerland
- 2012 University of Warwick, UK
- 2012 Stanford University, USA
- 2012 Bay Area Differential Geometry Seminar, Stanford University, USA
- 2012 Miami University, USA
- 2012 27th Annual Geometry Festival, Duke University, USA
- 2012 UMALCA Prize Lecture, Cordoba, Argentina
- 2012 IV CLAM Latin American Congress of Mathematicians, Cordoba, Argentina
- 2012 XVII Differential Geometry School, Manaus - Brazil
- 2012 II EIMAN, UFS, Aracaju, Brazil
- 2012 II Workshop on Differential Geometry, UFAL, Maceio, Brazil
- 2011 Chern Centennial Conference, MSRI, Berkeley, USA (November)
- 2011 Beijing International Center for Mathematical Research, Peking University, China
- 2011 Geometric Analysis, Edinburgh, Scotland
- 2010 PRIMA Conference on Geometric Analysis, University of British Columbia  
Vancouver, Canada
- 2010 XVI Differential Geometry School, Sao Paulo - Brazil

2010 Imperial College, London, England  
2010 University of Warwick, England  
2010 Geometrie Workshop, Oberwolfach - Germany  
2010 University of Texas, Austin, USA  
2010 Stanford University, Stanford, USA  
2010 University of Texas, Austin, USA  
2009 III CLAM Latin American Congress of Mathematicians, Santiago, Chile  
2009 International Conference - Spectral Theory and Geometry, Grenoble, France  
2009 TWAS-ROLAC 5th Young Scientist Conference, Rio de Janeiro, Brazil  
2009 Bay Area Differential Geometry Seminar, Stanford University, USA  
2009 Duke University, USA  
2008 City University of New York, USA  
2008 University of Pennsylvania, USA  
2008 Princeton University, USA  
2008 Institute for Advanced Study, Princeton, USA  
2008 XV Differential Geometry School, Fortaleza - Brazil  
2008 Ricci flow and related topics, Institut Henri Poincare (IHP), Paris - France  
2007 Loss of compactness in nonlinear PDE : Recent trends,  
at Banff International Research Station, Canada  
2007 International Congress on Minimal and Constant Mean  
Curvature Surfaces, Buzios - Brazil  
2006 Workshop on Geometric and Nonlinear Analysis,  
at Banff International Research Station, Canada  
2006 XIV Differential Geometry School, Salvador - Brazil  
2006 Duke University, USA  
2006 Ohio State University, USA

- 2006 Princeton University, USA
- 2006 University of California, San Diego, USA
- 2006 International Conference in Memory of José Escobar  
- Chepe, Universidad del Valle, Cali - Colombia
- 2005 25<sup>th</sup> Brazilian Colloquium of Mathematics, Rio de Janeiro - Brazil
- 2004 XIII Differential Geometry School, São Paulo - Brazil
- 2004 Second Latin American Congress of Mathematicians  
(UMALCA), Cancun - Mexico
- 2003 24<sup>th</sup> Brazilian Colloquium of Mathematics, Rio de Janeiro - Brazil
- 2002 XII Differential Geometry School, Goiânia - Brazil
- 1998 22<sup>nd</sup> Brazilian Colloquium of Mathematics, Rio de Janeiro - Brazil