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Jorge Rocha

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Curriculum

J. Rocha is a theoretical physicist with broad interests spanning gravitation, high-energy physics and mathematical physics. His research focuses on the study of black holes and other solutions of General Relativity, and extensions thereof. He obtained a PhD degree in Physics from University of California, Santa Barbara (UCSB) in 2008, under the supervision of Prof. Joseph Polchinski. He earned his pre-Bologna bachelor degree in Technological Physics Engineering, in 2002, from Instituto Superior Técnico (IST), University of Lisbon. He is currently an Assistant Professor of the Department of Mathematics at ISCTE-IUL. Between 2015 and 2019 he worked as a research post-doc fellow at Universitat de Barcelona.

In total, J. Rocha has published 30+ original articles in top international peer-reviewed journals. He has vast experience in oral presentations (20+ invited seminars at various institutes in the USA, UK, Belgium, Japan, Brazil, Spain and Portugal; 30+ oral communications at international conferences). He regularly engages in outreach activities.

J. Rocha organized 6 scientific meetings, among which four were international conferences/workshops. He supervised 1 Master thesis, and co-supervised one PhD student and another Master student. He was a member of the examination committee of 2 PhD students and 4 Master students. He is the recipient of 5 prizes and awards, including a Marie Sklodowska-Curie individual fellowship. He is a member of Sociedade Portuguesa de Relatividade e Gravitação.

Research Interests

Mathematical Physics; Gravitation theories; Black holes

Academic Qualifications

University/Institution	Type	Degree	Period
University of California, Santa Barbara	PhD	PhD in Physics	2008
Universidade de Lisboa - Instituto Superior Tecnico	Licenciate	Licenciatura em Engenharia Física Tecnológica	2002

Teaching Activities

Teaching Year	Sem.	Course Name	Degree(s)	Coord.
2025/2026	2º	Complements on Differential Calculus	Bachelor Degree in Finance and Accounting;	Yes
2025/2026	1º	Mathematical Methods in Machine Learning	Master Degree in Artificial Intelligence;	Yes
2025/2026	1º	Differential and Integral Calculus	Bachelor Degree in Finance and Accounting; Bachelor Degree in Marketing Management;	No
2024/2025	2º	Optimization		Yes
2024/2025	1º	Mathematical Methods in Machine Learning	Master Degree in Artificial Intelligence;	Yes
2024/2025	1º	Mathematics		No
2023/2024	2º	Mathematics and Numerical Methods for Economics and Finance II	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2023/2024	2º	Optimization		Yes
2022/2023	2º	Mathematics and Numerical Methods for Economics and Finance II	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2022/2023	2º	Optimization		Yes
2022/2023	1º	Linear Algebra Fundamentals	Bachelor Degree in Data Science (PL); Bachelor Degree in Data Science;	Yes

2021/2022	2º	Mathematics and Numerical Methods for Economics and Finance II	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2021/2022	2º	Optimization		Yes
2021/2022	1º	Calculus Topics I	Bachelor Degree in Data Science (PL); Bachelor Degree in Data Science;	No
2020/2021	2º	Complements of Mathematics		Yes
2020/2021	2º	Mathematics and Numerical Methods for Economics and Finance II	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2020/2021	1º	Linear Algebra Fundamentals	Bachelor Degree in Data Science (PL);	No
2020/2021	1º	Calculus Topics I	Bachelor Degree in Data Science (PL);	No
2019/2020	2º	Mathematics and Numerical Methods for Economics and Finance II	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2019/2020	2º	Optimization		No

Supervisions

• Ph.D. Thesis

- Ongoing

	Student Name	Title/Topic	Language	Status	Institution
1	Diogo Luís Farinha Gomes da Silva	Collapse or Collide: Improved Analysis of Black Hole Formation Mechanisms	Portuguese	Developing	Instituto Superior Técnico, Universidade de Lisboa

• M.Sc. Dissertations

- Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year
1	João Tiago dos Santos Marques Dias	Black Hole Fusion in Alternative Theories of Gravity	English	Instituto Superior Técnico	2022

• M.Sc. Traineeship Reports

- Ongoing

	Student Name	Title/Topic	Language	Status	Institution

1	David Duarte César Lopes	Mergers of compact objects in modified gravity (MECOMOG)	English	Extended period	Universidade de Lisboa, Instituto Superior Técnico, Centro de Astrofísica e Gravitação

Total Citations

Web of Science®	1041
Scopus	995

Publications

• Scientific Journals

- Scientific journal paper

1	Franzin, E., Frassino, A. M. & Rocha, J. V. (2024). Tidal Love numbers of static black holes in anti-de Sitter. Journal of High Energy Physics. 2024 (12) - Times Cited Scopus: 3 - Times Cited Google Scholar: 14
2	Dias, J. M., Frassino, A. M., Lopes, D. C., Paccoia, V. D. & Rocha, J. V. (2024). Impact of higher derivative corrections to general relativity on black hole mergers. Physical Review D. 110 (12) - Times Cited Web of Science®: 1 - Times Cited Scopus: 1 - Times Cited Google Scholar: 2
3	Frassino, A. M., Rocha, J. V. & Sanna, A. P. (2024). Weak cosmic censorship and the rotating quantum BTZ black hole. Journal of High Energy Physics. 2024 (7) - Times Cited Web of Science®: 10 - Times Cited Scopus: 6 - Times Cited Google Scholar: 15
4	Dias, J. M., Frassino, A. M., Paccoia, V. D. & Rocha, J. V. (2023). Black hole-wormhole collisions and the emergence of islands. Physical Review D. 107 (12) - Times Cited Web of Science®: 6 - Times Cited Scopus: 6 - Times Cited Google Scholar: 6
5	Frassino, A. M. & Rocha, J. V. (2020). Charged black holes in Einsteinian cubic gravity and nonuniqueness. Physical Review D. 102 (2), 1-8 - Times Cited Web of Science®: 28 - Times Cited Scopus: 22 - Times Cited Google Scholar: 31
6	Pedro Aniceto & Rocha, J. V. (2019). Self-similar solutions and critical behavior in Einstein-Maxwell-dilaton theory sourced by charged null fluids. Journal of High Energy Physics. - Times Cited Web of Science®: 5 - Times Cited Scopus: 3 - Times Cited Google Scholar: 5

7	Rocha, J. V. & Tomaševi, M. (2018). Self-similarity in Einstein-Maxwell-dilaton theories and critical collapse. Physical Review D. - Times Cited Web of Science®: 24 - Times Cited Scopus: 22 - Times Cited Google Scholar: 29
8	Rocha, J. V. & Raphael Santarelli (2018). Scanning the parameter space of collapsing rotating thin shells. Classical and Quantum Gravity. - Times Cited Web of Science®: 3 - Times Cited Scopus: 3 - Times Cited Google Scholar: 4
9	Aniceto, P. & Rocha, J. V. (2017). Dynamical black holes in low-energy string theory. Journal of High Energy Physics. - Times Cited Web of Science®: 11 - Times Cited Scopus: 11 - Times Cited Google Scholar: 16
10	Chakrabarty, B., Rocha, Jorge V. & Virmani, A. (2016). Smooth non-extremal D1-D5-P solutions as charged gravitational instantons. Journal of High Energy Physics. - Times Cited Web of Science®: 6 - Times Cited Scopus: 6 - Times Cited Google Scholar: 8
11	Brito, R., Cardoso, V. & Rocha, J. V. (2016). Interacting shells in AdS spacetime and chaos. Physical Review D. - Times Cited Web of Science®: 12 - Times Cited Scopus: 12 - Times Cited Google Scholar: 20
12	Cardoso, V. & Rocha, Jorge V. (2016). Collapsing shells, critical phenomena, and black hole formation. Physical Review D. - Times Cited Web of Science®: 12 - Times Cited Scopus: 13 - Times Cited Google Scholar: 16
13	Aniceto, P., Pani, P. & Rocha, J. V. (2016). Radiating black holes in Einstein-Maxwell-dilaton theory and cosmic censorship violation. Journal of High Energy Physics. - Times Cited Web of Science®: 11 - Times Cited Scopus: 11 - Times Cited Google Scholar: 16
14	Rocha, Jorge V. (2015). Gravitational collapse with rotating thin shells and cosmic censorship. International Journal of Modern Physics D. - Times Cited Web of Science®: 14 - Times Cited Scopus: 15 - Times Cited Google Scholar: 19
15	Delsate, T., Rocha, Jorge V. & Santarelli, R. (2015). Geodesic motion in equal angular momenta Myers-Perry-AdS spacetimes. Physical Review D. - Times Cited Web of Science®: 17 - Times Cited Scopus: 17 - Times Cited Google Scholar: 25

16	Jorge, R., De Oliveira, E.S. & Rocha, J. V. (2015). Greybody factors for rotating black holes in higher dimensions. Classical and Quantum Gravity. - Times Cited Web of Science®: 39 - Times Cited Scopus: 42 - Times Cited Google Scholar: 51
17	Lemos, J.P.S., Lopes, F.J., Minamitsuji, M. & Rocha, J. V. (2015). Thermodynamics of rotating thin shells in the BTZ spacetime. Physical Review D. - Times Cited Web of Science®: 24 - Times Cited Scopus: 27 - Times Cited Google Scholar: 40
18	Cardoso, V., Emparan, R., Mateos, D., Pani, P. & Rocha, J. V. (2014). Holographic collisions in confining theories. Journal of High Energy Physics. - Times Cited Web of Science®: 10 - Times Cited Scopus: 10 - Times Cited Google Scholar: 10
19	Rocha, Jorge V., Santarelli, R. & Delsate, T. (2014). Collapsing rotating shells in Myers-Perry- AdS5 spacetime: A perturbative approach. Physical Review D. - Times Cited Web of Science®: 21 - Times Cited Scopus: 20 - Times Cited Google Scholar: 21
20	Rocha, J. V. & Santarelli, R. (2014). Flowing along the edge: Spinning up black holes in AdS spacetimes with test particles. Physical Review D. - Times Cited Web of Science®: 73 - Times Cited Scopus: 68 - Times Cited Google Scholar: 80
21	Delsate, T., Rocha, J. V. & Santarelli, R. (2014). Collapsing thin shells with rotation. Physical Review D. - Times Cited Web of Science®: 25 - Times Cited Scopus: 27 - Times Cited Google Scholar: 38
22	Crispino, L.C.B., Higuchi, A., Oliveira, E.S. & Rocha, J. V. (2013). Greybody factors for nonminimally coupled scalar fields in Schwarzschild-de Sitter spacetime. Physical Review D. - Times Cited Web of Science®: 60 - Times Cited Scopus: 57 - Times Cited Google Scholar: 57
23	Rocha, J. V., Rodriguez, M.J., Varela, O. & Virmani, A. (2013). Charged black rings from inverse scattering. General Relativity and Gravitation. - Times Cited Web of Science®: 6 - Times Cited Scopus: 6 - Times Cited Google Scholar: 10
24	Rocha, J. V., Rodriguez, M.J. & Varela, O. (2012). An electrically charged doubly spinning dipole black ring. Journal of High Energy Physics. - Times Cited Web of Science®: 10 - Times Cited Scopus: 10 - Times Cited Google Scholar: 15

25	Rocha, J. V. & Cardoso, V. (2011). Gravitational perturbation of the BTZ black hole induced by test particles and weak cosmic censorship in AdS spacetime. Physical Review D. - Times Cited Web of Science®: 86 - Times Cited Scopus: 79 - Times Cited Google Scholar: 86
26	Rocha, J. V., Rodriguez, M.J. & Virmani, A. (2011). Inverse scattering construction of a dipole black ring. Journal of High Energy Physics. - Times Cited Web of Science®: 12 - Times Cited Scopus: 13 - Times Cited Google Scholar: 19
27	Figueras, P., Jamsin, E., Rocha, J. V. & Virmani, A. (2010). Integrability of five-dimensional minimal supergravity and charged rotating black holes. Classical and Quantum Gravity. - Times Cited Web of Science®: 40 - Times Cited Scopus: 43 - Times Cited Google Scholar: 59
28	Bouhmadi-López, M., Cardoso, V., Nerozzi, A. & Rocha, J. V. (2010). Black holes die hard: Can one spin up a black hole past extremality?. Physical Review D. - Times Cited Web of Science®: 87 - Times Cited Scopus: 80 - Times Cited Google Scholar: 109
29	Cardoso, V., Dias, O.J.C. & Rocha, Jorge V. (2010). Phase diagram for non-axisymmetric plasma balls. Journal of High Energy Physics. - Times Cited Web of Science®: 10 - Times Cited Scopus: 10 - Times Cited Google Scholar: 19
30	Rocha, J. V. (2009). Evaporation of large black holes in AdS: Greybody factor and decay rate. Journal of High Energy Physics. - Times Cited Web of Science®: 18 - Times Cited Scopus: 19 - Times Cited Google Scholar: 24
31	Rocha, J. V. (2008). Evaporation of large black holes in AdS: Coupling to the evaporon. Journal of High Energy Physics. - Times Cited Web of Science®: 64 - Times Cited Scopus: 57 - Times Cited Google Scholar: 92
32	Dubath, F., Polchinski, J. & Rocha, J. V. (2008). Cosmic string loops, large and small. Physical Review D. - Times Cited Web of Science®: 71 - Times Cited Scopus: 65 - Times Cited Google Scholar: 93
33	Rocha, J. V. (2008). Scaling solution for small cosmic string loops. Physical Review Letters. - Times Cited Web of Science®: 34 - Times Cited Scopus: 32 - Times Cited Google Scholar: 46
34	Polchinski, J. & Rocha, J. V. (2007). Cosmic string structure at the gravitational radiation scale. Physical Review D. - Times Cited Web of Science®: 84 - Times Cited Scopus: 80 - Times Cited Google Scholar: 119

35	Dubath, F. & Rocha, J. V. (2007). Periodic gravitational waves from small cosmic string loops. Physical Review D. - Times Cited Web of Science®: 9 - Times Cited Scopus: 8 - Times Cited Google Scholar: 16
36	Polchinski, J. & Rocha, J. V. (2006). Analytic study of small scale structure on cosmic strings. Physical Review D. - Times Cited Web of Science®: 90 - Times Cited Scopus: 85 - Times Cited Google Scholar: 125

• Conferences/Workshops and Talks

- Publication in conference proceedings

1	Lemos, J.P.S., Lopes, F.J., Minamitsuji, M. & Rocha, J. (2018). Entropy of a rotating thin shell in the BTZ spacetime. In Massimo Bianchi, Robert T Jantzen, Remo Ruffini (Ed.), 14th Marcel Grossman Meeting On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories, Proceedings. (pp. 1563-1566).: Wold Scientific.
2	Rocha, J., De Oliveira, E.S. & Rocha, J.V. (2018). Superradiance of rotating cohomogeneity-1 black holes: Scalar case. In 14th Marcel Grossman Meeting On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories, Proceedings. (pp. 1810-1815).
3	Delsate, T., Rocha, J. & Santarelli, R. (2015). Gravitational collapse with rotating thin shells and cosmic censorship. In Journal of Physics: Conference Series. - Times Cited Web of Science®: 1 - Times Cited Scopus: 1 - Times Cited Google Scholar: 1
4	Rocha, J., Rodriguez, M.J., Varela, O. & Virmani, A. (2014). Inverse Scattering Construction of Dipole Black Rings. In A. García-Parrado, F. C. Mena, F. Moura, E. Vaz (Ed.), Springer Proceedings in Mathematics and Statistics.: Springer. - Times Cited Google Scholar: 3
5	Bouhmadi-López, M., Cardoso, V., Nerozzi, A. & Rocha, J. (2011). Over spinning a black hole?. In Journal of Physics: Conference Series.: IOP. - Times Cited Web of Science®: 1 - Times Cited Scopus: 1 - Times Cited Google Scholar: 2
6	Rocha, J. (2010). Evaporation of large black holes in AdS. In Journal of Physics: Conference Series.: IOP. - Times Cited Web of Science®: 6 - Times Cited Scopus: 4 - Times Cited Google Scholar: 6

- Talk

1	Rocha, J. V. (2024). Mergers of black holes and exotic compact objects in the extreme mass ratio regime. Gravity: Challenges beyond General Relativity.
2	Rocha, J. V. (2024). Tidal Love numbers of black holes in anti-de Sitter. XVII Black Holes Workshop .

3	Rocha, J. V. (2024). Weak cosmic censorship with quantum-corrected black holes. Spanish and Portuguese Relativity Meeting 2024.
4	Rocha, J. V. (2023). Black hole-Wormhole mergers: Can one peek into the black hole interior?. Invited seminar at University of Barcelona.
5	Rocha, J. V. (2023). Can one peek inside black holes using a wormhole?. XVI Black Holes Workshop.
6	Rocha, J. V. (2023). Black Hole-Wormhole collisions and the emergence of islands. EREP 2023 - Spanish and Portuguese Relativity Meeting.
7	Rocha, J. V. (2023). Black Hole-Wormhole collisions and the emergence of islands. Gravity Sagas.
8	Rocha, J. V. (2023). Black Hole Mergers in Cubic Gravity. Dark Matter and Stars: Multi-messenger probes of Dark Matter and Modified Gravity.
9	Rocha, J. V. & Antonia M. Frassino (2022). Charged black holes in Einsteinian cubic gravity and nonuniqueness. 23rd International Conference on General Relativity and Gravitation.
10	Rocha, J. V. (2021). Love numbers of black holes in AdS and in modified gravity. CENTRA Meeting 2021.
11	Rocha, J. V. (2021). Self-similarity and critical collapse in General Relativity and beyond. Encontro Nacional da Sociedade Portuguesa de Matemática 2021.
12	Rocha, J. V. (2021). Love numbers of black holes in modified gravity. Spanish-Portuguese Relativity Meeting 2021.
13	Rocha, J. V. (2021). The inflationary universe. 10th IST Summer School on Astrophysics and Gravitation.
14	Rocha, J. V. (2021). Recent advances in the black hole information problem. Webinar @ Sapienza Università di Roma.
15	Rocha, J. V. & Franzin, E. (2020). Love in f (R). Black Holes Workshop XIII.

• Other Publications

- Non-peer-reviewed papers

1	Rocha, J. V. (2021). A ubiquidade do buraco negro na física moderna. Gazeta de Física. 44 (2/3), 28-35

- Other publications

1	Rocha, J. V. (2008). Analytic Approaches to the Study of Small Scale Structure on Cosmic String Networks. - Times Cited Google Scholar: 3

Academic Management Positions

Membro (Docente) (2025 - 2028)
Unit/Area: Comissão Científica

Coordenador de ECTS (2025 - 2028) Unit/Area: Department of Mathematics
Membro (Docente) (2023 - 2025) Unit/Area: Comissão Pedagógica
Membro (Docente) (2021 - 2023) Unit/Area: Comissão Pedagógica

Professional Associations

Portuguese Society of Relativity and Gravitation (Since 2016)

Organization/Coordination of Events

Type of Organization/Coordination	Event Title	Organizer	Year
Coordination of scientific event (with scientific committee) at ISCTE-IUL	XV Black Holes Workshop	Main organizer	2022

Diffusion Activities

Activity Type	Event Title	Activity Description	Year
Talk/Conference in public diffusion event	10th conference of spacial professors		2023