João Lopes Costa

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Contacts

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Academic Qualifications

University/Institution	Type	Degree	Period
Instituto Superior Técnico - ULisboa	Aggregation	Matemática	2020
University of Oxford	PhD	Mathematics	2010
Instituto Superior Técnico - UTL	M.Sc.	Matemática Aplicada	2004
Faculdade de Ciências e Tecnologia - UNL	Licenciate	Matemática (Ensino de)	2001

Teaching Activities

Teaching Year	Sem.	Course Name	Degree(s)	Coord

				.
2025/2026	2°	Calculus Topics II	Bachelor Degree in Data Science;	Yes
2025/2026	2°	Mathematical Foundations for Deep Learning	Master Degree in Artificial Intelligence;	Yes
2025/2026	1°	Mathematical methods for computation	Bachelor Degree in Computer Engineering;	Yes
2025/2026	1°	Deep Learning Fundamentals		Yes
2024/2025	2°	Mathematical Foundations for Deep Learning	Master Degree in Artificial Intelligence;	Yes
2024/2025	1°	Mathematical methods for computation	Bachelor Degree in Computer Engineering (PL); Bachelor Degree in Computer Engineering;	Yes
2023/2024	2°	Calculus Topics II	Bachelor Degree in Data Science;	Yes
2023/2024	1°	Mathematics and Numerical Methods for Economics and Finance I	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2023/2024	1°	Mathematical methods for computation	Bachelor Degree in Computer Engineering;	Yes
2022/2023	1°	Mathematics and Numerical Methods for Economics and Finance I		Yes
2022/2023	1°	Mathematical methods for computation	Bachelor Degree in Computer Engineering;	Yes
2021/2022	2°	Calculus Topics II	Bachelor Degree in Data Science;	Yes
2021/2022	1°	Mathematics and Numerical Methods for Economics and Finance I	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2021/2022	1°	Mathematical methods for computation	Bachelor Degree in Computer Engineering;	Yes
2020/2021	2°	Calculus Topics II	Bachelor Degree in Data Science (PL); Bachelor Degree in Data Science;	Yes
2020/2021	1°	Mathematics and Numerical Methods for Economics and Finance I	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2020/2021	1°	Mathematical methods for computation	Bachelor Degree in Computer Engineering;	Yes

2020/2021	1º	Calculus I		Yes
2019/2020	2º	Calculus Topics II	Bachelor Degree in Data Science (PL); Bachelor Degree in Data Science;	Yes
2019/2020	1º	Mathematics and Numerical Methods for Economics and Finance I	Doctorate Degree (PhD) in Economics; Doctorate Degree (PhD) in Finance;	Yes
2019/2020	1º	Calculus I		Yes

Supervisions

• Post-doc Supervisions

- Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year
1	Anne Franzen	--	English	CAMGSD	--
2	Moritz Rentjes	--	English	CAMGSD	--

• Ph.D. Thesis

- Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year
1	Flávio Rossetti	Stability of the Cauchy Horizon for Cosmological Black Holes in Spherical Symmetry	English	Instituto Superior Técnico - ULIsboa	2024
2	Pedro Oliveira	--	English	IST-ULisboa	--
3	Kyriakos Destounis	Dynamics of black hole space-times	English	Instituto Superior Técnico - ULisboa	--

Total Citations

Web of Science®	1237
Scopus	1263

Publications

• Scientific Journals

- Scientific journal paper

1	Carvalho, L., Costa, J. L., Mourão, J. & Oliveira, G. (2025). The positivity of the neural tangent kernel. SIAM Journal on Mathematics of Data Science. 7 (2), 495-515 - Times Cited Web of Science®: 2 - Times Cited Scopus: 2 - Times Cited Google Scholar: 12
2	Cardoso, V., Costa, J. L., Natário, J. & Zhong, Z. (2023). Energy extraction from bouncing geometries. Physical Review D. 108 (2) - Times Cited Scopus: 1 - Times Cited Google Scholar: 2
3	Costa, J. L., Franzen, A. T. & Oliver, J. (2023). Semilinear wave equations on accelerated expanding FLRW spacetimes. Annales Henri Poincaré. 24 (9), 3185-3207 - Times Cited Web of Science®: 4 - Times Cited Scopus: 3 - Times Cited Google Scholar: 6
4	Costa, J. L., Duarte, R. & Mena, F. C. (2023). Improved decay estimates and C2-asymptotic stability of solutions to the Einstein-scalar field system in spherical symmetry. Journal of Hyperbolic Differential Equations. 20 (4), 853-902 - Times Cited Web of Science®: 2 - Times Cited Scopus: 2 - Times Cited Google Scholar: 3
5	Luna, R., Zilhão, M., Cardoso, V., Costa, J. L. & Natário, J (2021). Addendum to “Strong cosmic censorship: The nonlinear story”. Physical Review D. 103 (10) - Times Cited Web of Science®: 4 - Times Cited Scopus: 6 - Times Cited Google Scholar: 9
6	Costa, João L. & Mena, F. C. (2021). Global solutions to the spherically symmetric Einstein-scalar field system with a positive cosmological constant in Bondi coordinates. Journal of Hyperbolic Differential Equations. 18 (2), 311-341 - Times Cited Web of Science®: 6 - Times Cited Scopus: 6 - Times Cited Google Scholar: 8
7	Costa, João L. & Girão, Pedro M. (2020). Higher order linear stability and instability of Reissner–Nordström’s Cauchy horizon. Analysis and Mathematical Physics. 10 (3) - Times Cited Web of Science®: 5 - Times Cited Scopus: 4 - Times Cited Google Scholar: 9
8	Costa, João L. (2020). The formation of trapped surfaces in the gravitational collapse of spherically symmetric scalar fields with a positive cosmological constant. Classical and Quantum Gravity. 37 (19) - Times Cited Web of Science®: 3 - Times Cited Scopus: 3 - Times Cited Google Scholar: 8
9	Costa, João L., Natário, J & Pedro F. C. Oliveira (2019). Decay of solutions of the wave equation in expanding cosmological spacetimes. Journal of Hyperbolic Differential Equations. 16 (1), 35-58 - Times Cited Web of Science®: 11 - Times Cited Scopus: 11 - Times Cited Google Scholar: 18

10	Luna, R., Zilhão, M., Cardoso, V., Costa, J. L. & Natário, J (2019). Strong cosmic censorship: the nonlinear story. Physical Review D. 99 (6), 1-9 - Times Cited Web of Science®: 54 - Times Cited Scopus: 49 - Times Cited Google Scholar: 67
11	Costa, João L. & Natário, J (2019). Elastic shocks in relativistic rigid rods and balls. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences. 475 (2225), 1-17 - Times Cited Web of Science®: 3 - Times Cited Scopus: 3 - Times Cited Google Scholar: 5
12	Costa, João L., Natário, J & Pedro F. C. Oliveira (2019). Cosmic no-hair in spherically symmetric black hole spacetimes. Annales Henri Poincaré. 20 (9), 3059-3090 - Times Cited Web of Science®: 6 - Times Cited Scopus: 7 - Times Cited Google Scholar: 15
13	Cardoso, V., Costa, J. L., Destounis, K., Hintz, P. & Jansen, A. (2018). Strong cosmic censorship in charged black-hole spacetimes: still subtle. Physical Review D. 98 (10) - Times Cited Web of Science®: 116 - Times Cited Scopus: 112 - Times Cited Google Scholar: 142
14	Costa, J. L., Girão, P. M., Natário, J. & Silva, J. D. (2018). On the occurrence of mass inflation for the Einstein-Maxwell-scalar field system with a cosmological constant and an exponential price law . Communications in Mathematical Physics. 361 (1), 289-341 - Times Cited Web of Science®: 31 - Times Cited Scopus: 31 - Times Cited Google Scholar: 45
15	Cardoso, V., Costa, J. L., Destounis, K., Hintz, P. & Jansen, A. (2018). Quasinormal modes and Strong Cosmic Censorship. Physical Review Letters. 120 (3) - Times Cited Web of Science®: 272 - Times Cited Scopus: 258 - Times Cited Google Scholar: 330
16	Costa, J. L., Girão, P. M., Natário, J. & Silva, J. D. (2017). On the global uniqueness for the Einstein–Maxwell-scalar field system with a cosmological constant: part 3. Mass inflation and extendibility of the solutions. Annals of PDE. 3 - Times Cited Web of Science®: 1 - Times Cited Scopus: 34 - Times Cited Google Scholar: 63
17	Costa, J. L. & Franzen, A. T. (2017). Bounded energy waves on the black hole interior of Reissner–Nordström–de Sitter. Annales Henri Poincaré. 18 (10), 3371-3398 - Times Cited Web of Science®: 29 - Times Cited Scopus: 30 - Times Cited Google Scholar: 43
18	Costa, J. L. (2015). A conjetura da censura cósmica forte: unicidade global para as equações de Einstein. Boletim da Sociedade Portuguesa de Matemática. 73, 1-18

19	Costa, J. L., Girão, P. M., Natário, J. & Drumond Silva, J. (2015). On the global uniqueness for the Einstein-Maxwell-scalar field system with a cosmological constant. Part 2: structure of the solutions and stability of the cauchy horizon. Communications in Mathematical Physics. 339 (3), 903-947 - Times Cited Web of Science®: 37 - Times Cited Scopus: 38 - Times Cited Google Scholar: 54
20	Costa, J. L., Girão, P. M., Natário, J. & Silva, J. S. (2015). On the global uniqueness for the Einstein–Maxwell-scalar field system with a cosmological constant: I. Well posedness and breakdown criterion. Classical and Quantum Gravity. 32 (1) - Times Cited Web of Science®: 36 - Times Cited Scopus: 40 - Times Cited Google Scholar: 53
21	Costa, João L. (2013). The spherically symmetric Einstein-scalar field system with positive and vanishing cosmological constant: a comparison. General Relativity and Gravitation. 45 (12), 2415-2440 - Times Cited Web of Science®: 3 - Times Cited Scopus: 3 - Times Cited Google Scholar: 4
22	Costa, João L., Alho, A & Natário, J (2013). The problem of a self-gravitating scalar field with positive cosmological constant. Annales Henri Poincaré. 14 (5), 1077-1107 - Times Cited Web of Science®: 9 - Times Cited Scopus: 9 - Times Cited Google Scholar: 13
23	Chrusciel, P. T., Costa, J. L. & Heusler, M. (2012). Stationary black holes: uniqueness and beyond. Living Reviews in Relativity. 15 - Times Cited Web of Science®: 467 - Times Cited Scopus: 454 - Times Cited Google Scholar: 689
24	Costa, J. L., Alho, A. & Natário, J. (2012). Spherical linear waves in de Sitter spacetime. Journal of Mathematical Physics. 53 (5) - Times Cited Web of Science®: 9 - Times Cited Scopus: 10 - Times Cited Google Scholar: 14
25	Costa, J. L. (2010). Proof of a Dain inequality with charge. Journal of Physics A: Mathematical and Theoretical. 43 (28), 285202 - Times Cited Web of Science®: 20 - Times Cited Scopus: 19 - Times Cited Google Scholar: 26
26	Costa, J. L. (2010). On the classification of stationary electro-vacuum black holes. Classical and Quantum Gravity. 27 (3), 035010 - Times Cited Web of Science®: 7 - Times Cited Scopus: 8 - Times Cited Google Scholar: 14
27	Chrusciel, P. T. & Costa, J. L. (2009). Mass, angular-momentum and charge inequalities for axisymmetric initial data. Classical and Quantum Gravity. 26 (23), 235013 - Times Cited Web of Science®: 30 - Times Cited Scopus: 33 - Times Cited Google Scholar: 44

28	Chrusciel, P. T. & Costa, J. L. (2008). On uniqueness of stationary vacuum black holes. Asterisque. 321, 195-265 - Times Cited Web of Science®: 64 - Times Cited Scopus: 62 - Times Cited Google Scholar: 127
29	Costa, J. L. & Natário, J. (2005). Homogeneous cosmologies from the quasi-Maxwell formalism. Journal of Mathematical Physics. 46 (8) - Times Cited Web of Science®: 5 - Times Cited Scopus: 3 - Times Cited Google Scholar: 6

• Conferences/Workshops and Talks

- Publication in conference proceedings

1	Costa, J. L., Couto, P. & Rodrigues, R. (2022). Multitask and transfer learning for cardiac abnormality detection in heart sounds. In Hyttinen, J., Paci, M., and Koivumäki, J. (Ed.), 49th Computing in Cardiology Conference. Tampere, Finland: Computing in Cardiology. - Times Cited Scopus: 5 - Times Cited Google Scholar: 5
2	Costa, João L., Girão, Pedro M., Natário, J & Drumond Silva, Jorge (2015). Cauchy horizon stability and mass inflation with a cosmological constant. In Spanish Relativity Meeting (ERE 2014): almost 100 years after Einstein's revolution. - Times Cited Web of Science®: 1 - Times Cited Scopus: 1 - Times Cited Google Scholar: 1
3	Costa, João L. (2012). Towards the Einstein-Lambda-scalar field system in spherical symmetry. In Xx International Fall Workshop on Geometry and Physics.
4	Costa, João L. (2012). Linear and non-linear waves in de Sitter. In Towards New Paradigms: Proceeding of the Spanish Relativity Meeting 2011. - Times Cited Google Scholar: 1
5	Costa, João L. (2010). Harmonic maps and black holes . In Journal of Physics: Conference Series .

- Talk

1	Costa, João L. (2025). Introduction to Deep Learning for mathematicians II. Mathematics for Artificial Intelligence.
2	Costa, João L. (2025). Introduction to Deep Learning for mathematicians I . Mathematics for Artificial Intelligence.
3	Costa, João L. (2024). Strong Cosmic Censorship in the context of de Sitter Black Holes - a perspective on the current state of affairs. Recent advances in black holes mathematics Grenoble.
4	Costa, João L. (2023). Debate: Inteligência Artificial no ensino, investigação e sociedade: ameaça ou oportunidade?. Jornada da Matemática, Estatística e Aplicações .
5	Costa, João L. (2023). Strong Cosmic Censorship in de Sitter Black Hole Spacetimes. Niels Bohr International Academy's Strong Group Meeting.

6	Costa, João L., Couto, Paula & Rodrigues, Rui (2022). Multitask and Transfer Learning for Cardiac Abnormality Detections in Heart Sounds. Computing in Cardiology 2022.
7	Costa, João L. (2021). Aprendizagem automática com redes neuronais artificiais: observações dum turista matemático. Temáticas Aprofundadas de Ciências da Comunicação - Doutoramento em Ciências da Comunicação, na FCSH.
8	Costa, João L. (2021). Black hole uniqueness theorems: brief history and state of affairs. XIV Black Holes Workshop.
9	Costa, João L. (2020). A análise matemática de buracos negros: Unicidade de Schwarzschild. Oficina Diagonal .
10	Costa, João L. (2020). 50 years of the Hawking Penrose Singularity Theorems. XIII black holes workshop.
11	Costa, João L. (2019). Strong Cosmic Censorship, Linear Waves and Quasinormal modes . Mathematical Relativity Seminar, Sorbonne Univ.
12	Costa, João L. (2019). Strong Cosmic Censorship and Quasinormal modes. Vienna Relativity Seminar. - Times Cited Scopus: 16
13	Costa, João L. (2019). Black hole interiors in General Relativity. Eddington at Sundy.
14	Costa, João L. (2019). A análise matemática de buracos negros. Seminário de Matemática e Seminário de Física, ISEL.
15	Costa, João L. (2018). Cosmic no-hair in spherically symmetric black hole spacetimes. ICMP 2018.
16	Costa, João L. (2016). On the decay of linear waves in Reissner-Nordström-de Sitter. IX Black Hole Workshop.
17	Costa, João L. (2016). On strong cosmic censorship in the presence of a positive cosmological constant. Spanish Portuguese Relativity Meeting .
18	Costa, João L. (2016). Global uniqueness in general relativity: the strong cosmic censorship conjecture. Ciência 2016.
19	Costa, João L. (2016). Bounded energy waves in the black hole interior of Reissner-Nordström-de Sitter spacetimes II. Seminário de Equações Diferenciais Parciais .
20	Costa, João L. (2016). Bounded energy waves in the black hole interior of Reissner-Nordström-de Sitter spacetimes. Seminário de Equações Diferenciais Parciais .
21	Costa, João L. (2015). Global uniqueness for the Einstein-Maxwell-scalar field system with a cosmological constant. RECENT ADVANCES IN MATHEMATICAL GENERAL RELATIVITY.
22	Costa, João L. (2015). Sobre a unidade curricular Análise Matemática II. Semana da Inovação Pedagógica no ISCTE-IUL 2015.
23	Costa, João L. (2015). On strong cosmic censorship with a cosmological constant. EquaDiff2015.
24	Costa, João L. (2015). On strong cosmic censorship with a cosmological constant . http://www.fields.utoronto.ca/programs/scientific/14-15/generalrelativity/singularities/.

25	Costa, João L. (2015). Cosmic no-hair for a sef-gravitating scalar field . AMS-EMS-SPM International Meeting 2015.
26	Costa, João L. (2015). Global Uniqueness in General Relativity. Open day of CMAT.
27	Costa, João L. (2014). Cauchy horizon stability and mass inflation with a cosmological constant. ERE2014.
28	Costa, João L. (2014). On Mass Inflation with a Cosmological Constant. Hyp2014.
29	Costa, João L. (2014). The interior of black holes with a cosmological constant. VII Blaack Holes Worshop.
30	Costa, João L. (2013). Strong cosmic censorship with a cosmological constant. VI Black Holes Workshop.
31	Costa, J. L. (2012). The problem of a self-gravitating scalar field with positive cosmological constant. ESI Workshop: Dynamics of General Relativity; Black holes and Asymptotics.
32	Costa, J. L. (2012). The problem of a self-gravitating scalar field with positive cosmological constant. Workshop on Numerical and Mathematical Relativity at Oppurg.
33	Costa, J. L. (2012). The Problem Of A Self-gravitating Scalar Field With Positive Cosmological Constant. CENTRA Seminar.
34	Costa, J. L., Alho, A & Natário, J (2012). The problem of a self-gravitating scalar field with positive cosmological constant. Spanish Relativity Meeting in Portugal 2012.
35	Alho, A, Costa, J. L. & Natário, J (2011). Linear spherical waves in de Sitter spacetime. XX International Fall Workshop on Geometry and Physics .
36	Costa, J. L. (2011). Towards the Einstein-scalar field system with positive cosmological constant. Third Minho Meeting on Mathematical Physics.
37	Costa, J. L., Alho, A & Natário, J (2011). Linear spherical waves in de Sitter spacetime. Spanish Relativity Meeting 2011.
38	Alho, A, Costa, J. & Natário, J (2011). Towards the Einstein-Lambda-Scalar field system in spherical symmetry. IV Black Holes Workshop 2011.

- **Other Publications**

- Non-peer-reviewed papers

1	Costa, João L. (2021). O interior de buracos negros - singularidades e censura cósmica . Gazeta de Física. 44 (2/3), 15

Academic Management Positions

Sub-diretor (2026 - 2029)
Unit/Area: Master Degree in Artificial Intelligence

Sub-diretor (2025 - 2026)
Unit/Area: Master Degree in Artificial Intelligence

Membro (2025 - 2027)
Unit/Area: Comissão Permanente do Conselho Científico

Membro (Docente) (2025 - 2027)
Unit/Area: Plenário do Conselho Científico

Sub-diretor (2021 - 2025)
Unit/Area: Department of Mathematics

Membro (Docente) (2019 - 2021)
Unit/Area: Comissão Pedagógica

Sub-diretor (2017 - 2021)
Unit/Area: Department of Mathematics

Membro (Docente) (2017 - 2019)
Unit/Area: Comissão Pedagógica