Maria do Rosário Domingos Laureano

Professora Auxiliar
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Contacts

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Curriculum

Rosário D. Laureano is an Assistant Professor at ISCTE - Instituto Universitário de Lisboa, teaching multivariate calculus, multicriteria analysis, nonlinear optimization, and modelling of complex systems in the Department of Mathematics. She has a degree in Pure Mathematics by Faculty of Science of Lisbon University, MSc. in Applied Mathematics by IST-Instituto Superior Técnico of Technical University of Lisbon, and Ph.D. in Quantitative Methods with specialization of Mathematics by ISCTE. Her research interests include synchronization and control of chaotic dynamical systems, quantum dynamics, optimization methods, complex networks, and analysis of error in maths' learning, being an integrated researcher at ISTAR - Information Sciences, Technologies and Architecture Research Center and a member of the Executive Committee and the Scientific Council of this research center. Since 2018 she is the coordinator of the CCM - Complexity and Computational Modelling research group of ISTAR. She was a collaborator member of CFCUL (2004-2016) integrating the research line Philosophy of Mathematics and the FCT project Poincaré Philosopher of Science. She is now a member of the ISCTE Data Science Executive Group.

Research Interests

Dynamical systems

Mathematical optimization
Complex networks
Mathematics methodology
Multicriteria analysis
Error analysis
Synchronization of chaotic systems
Controle of chaotic systems

Academic Qualifications

University/Institution	Type	Degree	Period
ISCTE-IUL - Instituto Superior Ciências Trabalho e da Empresa	PhD	Quantitative Methods (Mathematics specialty)	2009
IST - Instituto Superior Técnico da Universidade Técnica de Lisboa	M.Sc.	Applied Mathematics	2002
FCUL - Faculdade de Ciências da Universidade de Lisboa	Licenciate	Pure Mathematics	1990

Teaching Activities

Teaching Year	Sem.	Course Name	Degree(s)	Coord.
2026/2027	2º	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	No
2025/2026	2º	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	No
2025/2026	2º	Multivariable Calculus	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2025/2026	2º	Fundamentals of Mathematics		Yes
2025/2026	2º	Computational Optimization	Post Graduation Program in Applied Machine Learning;	Yes
2025/2026	1º	Numerical Analysis	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2025/2026	1º	Mathematical Optimization	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2025/2026	1º	Project in Applied Mathematics I	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes

2025/2026	1º	Cryptography for Cybersecurity and Resilience	Master Degree in Cybersecurity and Resiliency;	Yes
2025/2026	1º	Fundamentals of Mathematics	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2024/2025	2º	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	Yes
2024/2025	2º	Multivariable Calculus	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2024/2025	2º	Mathematical Optimization	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2024/2025	2º	Stochastic Processes and Simulation		Yes
2024/2025	2º	Project in Applied Mathematics II		Yes
2024/2025	1º	Linear Algebra and Applications	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2024/2025	1º	Linear Algebra and Geometry		Yes
2024/2025	1º	Numerical Analysis	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2024/2025	1º	Project in Applied Mathematics I	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2023/2024	2º	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	No
2023/2024	2º	Multivariable Calculus	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2023/2024	2º	Mathematical Optimization	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2023/2024	1º	Linear Algebra and Applications	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2023/2024	1º	Linear Algebra and Geometry	Bachelor Degree in Digital Technologies and Automation;	Yes
2023/2024	1º	Numerical Analysis	Bachelor Degree in Mathematics Applied and Digital Technologies;	Yes
2023/2024	1º	Graphs and Complex Networks		Yes
2023/2024	1º	Mathematics		Yes
2022/2023	2º	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	Yes
2022/2023	2º	Geometry and Trigonometry		Yes
2022/2023	2º	Logic, Sequences, Combinatory and Probability		Yes

2022/2023	2°	Functions and Complex Numbers		Yes
2022/2023	2°	Derivative of Functions and Applications		Yes
2022/2023	2°	Topics of Elementary Mathematics I		Yes
2022/2023	2°	Topics of Elementary Mathematics II		Yes
2022/2023	2°	Numerical Linear Algebra		Yes
2022/2023	2°	Calculus		Yes
2022/2023	2°	Multivariable Calculus		Yes
2022/2023	2°	Introduction to Statistics and Probabilities		Yes
2022/2023	2°	Analytic Methods Applied to Management		Yes
2022/2023	1°	Functions and Complex Numbers		Yes
2022/2023	1°	Derivative of Functions and Applications		Yes
2022/2023	1°	Topics of Elementary Mathematics I		Yes
2022/2023	1°	Topics of Elementary Mathematics II		Yes
2022/2023	1°	Calculus		Yes
2022/2023	1°	Single Variable Calculus		Yes
2022/2023	1°	Geometry and Statistics		Yes
2022/2023	1°	Mathematics	Bachelor Degree in Politics, Economics and Society;	Yes
2021/2022	2°	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	No
2021/2022	2°	Geometry and Trigonometry		Yes
2021/2022	2°	Logic, Sequences, Combinatory and Probability		Yes
2021/2022	2°	Functions and Complex Numbers		Yes
2021/2022	2°	Derivative of Functions and Applications		Yes

2021/2022	2º	Mathematics Topics for Telecommunications	Bachelor Degree in Telecommunications and Computer Engineering;	Yes
2021/2022	1º	Business Intelligence Applications I		Yes
2021/2022	1º	Topics of Elementary Mathematics I		Yes
2021/2022	1º	Topics of Elementary Mathematics II		Yes
2021/2022	1º	Calculus I	Bachelor Degree in Computer Engineering;	No
2020/2021	2º	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	Yes
2020/2021	2º	Geometry and Trigonometry		Yes
2020/2021	2º	Logic, Sequences, Combinatory and Probability		Yes
2020/2021	2º	Functions and Complex Numbers		Yes
2020/2021	2º	Derivative of Functions and Applications		Yes
2020/2021	2º	Topics of Elementary Mathematics I		Yes
2020/2021	2º	Topics of Elementary Mathematics II		Yes
2020/2021	2º	Mathematics Topics for Telecommunications	Bachelor Degree in Telecommunications and Computer Engineering;	Yes
2020/2021	1º	Business Intelligence Applications I		Yes
2020/2021	1º	Topics of Elementary Mathematics I		Yes
2020/2021	1º	Topics of Elementary Mathematics II		Yes
2019/2020	2º	Functions and Complex Numbers		Yes
2019/2020	2º	Derivative of Functions and Applications		Yes
2019/2020	2º	Calculus Topics II	Bachelor Degree in Data Science (PL); Bachelor Degree in Data Science;	No
2019/2020	2º	Topics of Elementary Mathematics I		No
2019/2020	2º	Calculus II		Yes
2019/2020	1º	Business Intelligence Applications I		Yes

2019/2020	1º	Research Methods for Phd in Complexity Sciences I		No
2019/2020	1º	Advanced Topics in Complexity Sciences I		No
2019/2020	1º	Computational Intelligence and Optimization	Institutional Degree in Escola de Tecnologias e Arquitetura;	No
2019/2020	1º	Functions and Complex Numbers		Yes
2019/2020	1º	Derivative of Functions and Applications		Yes
2019/2020	1º	Topics of Elementary Mathematics I		No
2018/2019	2º	Business Intelligence Applications I		Yes
2018/2019	2º	Functions and Complex Numbers		Yes
2018/2019	2º	Derivative of Functions and Applications		Yes
2018/2019	2º	Calculus II		Yes
2018/2019	1º	Computational Intelligence and Optimization		Yes
2018/2019	1º	Calculus I		No
2017/2018	2º	Business Intelligence Applications I		Yes
2017/2018	2º	Calculus II		Yes
2017/2018	2º	Calculus II		Yes
2017/2018	2º	Calculus II		Yes
2017/2018	2º	Optimization		Yes
2017/2018	1º	Advanced Topics in Complexity Sciences I		No
2017/2018	1º	Calculus I		No
2016/2017	2º	Calculus II		Yes
2016/2017	2º	Calculus II		Yes
2016/2017	2º	Calculus II		Yes

2016/2017	2º	Optimization		Yes
2015/2016	2º	Advanced Topics in Complexity Sciences I		No
2015/2016	2º	Calculus II		Yes
2015/2016	2º	Calculus II		Yes
2015/2016	2º	Calculus II		Yes
2015/2016	2º	Optimization		Yes
2015/2016	1º	Calculus I		Yes
2015/2016	1º	Calculus I		Yes
2015/2016	1º	Calculus I		Yes
2014/2015	2º	Calculus II		Yes
2014/2015	2º	Calculus II		Yes
2014/2015	2º	Calculus II		Yes
2014/2015	2º	Calculus II		Yes
2014/2015	2º	Optimization		Yes
2014/2015	1º	Advanced Topics in Business Intelligence		No
2014/2015	1º	Calculus I		No
2014/2015	1º	Calculus I		No
2013/2014	2º	Decision Support Tools		Yes
2013/2014	2º	Calculus II		No
2013/2014	2º	Optimization		No
2013/2014	1º	Calculus I		Yes
2013/2014	1º	Calculus I		Yes
2013/2014	1º	Calculus I		Yes
2013/2014	1º	Calculus I		Yes
2012/2013	2º	Calculus II		No

2012/2013	2º	Optimization		No
2012/2013	1º	Calculus I		Yes
2011/2012	2º	Calculus II		No
2011/2012	2º	Optimization		No
2011/2012	1º	Calculus I		Yes
2010/2011	2º	Calculus II		No
2010/2011	2º	Optimization		No
2010/2011	1º	Calculus I		Yes
2010/2011	1º	Mathematics		No
2008/2009	2º	Optimization		No
2008/2009	1º	Calculus I		No
2008/2009	1º	Mathematics		No
2007/2008	2º	Optimization		No

Supervisions

• **Ph.D. Thesis**
  - Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year
1	Francisco Cano Marchal	Water Dynamics, Coherent Domains and the Origin of Life	English	Iscte	2021

• **M.Sc. Final Projects**
  - Ongoing

	Student Name	Title/Topic	Language	Status	Institution
1	Fernando Pedro dos Santos Soares Moreira	A utilização da Inteligência Artificial Generativa em tarefas de investigação no ensino da Geografia.	--	Developing	Iscte

  - Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year
1	Raquel Andrade Sousa	O Modelo de Compras da Portugal Telecom - A sua robustez e o seu contributo para a sustentabilidade	Portuguese	Iscte	2014

Total Citations

Web of Science®	8
Scopus	10

Publications

• Scientific Journals

- Scientific journal paper

1	Laureano, R. D. (2025). Cocycles in lie groups, cochains and regularity problem. European Journal of Pure and Applied Mathematics. 18 (2)
2	Laureano, R. D. (2024). From Anosov Closing Lemma to global data of cohomological nature. European Journal of Pure and Applied Mathematics. 17 (3), 1403-1416 - Times Cited Web of Science®: 1 - Times Cited Scopus: 1 - Times Cited Google Scholar: 1
3	Laureano, R. D., Mendes, D. A., Grácio, C. & Laureano, F. (2020). Searching for complexity in the human pupillary light reflex. Mathematics. 8 (3) - Times Cited Web of Science®: 3 - Times Cited Scopus: 3 - Times Cited Google Scholar: 5
4	Laureano, R. D. (2020). Livschitz Theorem in suspension flows and Markov systems: approach in cohomology of systems. Symmetry. 12 (3) - Times Cited Web of Science®: 2 - Times Cited Scopus: 2 - Times Cited Google Scholar: 2
5	Laureano, M. (2013). Cohomology of discrete dynamical systems. Journal of Mathematics and Technology. 4 (2), 44-48
6	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2013). Dislocated Negative Feedback Control with Partial Replacemrnt between Chaotic Lorenz Systems. Mathematica Aeterna. 3 (5), 337-348
7	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2011). Synchronization of chaotic dynamical systems: a brief review. International Journal of Academic Research. 3 (3), 402-408 - Times Cited Google Scholar: 2

8	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2010). Efficient synchronization of one-dimensional chaotic quadratic maps by different couling terms. Journal of Mathematics and Technology. 1 (1), 5-12 - Times Cited Google Scholar: 5

- Scientific journal editor

1	Laureano, M., Pedro Ribeiro, Fernando Silva & José Dernando Mendes (2022). Lecture Notes in Computer Science. Springer Nature Switzerland AG 2022.

• Books and Book Chapters
- Book chapter

1	Stellacci, S., Rato, V. & Laureano, R. (2020). The MACBETH approach to evaluate strategies for the conservation of architectural heritage. In José António Filipe, Tolga Genç (Ed.), MCDM Methods for Business and Management . (pp. 125-135). Ottawa: Clausius Scientific Press. - Times Cited Google Scholar: 1
2	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2009). Sincronização de sistemas dinâmicos contínuos e caóticos. In Maria de Fátima Salgueiro; Diana A. Mendes; Luís F. Martins (Ed.), Temas em Métodos Quantitativos 6. (pp. 251-371). Lisboa: Edições Sílabo.

• Conferences/Workshops and Talks
- Publication in conference proceedings

1	João Guerreiro, Dias, J., Barros, J., Costa, P. & Laureano, M. (2025). On the Benefits of Teaching and Learning Symmetries Using AR and VR. In 2025 International Conference on Graphics and Interaction (ICGI). (pp. 1-8). Sintra, Portugal: IEEE.
2	Domingos, L., Rato, V. & Laureano, R. (2020). Designing and building for extreme environments. A multi-criteria decision model to evaluate architecture for extreme temperatures. In Rodríguez Álvarez, J., and Gonçalves, J. C. S. (Ed.), PLEA 2020 - Planning Post Carbon Cities: 35th PLEA Conference on Passive and Low Energy Architecture. (pp. 1155-1160). A Coruña: University of A Coruña, Asoc. PLEA2020 Planning Post Carbon Cities. - Times Cited Google Scholar: 1
3	Cardoso, M. G. M. S., Laureano, R. D. & Serrão, C. (2017). Cybersecurity culture in Portuguese organizations: An exploratory analysis. In Reis, L. P., Rocha, A., Alturas, B., Costa, C. and Cota, M. P. (Ed.), 2017 12th Iberian Conference on Information Systems and Technologies (CISTI). (pp. 2090-2094). Lisbon, Portugal: IEEE. - Times Cited Web of Science®: 2 - Times Cited Google Scholar: 9
4	Laureano, R., Mendes, D. A. & Ferreira, M. A. M. (2007). Efficient synchronization with chaotic quadratic maps. In Kovacova, M. (Ed.), 6th International Conference APLIMAT 2007. (pp. 215-224). Bratislava, Slovakia: Slovak University of Technology in Bratislava.

- Talk

1	Laureano, M. (2024). Nonlinear differential equa- tion with delay: searching for complexity in the human pupillary light reflex. NODBIF - Nonlinear Dynamics of the Biological Information Flow .

2	Domingos, L., Rato, V. & Laureano, M. (2020). Designing and Building for Extreme Environments. A multi-criteria decision model to evaluate architecture for extreme temperatures. PLEA 2020 - Planning Post Carbon Cities.
3	Laureano, M. (2020). NetSciX- 2021 Presentation. NetSciX 2020 - International School and Conference on Network Science.
4	Laureano, M. & Marchal, F. (2019). "Fishing" of networks. Seminário Multidisciplinar Sousa Ramos - 8º Dia Dinâmico.
5	Laureano, M. & Mendes, D. A. (2018). Human Pupillary Light Reflex Model: research of dynamic in a Delay Differential Equation. Dynamics Days Europe.
6	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2018). Generalized synchronization with continuous chaotic dynamical systems. Conference on Complex Systems 2018-CCS 2018.
7	Laureano, M., Cardoso, M. G. M. S. & Serrão, C. (2017). Cybersecurity culture in Portuguese organizations: an exploratory analysis. CISTI'2017 - 12ª Conferência Ibérica de Sistemas e Tecnologias de Informação.
8	Laureano, R. D. (2016). Synchronization Phenomenon in Complex Systems. CoLAB Workshop - Mathematics of Complex Systems: from precision medicine to smart cities.
9	Laureano, R. D. & Mendes, D. A. (2016). Research of complexity in the human pupillary light reflex. Summer Solstice 2016 8th International Conference on Discrete Models of Complex Systems.
10	Laureano, R. D: & Mendes, D. A. (2016). Searching for complexity in the HUMAN PUPILLARY LIGHT REFLEX. Portuguese Meeting in Biomathematics 2016.
11	Laureano, M. (2014). Chaotic Synchronization od One-Dimensional Quadratic Maps by Non-Symmetric Coupling. IECMSA-2014, 3rd International Eurasian Conference on Mathematical Sciences and Applications.
12	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2012). Efficient synchronization of one-dimensional chaotic quadratic maps coupled with symmetry. ICDEA 2012-18th International Conference on Difference Equations and Applications.
13	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2012). Dislocated negative feedback control with partial replacement between chaotic Lorentz systems. International Conference on Differential Equations, Difference Equations and Special Functions-In Memory of Professor Panayiotis D. Siafarikas.
14	Laureano, M. (2011). Predictability versus determinism in the context of Poincaré's Work on Celestial Mechanics. International Colloquim Poincaré, philosopher of science: Problems and Perspectives.
15	Laureano, R. (2011). Efficient Synchronization with Lorenz and Rössler chaotic systems. NOMA'11 - International Workshop on Nonlinear Maps and Applications.
16	Laureano, R. (2011). Poincaré as Founder of Deterministic Chaos Theory. CLMPS 2011 - 14th International Congress of Logic, Methodology and Philosophy of Science.
17	Laureano, R. (2011). Determinism versus predictability in the context of Poincare's work in the restricted three-body problem. IJAS/ROME - International Journal of Arts & Sciences Conference.
18	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2007). Efficient synchronization with chaotic quadratic maps. 6th International Conference-APLIMAT 2007.

• Other Publications

- Working Papers

1	Laureano, M. (2024). Cocycles in Lie Groups, Cochains and Regularity Problem. arXiv:2411.18757.

- Paper in press

1	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2025). Globally Stable Synchronization Conditions in Total Diffusive Linear Bidirectional Coupling Between Continuous Dynamical Systems and Partial Replacement (Rössler and Lorenz). EasyChair Preprint Nº 9873.
2	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2025). Efficient Synchronization Between Chaotic Lorenz Systems in Unidirectional Coupling. EasyChair Preprint Nº 9872.
3	Laureano, M., Mendes, D. A. & Ferreira, M. A. M. (2025). Chaos synchronization: a review. arXiv:2412.20649v1. - Times Cited Scopus: 4 - Times Cited Google Scholar: 4
4	Laureano, M. & Ferreira, M. A. M. (2025). Poincaré Work on Celestial Mechanics: Predictability versus Determinism in the Context of Restricted Three-Body Problem. arXiv:2212.12339.

Academic Management Positions

Coordenador do 2º Ano (2025 - 2026)
Unit/Area: Bachelor Degree in Mathematics Applied and Digital Technologies

Director (2025 - 2028)
Unit/Area: Bachelor Degree in Mathematics Applied and Digital Technologies

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

Coordenador do 2º Ano (2024 - 2025)
Unit/Area: Bachelor Degree in Mathematics Applied and Digital Technologies

Coordenador do 3º Ano (2024 - 2025)
Unit/Area: Bachelor Degree in Mathematics Applied and Digital Technologies

Director (2023 - 2025)
Unit/Area: Bachelor Degree in Mathematics Applied and Digital Technologies

Coordenador do 2º Ano (2023 - 2024)
Unit/Area: Bachelor Degree in Mathematics Applied and Digital Technologies

Director (2023)
Unit/Area: Bachelor Degree in Mathematics Applied and Digital Technologies

Membro (Docente) (2023 - 2024)
Unit/Area: Comissão Pedagógica

Coordenador do 1º Ano (2022 - 2023)
Unit/Area: [0388] Mathematics Applied to Digital Transformation

Membro (Docente) (2022 - 2024)
Unit/Area: Comissão Científica

Membro (Docente) (2022 - 2026)
Unit/Area: Comissão Científica

Director (2022 - 2023)
Unit/Area: [0388] Mathematics Applied to Digital Transformation

Membro (2018 - 2020)
Unit/Area: Comissão Científica

Membro (Docente) (2017 - 2019)
Unit/Area: Plenário do Conselho Pedagógico

Membro (Docente) (2015 - 2017)
Unit/Area: Plenário do Conselho Pedagógico

Membro (Docente) (2012 - 2017)
Unit/Area: Comissão Científica

Awards

Teaching award (ranked 1st) of ISTA (ISCTE-IUL) (2017)

Teaching award (ranked 3rd) of ISTA (ISCTE-IUL) (2015)

Organization/Coordination of Events

Type of Organization/Coordination	Event Title	Organizer	Year
Member of scientific event's organizing committee	NOMA'24 - International Workshop on Nonlinear Maps and Applications	University of Évora, University of Porto	2024
Coordination of scientific event (with scientific committee) outside of ISCTE-IUL	NetSciX 2022 - International School and Conference on Network Science	University of Porto, University of Aveiro	2022
Member of scientific event's organizing committee	NOMA'11 - International Workshop on Nonlinear Maps and their Applications	University of Évora	2011