

Roberto Imbuzeiro Oliveira

Professor, IMPA

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Introduction

Brief bio: Roberto Imbuzeiro Oliveira (b. 1977) is a full professor at IMPA and a level 1C research fellow at CNPq. Roberto's research interests are in Probability and related disciplines such as Statistics, Discrete Math and Quantum Information, especially as they pertain to systems with many degrees of freedom. Roberto holds a Ph.D. degree from the Courant Institute at New York University (2004), where he was advised by Joel Spencer. Previous degrees include a B.Sc. in Math from PUC-Rio (1999) and a M.Sc. in Math from IMPA (2000). Prior to joining the faculty of IMPA in 2006, Roberto was a Postdoctoral Researcher with the Physics of Information group at IBM TJ Watson Research Center, where he was mentored by Barbara Terhal.

Personal information

Full name	Roberto Imbuzeiro Moraes Felinto de Oliveira
Birth	September 6 th , 1977 - Rio de Janeiro, RJ, Brazil
Nationality	Brazilian
Languages	Portuguese (mother tongue), English (fluent), Spanish (intermediate/advanced)
Family status	Married with three children (b. 2007, 2009, 2012)

Education

Courant Institute of Mathematical Sciences, New York University (NYU), New York, NY, USA

2000 - 2004 PhD. in Mathematics. Advisor: Joel Spencer.

Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, RJ, Brazil

1999 - 2000 Mestrado em Matemática (M.Sc. in Math). Advisor: Marcelo Viana.

Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio), Rio de Janeiro, RJ, Brazil

1995 - 1999 Bacharelado em Matemática (B.Sc. in Math). Advisor: Ricardo de Sá Earp

Employment history

Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, RJ, Brazil

2006 - present Pesquisador (researcher/professor)

Levels: assistant (2006-2010), associate (2010-2017), and full (2017-present).

Main activities/responsibilities: scientific research in Probability, Statistics and related topics. Advising and mentoring graduate students and postdoctoral associates (50+ individuals). Teaching classes at the graduate level (28+ classes). Organization of 15 scientific events, seminars and working groups involving faculty and students. Various other service activities such as associate editorships in two journals.

2016 - 2018 Gerente de Planejamento e Projetos (Head for Projects and Planning)

Main responsibilities: in charge of applications and administration of funding for IMPA's scientific projects. Oversight of campus expansion.

2014 - 2016 Coordenador de Ensino (Head of Graduate Studies)

Main responsibilities: student admissions to all of IMPA's graduate programs. General oversight over all classes and advising relationships. Reviewing rules for graduate programs.

IBM T.J. Watson Research Center, Yorktown Heights, NY, USA

2004 - 2006 Post-doctoral researcher in Physics of Information, mentored by Barbara Terhal

Main responsibilities: conducting research on complex networks and quantum information theory.

Courant Institute of Mathematical Sciences, New York University (NYU), New York, NY, USA

2003 - 2004 Research and teaching assistant

Main responsibilities: teaching and conducting research on Cryptography.

Teaching

[all classes at IMPA unless otherwise stated]

Regular classes	Analysis over \mathbb{R} , Analysis over \mathbb{R}^n (multiple times), Complex Analysis (2x), Introduction to Combinatorics (2x), Functional Analysis, Measure and Integration (2x) Probability I (multiple times), Probability II (multiple times), Probability on Graphs, Random Graphs and Concentration Inequalities, Stochastic Processes, Topics in Mathematical Statistics (2x).
Minicourses	Chaining and concentration of measure, Mathematics of card shuffling (invited minicourses in Campinas and Florianópolis, with Marcelo Hilário)

Awards, scholarships and research grants (as PI or co-PI)

[funding for events is not included here]

Academia Brasileira de Ciências (Brazilian Academy of Sciences)

2012 - 2017 Associate (junior) member

Fundação Carlos Chagas de Amparo à Pesquisa no Rio de Janeiro (FAPERJ), Brazil

2016 - 2019 Cientista do Nosso Estado
BRL 75,600.00 grant for travel, visitors, equipment

Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brazil

2015 - 2017 Ciência sem Fronteiras (Science without borders)
Co-PI with Gábor Lugosi (ICREA/Universitat Pompeu Fabra)
BRL 692,461.12 grant for travel, visitors, postdocs and student exchanges

2016 - 2019 Bolsa de produtividade em pesquisa – award + personal grant
Level 1C (BRL 27,000.00/year – third highest of five levels)

2012 - 2015 Bolsa de produtividade em pesquisa – award + personal grant
Level 1D (BRL 27,000.00/year – fourth highest of five levels)

2007 - 2012 Bolsa de produtividade em pesquisa – award
Level 2 (BRL 14,400.00/year)

2000 - 2004 PhD scholarship

1998 - 1999 MSc scholarship

Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio), Rio de Janeiro, RJ, Brazil

1995 - 1998 Bolsa de desempenho acadêmico
Full-tuition merit-based scholarship awarded to top 4% of entering class in STEM.

Selected evaluation and committee activities

Comissão de Aperfeiçoamento de Pessoal do Nível Superior (CAPES), Brasília, DF, Brazil

2018 – present Deputy Head of the Advisory Committee for Mathematics and Statistics
2017 Member of the Advisory Committee for Mathematics and Statistics

Main responsibilities: evaluating and ranking all of Brazil's graduate programs in Math and Statistics.

Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brasília, DF, Brazil

2008 - present Evaluated proposals for grants and fellowships (PhD abroad and postdocs)

Editorial work

ALEA: Latin American Journal of Probability and Statistics (ISSN 1980-0436)

2017 - present Associate editor

Operations Research (INFORMS Journal - ISSN 0030-364X)

2018 - present Associate editor for Machine Learning and Data Science

Sociedade Brasileira de Matemática (SBM – Brazilian Math Society)

2017 - present Deputy editor of “Fronteiras da Matemática” book collection of advanced mathematical monographs (main editor: Eduardo Teixeira)

2010 - 2011 Chief editor for books

Selected invited talks and research visits since 2007

- 2018 Probability and Combinatorics: 13th Annual Workshop, Holetown, Barbados
 Workshop on Combinatorial Statistics, CRM, Montréal, Canada
 Workshop on Concentration of Measure and its Applications, IESC Cargèse, France
- 2017 National Week of Science and Technology, CEFET, Belo Horizonte, MG, Brazil
 Duke University, Durham, NC, USA
- 2016 ENSAE, Malakoff, Île-de-France, France
 Université Paris-Diderot, Paris, Île-de-France, France
 MIT Statistics and Stochastics Seminar, Boston, MA, USA
 Probability and Combinatorics: Eleventh Annual Workshop, Holetown, Barbados
 Federal University of Minas Gerais, Belo Horizonte, MG, Brazil
 NeuroMat Project Workshop, São Paulo, SP, Brazil
- 2015 IMA Workshop on the Power of Randomness in Computation, Atlanta, GA, USA
 IMA Workshop on Information Theory and Concentration Phenomena,
 Brazilian Probability School, Maresias, SP, Brazil
- 2014 XIII CLAPEM, Cartagena de Índias, Colombia
 Probability and Combinatorics: Ninth Annual Workshop, Holetown, Barbados
 Math Colloquium of Southern Brazil, Florianópolis, SC, Brazil
 21°. SINAPE, Natal, RN, Brazil
 Federal University of Santa Catarina, Florianópolis, SC, Brasil
- 2013 Microsoft Research, Redmond, WA, USA
 Pacific Northwest Probability Seminar, Seattle and Redmond, WA, USA
 VI Biannual meeting of the Brazilian Math Society, Campinas, SP, Brazil
 Probability and Combinatorics: Eighth Annual Workshop, Holetown, Barbados
- 2012 Stouffer Colloquium at University of Kansas, Lawrence, KS, USA
 Microsoft Research, Redmond, WA, USA

- 2011 XXVIII Brazilian Math Colloquium, Rio de Janeiro, RJ, Brazil
Escuela de Matemáticas de América Latina y Caribe (EMALCA), Potosí, Bolivia
McGill University, Montréal, QC, Canada
Workshop on Mathematical Physics, Belo Horizonte, MG, Brazil
- 2010 NUMEC/Universidade de São Paulo, São Paulo, SP, Brazil
Duke University, Durham, NC, USA
- 2009 III School for Gold Medalists of the Brazilian Math Olympiad for Public Schools (OBMEP), Nova Friburgo, Brazil
- 2008 Algorithms and Randomness Center (ARC), GeorgiaTech, Atlanta, GA, USA
Federal University of Minas Gerais, Belo Horizonte, MG, Brazil
NUMEC/Universidade de São Paulo, São Paulo, SP, Brazil
- 2007 Workshop on Randomness and Enumeration, Cuarcacautín, Chile
Workshop on Quantum Hamiltonians, Leiden, Netherlands

Event (co-)organization

[includes upcoming events; other organizers not listed]

- 2018 International Congress of Mathematicians, Rio de Janeiro, RJ, Brazil
Thematic Program on Graph Theory, IMPA, Rio de Janeiro, RJ, Brazil
- 2017 IMPA Section of the National Week of Science and Technology
1st CRM/IMPA Joint Workshop: Challenges at the Interface of Optimization and Stochastic Processes, Montréal, Québec, Canada
- 2016 Brazilian Probability School, São Carlos, SP, Brazil
American Institute of Mathematics - Markov Chain mixing times, San Jose, CA, USA
- 2014 Workshop on Discrete Markov Chains: Mixing Times and Beyond, Rio de Janeiro, RJ, Brazil
10o ERPEM - High Dimensional Phenomena in Probability, Statistics and Signal Processing, Rio de Janeiro, RJ, Brazil
VII Simpósio Nacional/Jornadas de Iniciação Científica, Rio de Janeiro, RJ
- 2013 Paraty Quantum Information School and Workshop, Paraty, RJ, Brazil
- 2012 VI Simpósio Nacional/Jornadas de Iniciação Científica, Rio de Janeiro, RJ
- 2011 Paraty Quantum Information School and Workshop, Paraty, RJ, Brazil
- 2010 V Simpósio Nacional/Jornadas de Iniciação Científica, Rio de Janeiro, RJ
- 2008 International Conference on the Analysis of Algorithms (AofA), Maresias, SP, Brazil
American & Brazilian Math Societies: 1st Joint Meeting, Rio de Janeiro, RJ, Brazil

Advising and mentoring

Postdoctoral research associates

Current	Rodrigo Botelho Ribeiro
2017	Anna Ben-Hamou (now “maître de conférences” at Sorbonne)
2012	Raphael Drumond (now assistant prof. at UFMG)
	Matthieu Lerasle (visiting postdoc from USP, now CNRS researcher)

Ph.D. students

Current	Daniel Yukimura (joint with Augusto Teixeira, IMPA)
	Dyego Soares de Araújo
	Guilherme Henrique de Paula Reis
	Luiz Paulo Freire Moreira
	Maria Clara Mendes Silva
2018	Alan Anderson da Silva Pereira (with Gábor Lugosi, UPF; now postdoc at UFMG)
2017	Lucas Martins Stolerma (with J. Nathan Kutz. UW; now postdoc at UCSD)
2016	Eric Biagioli (joint with Luis Peñaranda, UFRJ; now research engineer at INRIA)
2012	Alan Prata de Paula (now associate prof. at UFF Volta Redonda)

M.Sc. students, academic track (Pure and Applied Math)

Current	Davi de Castro Silva
	Eddy Santiago Achig Andrango
2018	Diego Alejandro Batista Theuerkauf
2016	Brian David Vásquez Campos
2015	Guilherme Henrique de Paula Reis
2014	Diogo Carlos dos Santos
	Luiz Paulo Freire Moreira
2009	Sergio Augusto Romaña Ibarra

M.Sc. students, Math Finance track

Current	Tereza Cristina Amorelli Coelho
2013	Ângelo Miguel de Barros
2011	Leonardo Lima da Silva Marotta (joint with Jorge Zubelli, IMPA)
2009	Elsio Paiva de Oliveira

PROFMAT Masters program for high school teachers

2017	Diego Alves
	Harley Paulino de Moura Mello
	Milton Roberto Pereira da Silva
2016	Antonio Marcus Dias Moreira
	Daniel Pinto Mororó
	Patrick Lopes Esteves
	Pedro Paulo Cavalcante

2015 André Luiz Gomes Augusto
Elizabeth Ribeiro de Macedo Motta
Felipe Machado Teixeira Couto

2014 Alexandre de Azevedo Silva
Gabriella Marques Pereira da Costa
Carlos Vinicius Andrade da Costa
Daniel da Conceição Santos
Fábio Fiuza de Souza
Thiago Salvador Pacheco Chagas
Leandro Figueira Freitas
Rafaela Ramos Soares Gonçalves

2013 Anderson Carvalho dos Santos
Iury Kersnowsky de Sant'Anna
Paulo César Antunes Pereira
Rodrigo Rodrigues Faria
Welbert de Oliveira Moutta

Undergraduate interns

2016 Luiz Hoffman (from UERJ, Rio de Janeiro, Brazil)
2014 Juan Redondo (from École Polytechnique, Paris, France)
2010 Daniel Mororó (from UERJ, Rio de Janeiro, Brazil)

Preprints

2018 R.I.O., A. Pereira, R. Ribeiro
[Concentration in the Generalized Chinese Restaurant Process](#)

R.I.O., Y. Peres
[Random walks on graphs: new bounds on hitting, meeting, coalescing and returning](#)

R.I.O., G. Reis
[Interacting diffusions on random graphs with diverging degrees: hydrodynamics and large deviations](#)

2017 R.I.O., P. Thompson
[Sample average approximation with heavier tails II: non-asymptotic bounds with weak assumptions and stochastic constraints](#)

R.I.O., P. Thompson
[Sample average approximation with heavier tails I: non-asymptotic bounds with weak assumptions and stochastic constraints](#)

D. R. Figueiredo, G. Iacobelli, R.I.O., B. Reed, R. Ribeiro
[Building your path to escape from home \[preliminary version\]](#)

- 2016 A. Jofré, A. Iusem, R.I.O., P. Thompson
[Variance-based stochastic extragradient methods with line search for stochastic variational inequalities](#)

Accepted research papers

- 2018 R.I.O., R. Ribeiro, R. Sanchis
[Disparity of clustering coefficients in the Holme-Kim network model](#)
 To appear in *Advances in Applied Probability*

Published research papers

- 2018 A. Ben-Hamou, R.I.O., Y. Peres
[Estimating graph parameters via random walks with restarts](#)
Proceedings of the Twenty-Ninth Annual ACM-SLAM Symposium on Discrete Algorithms. 2018, 1702-1714
- C. Duarte, R. Drumond, R.I.O. (** non-alphabetical author ordering*)
[Small violations of Bell inequalities for multipartite pure random states \(arXiv version\)](#)
Journal of Mathematical Physics, Volume 59, Issue 5
- B. Amaral, C. Duarte, R.I.O. (** non-alphabetical author ordering*)
[Necessary conditions for extended noncontextuality in general sets of random variables \(arXiv version\)](#)
Journal of Mathematical Physics, Volume 59, 072202
- 2017 A. Jofré, A. Iusem, R.I.O., P. Thompson
[Extragradient method with variance reduction for stochastic variational inequalities \(arXiv version\)](#)
SIAM Journal on Optimization, Volume 27, Number 2 (2017), 686-724.
- E. Joly, G. Lugosi, R.I.O.
[On the estimation of the mean of a random vector](#)
Electronic Journal of Statistics, Volume 11, Number 1 (2017), 440-451.
- A. Belloni and R.I.O.
[Approximate group context tree \(arXiv version\)](#)
Annals of Statistics, Volume 45, Number 1 (2017), 355-385.
- Song Mei, Theodor Misiakiewicz, Andrea Montanari, R.I.O.
[Solving SDPs for synchronization and MaxCut problems via the Grothendieck inequality](#)
Proceedings of Machine Learning Research, Volume 65: Conference on Learning Theory (2017) [NB: full refereed paper]
- 2016 L. Devroye, M. Lerasle, G. Lugosi, R.I.O.
[Sub-Gaussian mean estimators \(arXiv version\)](#)
Annals of Statistics, Volume 44, Number 6 (2016), 2695-2725.

R.I.O.

[The lower tail of random quadratic forms with applications to ordinary least squares \(arXiv version\)](#)

Probability Theory and Related Fields, Volume 166, Number 3 (2016) 1175–1194.

L. Addario-Berry, R.I.O., Y. Peres, P. Sousi

[Random walks colliding before getting trapped](#)

Electronic Journal of Probability, Volume 21 (2016), paper no. 42, 19 pp.

2015

R.I.O.

[Stochastic Processes With Random Contexts: A Characterization and Adaptive Estimators for the Transition Probabilities \(arXiv version\)](#)

IEEE Transactions on Information Theory, Volume: 61, Issue 12 (2015).

L. Addario-Berry, S. Bhamidi, S. Bubeck, L. Devroye, G. Lugosi, R.I.O.

[Exceptional rotations of random graphs: a VC theory](#)

Journal of Machine Learning Research, Volume 16 (2015), p. 1893-1922.

2014

S. Griffiths, R. Kang, R.I.O., V. Patel

[Tight inequalities among set hitting times in Markov chains \(arXiv version\)](#)

Proceedings of the American Mathematical Society, Volume 142 (2014), p. 3285 - 3298.

2013

R.I.O.

[Mean field conditions for coalescing random walks](#)

Annals of Probability, Volume 41 (2013), p. 3420 - 3461.

R.I.O.

[Mixing of the symmetric exclusion processes in terms of the corresponding single-particle random walk](#)

Annals of Probability, Volume 41 (2013), p. 871 - 913.

2012

R.I.O.

[Mixing and hitting times for finite Markov chains](#)

Electronic Journal of Probability, Volume 7 (2012), paper no. 70, 16 pp.

R.I.O.

[On the coalescence time of reversible random walks \(arXiv version\)](#)

Transactions of the American Mathematical Society, Volume 364 (2012), p. 2109 - 2128.

R. C. Drumond, R.I.O.

[Small violations of full-correlation Bell inequalities for multipartite pure random states \(arXiv version\)](#)

Physical Review A, Volume 86 (2012), paper no. 012117.

2011

R.I.O.

[The spectrum of random k-lifts of large graphs \(with possibly large k\) \(arXiv version\)](#)

Journal of Combinatorics, Volume 1 (2011), p. 285 - 306.

- 2010 R.I.O.
[Sums of random Hermitian matrices and an inequality by Rudelson](#)
Electronic Communications in Probability, Volume 15 (2010), p. 203 - 212.
- 2009 R.I.O.
[On the convergence to equilibrium of Kac's random walk on matrices](#)
The Annals of Applied Probability, Volume 19 (2009), p. 1200 - 1231.
- R.I.O.
[The onset of dominance in balls-in-bins processes with feedback \(arXiv version\)](#)
Random Structures and Algorithms, Volume 34 (2009), p. 454 - 477.
- 2008 R.I.O.
[Balls-in-bins processes with feedback and Brownian motion \(arXiv version\)](#)
Combinatorics, Probability & Computing, Volume 17 (2008), p. 87 - 110.
- R.I.O., B. Terhal
[The complexity of quantum spin systems on the planar square lattice \(arXiv version\)](#)
Quantum Information & Computation, Volume 8 (2008), p.0900 - 0924.
- S. Bravyi, D. DiVincenzo, R.I.O., B. Terhal
[The complexity of stoquastic local Hamiltonian problems \(arXiv version\)](#)
Quantum Information & Computation, Volume 8 (2008), p. 0361 - 0385.
- 2007 R.I.O., O. Dahlsten, M. Plenio (* non-alphabetical author ordering)
[Generic entanglement can be generated efficiently \(arXiv version\)](#)
Physical Review Letters, Volume 98 (2007), paper no. 130502.
- O. Dahlsten, R.I.O., M. Plenio (* non-alphabetical author ordering)
[The emergence of typical entanglement in two-party random processes \(arXiv version\)](#)
Journal of Physics A, Volume 40 (2006), Number 28.
- 2006 A. Harrow, R.I.O., B. Terhal
[Quantum bit commitment with misaligned reference frames \(arXiv version\)](#)
Physical Review A, Volume 73 (2006), Number 3, paper no. 032331.
- 2005 R.I.O., J. Spencer
[Connectivity transitions in networks with superlinear preferential attachment](#)
Internet Mathematics, Volume 2 (2005), Number 2, p. 121 - 163.
- 2004 M. Mitzenmacher, R.I.O., J. Spencer
[A scaling result for explosive processes](#)
Electronic Journal of Combinatorics, Volume 11 (2004), p. 1 - 14.

Other publications and reports

- Tech reports** R.I.O.
[Concentration of the adjacency matrix and of the Laplacian in random graphs with independent edges](#)

arXiv: 0911.0600 (unpublished for various reasons, but cited quite often)

**Conference
abstracts
(refereed)**

J. Langford, R.I.O., B. Zadrozny

[Predicting Conditional Quantiles via Reduction to Classification](#)

In: 22nd Conference on Uncertainty in Artificial Intelligence (UAI), 2006, Cambridge, EUA.

Y. Dodis, K. Pietrzak, R.I.O.

[On the Generic Insecurity of Full-Domain Hash](#)

In: CRYPTO 2005 -- The 25th Annual International Cryptology Conference, 2005, Santa Barbara, CA - EUA.

A. Elbaz, Y. Dodis, R.I.O., R. Raz,

[Improved Randomness Extraction from Two Independent Sources](#)

In: Approximation, Randomization, and Combinatorial Optimization, Algorithms and Techniques: APPROX - RANDOM 2004, 2004, Cambridge, MA - EUA.

Y. Dodis, R.I.O.

[On extracting private randomness over a public channel](#)

Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques: APPROX - RANDOM 2003., 2003, Princeton, NJ - EUA.

Lecture notes

R. Morris, R.I.O.

Extremal and Probabilistic Combinatorics

XXVII Colóquio Brasileiro de Matemática (SBM/IMPA)

M. R. Hilário, R.I.O.

A matemática de embaralhar cartas

VII Bienal Brasileira de Matemática (UNICAMP)