Curriculum Vitæ

Paulo H. Contente Rocha

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Academic degrees:

2026 PhD in Mathematics (Mathematical Analysis) *University of Lisbon, Faculty of Sciences, Department of Mathematics.*
Supervisors: João Pedro Boto, PhD and Fernanda Cipriano, PhD
Thesis title: Optimal Control of Stochastic Differential Equations in Finance
Final classification: Approved with Distinction (Aprovado com Distinção), 29 January 2026.
PhD scholarship from FCT (PD/BD/135509/2018), within the LisMath doctoral programme.

2014 MSc in Mathematics *University of Lisbon, Faculty of Sciences, Department of Mathematics.*
Supervisors: Pedro G. Lind, PhD and João Pedro Boto, PhD
Dissertation title: Stochastic evolution of parameters defining probability density functions: Application to the New York stock market
Final mark: 17/20 (Muito Bom), with 20/20 for the dissertation.

2012 BSc in Physics *University of Lisbon, Faculty of Sciences, Department of Physics.*
Final mark: 16/20

Scientific domain: Mathematics/Physics

Current research interests: Stochastic Analysis and Modelling, Stochastic Optimal Control, Statistical Inference for Stochastic Processes, Numerical Analysis, Mathematical Finance,

Dynamical Systems, Data Analysis, Mathematical Physics, Computer Science, Mathematics Education

Current academic positions: Invited Assistant Professor (Professor Auxiliar Convidado) at Iscte (Iscte-Sintra), Invited Adjunct Professor (Professor Adjunto Convidado) at ENIDH and Teaching Assistant (Assistente Convidado) at Nova SBE.

Research units (University of Lisbon):

2025 – 2026	CEMS.UL – Center for Mathematical Studies, *PhD student* (until the completion of the PhD).
2015 – 2024	CMAF-CIO – Centro de Matemática, Aplicações Fundamentais e Investigação Operacional, *research grant holder and PhD student*.
2013 – 2015	CMAF – Centro de Matemática e Aplicações Fundamentais, *MSc student and research grant holder*.
2012 – 2013	CFTC – Centro de Física Teórica e Computacional, *collaborating member*.

CMAF-CIO resulted from the merger of CMAF with the Centro de Investigação Operacional (CIO) in 2015 and was renamed CEMS.UL in 2025.

Professional and research experience:

09/2026 – Present	Escola Superior Náutica Infante D. Henrique (ENIDH), *Invited Adjunct Professor* (Professor Adjunto Convidado).
2022 – Present	Iscte – Instituto Universitário de Lisboa, *Invited Assistant Professor* (Professor Auxiliar Convidado).
2021 – Present	Nova School of Business and Economics (Nova SBE), *Teaching Assistant* (Assistente Convidado).
09/2023 – 01/2026	Faculdade de Ciências da Universidade de Lisboa (FCUL), *Teaching Assistant* (Assistente Convidado).
10/2016 – 01/2018	CMAF-CIO, University of Lisbon, *Research Grant Holder* (Bolseiro de Investigação).
10/2014 – 05/2015	CMAF, University of Lisbon, *Research Grant Holder* (Bolseiro de Investigação).
06/2015	ForWind, University of Oldenburg, *Visiting Researcher* (four-week research exchange funded by the DAAD).
10/2012 – 12/2012	CFTC, University of Lisbon, *Research Initiation Grant Holder* (Bolseiro de Iniciação Científica).

A Research

A-1 Scientific production

Articles in international scientific journals

1. Boto, J., Cipriano, F., **Rocha, P.**, *Pricing European-options with α-hypergeometric stochastic volatility model under parameter uncertainty*, Journal of Applied Mathematics and Computing, **72**, 232, 2026. DOI: 10.1007/s12190-026-02888-8.

2. Boto, J., Cipriano, F., **Rocha, P.**, *Portfolio problem for the α-hypergeometric stochastic*

volatility model with consumption, Journal of Mathematical Analysis and Applications, **543**(2), 128891, 2025. DOI: 10.1016/j.jmaa.2024.128891.

3. Estevens, J., **Rocha, P.**, Boto, J.P., and Lind, P.G., *Stochastic modelling of non-stationary financial assets*, Chaos, **27**, 113106, 2017. DOI: 10.1063/1.5010613.

4. **Rocha, P.**, Raischel, F., Boto, J.P., and Lind, P.G., *Uncovering the evolution of non-stationary stochastic variables: the example of asset volume-price fluctuations*, Physical Review E, **93**, 052122, 2016. DOI: 10.1103/PhysRevE.93.052122.

Publications in proceedings of scientific meetings

5. **Rocha, P.**, Raischel, F., Cruz, J., and Lind, P.G., *Stochastic Evolution of Stock Market Volume-Price Distributions*, 3rd SMTDA Conference Proceedings, pp. 619–627, 2015. arXiv:1404.1730. DOI: 10.48550/arXiv.1404.1730.

6. **Rocha, P.**, Raischel, F., Boto, J.P., and Lind, P.G., *Optimal models of extreme volume-prices are time-dependent*, Journal of Physics: Conference Series, **574**, 012148, 2015 (IC-MSQUARE 2014). DOI: 10.1088/1742-6596/574/1/012148.

Communications in scientific meetings

- **Communications in international meetings**

  1. **JIM 2025**, "Summer JIM Days", *Coimbra, Portugal*, Jul 2025. Talk: *Portfolio Problem with Consumption Under the α-Hypergeometric Stochastic Volatility Model.*
  2. **EUROPT 2022**, "19th Workshop on Advances in Continuous Optimization", *Caparica, Portugal*, Jul 2022. Talk: *Portfolio Problem with Consumption Under the α-Hypergeometric Stochastic Volatility Model.*
  3. **CHAOS 2017**, "10th Chaotic Modeling and Simulation International Conference", *Barcelona, Spain*, Jun 2017. Talk: *Diabolical points, repulsion and chaos.*
  4. **Summer School 2015**, "Novos Talentos em Matemática - Summer School", *Lisbon, Portugal*, Jul 2015.
  5. **IC-MSQUARE 2014**, "International Conference on Mathematical Modeling in Physical Sciences", *Madrid, Spain*, Aug 2014. Talk: *Optimal models of extreme volume-prices are time-dependent.*
  6. **SMTDA 2014**, "3rd Stochastic Modeling Techniques and Data Analysis International Conference", *Lisbon, Portugal*, Jun 2014. Talk: *Stochastic Evolution of Stock Market Volume-Price Distributions.*

- **Communications in national meetings and seminars**

  1. **LisMath Seminar Day**, LisMath doctoral programme, *online*, Apr 2022. Talk: *Dynamic Programming and the Portfolio Problem with Consumption (Under the α-Hypergeometric Stochastic Volatility Model).*

2. **Doctoral Seminar**, Department of Mathematics, FCUL, *Lisbon, Portugal*, May 2019. Talk: *Extracting stochastic evolution equations from empirical data.*
3. **LisMath Seminar**, FCUL, *Lisbon, Portugal*, Oct 2018. Talk: *An introduction to PT-symmetric quantum theory.*
4. **Seminar on Analysis and Differential Equations**, CMAF-CIO, FCUL, *Lisbon, Portugal*, Jul 2015. Talk: *Study of eigenvalues and eigenvectors of a parametrized matrix.*

- **Posters**

1. **DPG-Frühjahrstagung**, *Dresden, Germany*, Apr 2014. Poster: *Stochastic Evolution of New York Stock Market Distributions.*

Organisation of scientific events

1. **Organiser** of the informal seminar of the PhD students in Mathematics (*PhD Informal Seminar*), Faculdade de Ciências da Universidade de Lisboa, online, March – June 2021.

A-2 Scientific and applied research projects

1. **Doctoral research project "Optimal Control of Stochastic Differential Equations in Finance"**, Faculty of Sciences, University of Lisbon (2018 – 2026). PhD student. Supervisors: João Pedro Boto, PhD and Fernanda Cipriano, PhD.
   - *Funding:* FCT PhD studentship PD/BD/135509/2018 (LisMath doctoral programme).
   - *Problem:* optimal investment and consumption decisions and the pricing of European options under parameter uncertainty, for a stochastic volatility model used in the financial industry.
   - *Methods:* maximum likelihood calibration of the model to high-frequency S&P 500 data, Crank–Nicolson finite differences for the Hamilton–Jacobi–Bellman equation and the optimal investment and consumption policies, and regression Monte Carlo for the backward stochastic differential equations that give upper and lower bounds for option prices.
   - *Results:* two articles, in the Journal of Applied Mathematics and Computing (2026) and in the Journal of Mathematical Analysis and Applications (2025).
   - *Programming languages:* Python and R.
2. **CMAF-CIO, University of Lisbon** (Oct 2016 – Jan 2018). Member of the research team. Field: Linear Algebra and Computational Mathematics. Supervisor: Cristian Barbarosie, PhD.
   - *Funding:* research grant (BI) funded by FCT through the CMAF-CIO strategic project UID/MAT/04561/2013 (call 6211-BI-2016-33).
   - *Problem:* regularity of the eigenvalues and eigenvectors of symmetric matrices depending on parameters, such as those arising from the discretisation of differential equations, with emphasis on multiple eigenvalues.

- *Methods:* finite-element computation of the eigenvalues of the Dirichlet Laplacian on domains depending on parameters, tracking of eigenvalue crossings, detection of degeneracies (diabolical points) by the Berry phase test, and Runge–Kutta integration of systems of ordinary differential equations.
- *Results:* talk presented at CHAOS 2017, "Diabolical points, repulsion and chaos".
- *Programming languages:* FreeFem++ and Python.

3. **ForWind – Center for Wind Energy Research, University of Oldenburg, Germany** (Jun 2015). Member of the research team. Field: Computational and Theoretical Physics. Supervisor: Pedro G. Lind, PhD.
   - *Funding:* four-week research exchange (1–28 June 2015) funded by the DAAD through the programme *IPID4all – Mobile Doctorates in System Integration of Renewable Energy* of the University of Oldenburg (exchange proposal selected by the programme's Management Board).
   - *Problem:* stochastic evolution of non-stationary time series, applied to the volume-price fluctuations of about 2000 shares of the New York Stock Exchange, in the group of Prof. J. Peinke.
   - *Methods:* numerical tests of the Markov property at several time lags, a prerequisite for estimating the drift and diffusion coefficients of Langevin models from data.
   - *Results:* the article "Uncovering the evolution of nonstationary stochastic variables: the example of asset volume-price fluctuations" (Physical Review E, 2016, item 4 of Section A-1) was completed during the exchange and acknowledges its DAAD funding.
   - *Programming languages:* C++ and Python.

4. **Research grant "Analytical and numerical study of eigenvalues and eigenvectors of matrices depending on a parameter"**, CMAF, University of Lisbon (Oct 2014 – May 2015). Research grant holder. Supervisor: Cristian Barbarosie, PhD.
   - *Funding:* research grant (BI) funded by FCT through the CMAF project Incentivo/MAT/UI0209/2014.
   - *Problem:* continuity and differentiability of the eigenvalues and eigenvectors of matrices depending on a parameter, including repeated eigenvalues, motivated by finite-element models of engineering structures, where they give the natural vibration modes and, through their derivatives, the design sensitivity used in optimisation.
   - *Methods:* numerical computation of the eigenvalues and eigenvectors along the parameter, ordering of the eigenvalue branches across crossings by a smoothness criterion, and study of Nelson's algorithm for computing their derivatives.
   - *Results:* talk presented at the Seminar on Analysis and Differential Equations of CMAF-CIO, "Study of eigenvalues and eigenvectors of a parametrized matrix" (July 2015).
   - *Programming languages:* FreeFem++ and Python.

5. **CFTC, University of Lisbon** (Oct 2012 – Dec 2012). Member of the research team. Field: Computational and Theoretical Physics. Supervisor: Pedro G. Lind, PhD.

- *Funding:* research initiation grant (BIC), awarded in a competitive call and funded by FCT through the CFTC strategic project PEst-OE/FIS/UI0618/2011, "Evolution of Market Volume Distributions".
- *Problem:* time evolution of the trading-volume distributions of New York Stock Exchange shares.
- *Methods:* construction of a database of shares sampled every ten minutes, empirical probability density and cumulative distribution functions with logarithmic binning, and automated nonlinear least-squares fitting of lognormal distributions to each ten-minute snapshot.
- *Results:* basis of the proceedings paper "Stochastic Evolution of Stock Market Volume-Price Distributions" (3rd SMTDA Conference Proceedings, 2015, item 5 of Section A-1).
- *Programming languages:* C++.

A-3 Participation in scientific evaluation

1. **Member of the Programme Committee** of the 2nd Symposium on Undergraduate Research at Iscte (*2.º Simpósio de Investigação nas Licenciaturas do Iscte*, SIL-ISCTE 2026), Iscte, 2026. Reviewer of one full paper submitted to the symposium.

B Teaching

B-1 Teaching activity and pedagogical innovation

Teaching activities

• Undergraduate courses

Álgebra Linear	Nova SBE BSc programmes in Economics and Management. Teaching assistant: 2021/22.
Álgebra Linear com Programação	Nova SBE BSc programmes in Economics and Management. Teaching assistant: 2022/23.
Cálculo II	Nova SBE BSc in Economics. Teaching assistant: 2021/22.
Optimização	Iscte, Lisbon BSc in Gestão de Marketing. Lectures and exercises classes: 2021/22.

Geometria e Estatística	Iscte, Iscte-Sintra BSc in Tecnologias Digitais Educativas (2023/24, 2024/25) and BSc in Tecnologias Digitais, Edifícios e Construção Sustentável (2024/25, 2025/26). Lectures and exercises classes: 2023/24, 2024/25, 2025/26.
Geometria e Estatística Aplicada à Educação	Iscte, Iscte-Sintra BSc in Tecnologias Digitais Educativas. Lectures and exercises classes: 2025/26.
Tópicos de Mat. Elementar I	Iscte, Iscte-Sintra Preparatory module for the BSc programmes. Lectures and exercises classes: 2022/23, 2024/25, 2025/26, 2026/27.
Tópicos de Mat. Elementar II	Iscte, Iscte-Sintra Preparatory module for the BSc programmes. Lectures and exercises classes: 2022/23, 2024/25, 2025/26, 2026/27.
Geometria e Trigonometria	Iscte, Iscte-Sintra Preparatory module for the BSc programmes. Lectures and exercises classes: 2022/23, 2023/24.
Lógica, Sucessões, Combinatória e Probabilidade	Iscte, Iscte-Sintra Preparatory module for the BSc programmes. Lectures and exercises classes: 2022/23, 2023/24.
Funções e Núm. Complexos	Iscte, Iscte-Sintra Preparatory module for the BSc programmes. Lectures and exercises classes: 2022/23, 2023/24.
Derivadas de Funções e Apl.	Iscte, Lisbon (2021/22) and Iscte-Sintra (2022/23, 2023/24) Preparatory module in Mathematics. Lectures and exercises classes: 2021/22, 2022/23, 2023/24.
Matemática Aplicada	Iscte, Iscte-Sintra BSc programmes in Tecnologias Digitais e Inteligência Artificial, in Desenvolvimento de Software e Aplicações and in Tecnologias Digitais, Edifícios e Construção Sustentável. Lectures and exercises classes: 2024/25, 2025/26, 2026/27.
Introdução à Estatística	Iscte, Iscte-Sintra BSc in Tecnologias Digitais e Automação. Lectures and exercises classes: 2024/25.

Estatística e Probabilidades	Iscte, Iscte-Sintra BSc in Tecnologias Digitais e Segurança de Informação. Lectures and exercises classes: 2024/25.
Fundamentos de Matemática	Iscte, Iscte-Sintra BSc in Matemática Aplicada e Tecnologias Digitais. Lectures and exercises classes: 2025/26.
Álg. Linear e Geom. Analítica	FCUL BSc in Física. Exercises classes: 2023/24.
Matemática (Faculdade de Farmácia)	FCUL Integrated MSc in Ciências Farmacêuticas. Exercises classes: 2023/24, 2024/25, 2025/26.
Análise Matemática IV	FCUL BSc programmes in Matemática and Matemática Aplicada. Exercises classes: 2023/24.
Elementos de Álgebra Linear	FCUL BSc in Engenharia Informática. Exercises classes: 2024/25.
Álgebra Linear	ENIDH BSc programmes in Gestão Portuária and Gestão de Transportes e Logística. Course coordinator (regente). Lectures and theoretical-practical classes: 2026/27.

- **MSc courses**

MS Office Specialist/Expert Excel	Nova SBE Transversal course, open to all MSc programmes. Teaching assistant: 2022/23, 2023/24, 2024/25.
Data Curation for Business Analytics	Nova SBE MSc in Business Analytics. Grading Assistant: 2021/22, 2025/26.
Computational Thinking	Nova SBE MSc programmes in Economics, Finance and Management. Grading Assistant: 2022/23.
Intro. to Python for Data Analysis	Nova SBE MSc in Business Analytics. Grading Assistant: 2025/26, 2026/27.
Num. Methods for Econ. & Finance	Nova SBE MSc programmes in Economics, Finance and International Finance. Grading Assistant: 2025/26.

- **Teaching in international programmes**

Tech4Society (Erasmus+ Blended Intensive Programme)	Iscte-Sintra, with European partner universities ECTS-credited programme for international students Session “Music and Digital Technologies”: 2024/25.

Student satisfaction

Overall average across the three institutions: 7.2/10 (20 course editions, 466 responses), after converting each scale linearly to 0–10 (Iscte as reported, FCUL as $(x-1)/4 \times 10$ and Nova SBE as $(x-1)/5 \times 10$).

Overall satisfaction of the students with the teacher, from the institutional pedagogical surveys, 2021/22 to 2025/26.

Iscte (scale 0–10). **Average of the 11 course editions: 7.2/10** (204 responses). There are no survey results for the preparatory modules in Mathematics.

Year	Course	Responses	Average
2021/22, 2nd sem.	Optimização	25	7.1
2023/24, 1st sem.	Geometria e Estatística	18	8.1
2023/24, 2nd sem.	Geometria e Estatística	8	8.3
2024/25, 1st sem.	Matemática Aplicada	31	8.1
2024/25, 1st sem.	Estatística e Probabilidades	18	6.3
2024/25, 2nd sem.	Geometria e Estatística	26	6.5
2024/25, 2nd sem.	Introdução à Estatística	12	6.8
2025/26, 1st sem.	Fundamentos de Matemática	16	7.1
2025/26, 1st sem.	Matemática Aplicada	30	6.9
2025/26, 2nd sem.	Geometria e Estatística Aplicada à Educação	9	7.8
2025/26, 2nd sem.	Geometria e Estatística	11	6.5

FCUL (scale 1–5). **Average of the 6 course editions: 4.0/5** (216 responses).

Year	Course	Responses	Average
2023/24, 1st sem.	Álgebra Linear e Geometria Analítica	46	4.1
2023/24, 1st sem.	Matemática (Faculdade de Farmácia)	20	4.5
2023/24, 2nd sem.	Análise Matemática IV	84	3.7
2024/25, 1st sem.	Matemática (Faculdade de Farmácia)	25	3.8
2024/25, 2nd sem.	Elementos de Álgebra Linear	24	4.8
2025/26, 1st sem.	Matemática (Faculdade de Farmácia)	17	3.3

Nova SBE (scale 1–6, courses taught as teaching assistant). **Average of the 3 course editions: 4.3/6** (46 responses).

Year	Course	Responses	Average
2021/22, 1st sem.	Álgebra Linear	12	3.9
2021/22, 2nd sem.	Cálculo II	3	5.0
2022/23, 1st sem.	Álgebra Linear com Programação	31	3.9

Teaching materials

1. **Author** of a Moodle database of approximately 900 exercises for the courses (Iscte): "Matemática Aplicada", "Introdução à Estatística", "Estatística e Probabilidades", "Geometria e Estatística" and "Complementos de Matemática", for the academic year 2024/25.

2. **Author** of a new set of course materials for the courses "Geometria e Estatística" and "Geometria e Estatística Aplicada à Educação" (Iscte), including a textbook and a collection of exercises with solutions, for the academic year 2025/26.

3. **Author** of a new set of course materials for the course "Álgebra Linear" (ENIDH), including a textbook, exercise sheets, slides and videos with mathematical animations programmed in Python (Manim), for the academic year 2026/27.

4. **Author** of new sets of course materials for the courses "Tópicos de Matemática Elementar I" and "Tópicos de Matemática Elementar II" (Iscte, preparatory modules in Mathema-

tics), including a textbook and exercise sheets for each course, for the academic year 2026/27.

Pedagogical innovation

1. **Developer** of interactive course websites for "Álgebra Linear" (ENIDH) and "Tópicos de Matemática Elementar I" and "II" (Iscte), used by the students of these courses in 2026/27. Each site has multiple-choice quizzes for each topic, drawn at random from a question bank and with step-by-step solutions. It also has interactive demonstrations, in which the student chooses the data and follows the method step by step, a glossary linked to the pages of the textbook and study cards.
   `https://paulohcrocha.com/algebra-linear/`
   `https://paulohcrocha.com/tme/i/` and `https://paulohcrocha.com/tme/ii/`

2. **Developer** of *Granymede*, a web tool that assists the grading of Jupyter notebook assignments in programming and data analysis courses. It detects plagiarism with a similarity measure that combines the TF-IDF cosine similarity, the Jaccard index of the code tokens and a comparison of the syntax-tree structure of the code. Groups of similar submissions are identified as the connected components of the similarity graph. Shared with lecturers at Nova SBE and at Iscte, 2025/26.
   `https://paulohcrocha.github.io/GradingToolJupyter2000/`

3. **Developer** of a system for the automatic grading of the students' SQL answers, used to grade assessments of the course "Data Curation for Business Analytics" (Nova SBE), 2025/26. It compares the results of the students' queries with those of the reference solutions and produces a grading report.

Pedagogical training

1. **Postgraduate Specialization Seminar in Distance Learning Practices** (*Seminário de Especialização em Práticas de Ensino à Distância*), Iscte, 1 ECTS, final grade 20/20, completed in June 2026.

2. **Pedagogical Training for Faculty Course** (*Curso de Formação Pedagógica de Professores*), Universidade NOVA de Lisboa, blended learning course, 15 hours, Oct 2021.

B-2 Supervision

1. **Co-supervisor**, with Prof. José Barros, of the MSc dissertation of Lampros Baltadoros, *Mood-Adaptive Music Recommendation: A Retrospective Data-Driven System for Mental Health Support*, MSc in Managing Digital Transformation in the Health Sector (ManagiDiTH, international programme), Iscte, 2026/27 (ongoing, completion expected in the second semester of 2026/27).

C University extension

C-1 Relevant professional experience

Entrepreneurship and software development projects

Co-founder, with Renato Silva, of the project "PROSI" (2019 – present), in software development, in cowork at TERINOV – Parque de Ciência e Tecnologia da Ilha Terceira since July 2023.

1. Projects: Localy, Bullfight Finder and TutorMath, described below. Promoted the Localy project at Web Summit 2019.

Founder and **Lead Software Developer** of the project "TutorMath" (2026 – present), developed within PROSI.

1. Mobile platform (iOS), designed to connect university and secondary-school students with verified mathematics tutors, with booking of online or face-to-face sessions and in-app payment.
2. Includes "Math Power UP", a module for reviewing the mathematical foundations needed at the start of university.
3. Development of the iOS app (Swift), the management back office (Vue 3 and Firebase) and the public website, in Portuguese and English. The app has not yet been released and is being prepared for submission to the App Store.
4. **Attendance** at Web Summit 2026 (Lisbon, 9–12 November 2026).

Founder and **Lead Software Developer** of the project "Localy" (2019 – 2022), developed within PROSI.

1. Mobile app to promote festivals and festivities, initially across the whole of Portugal, with the programmes of the events, for residents and tourists. The project later became the basis of Bullfight Finder.
2. **Winner** of the 2019 "Tourism Explorers" regional contest.
3. **Finalist** of the 2019 "Tourism Explorers" national contest.
4. **Promotion** of the project at Web Summit 2019 (Lisbon, 4–7 November 2019).
5. **Finalist** of the hackathon "Hack 2 Emerge" by TERINOV (2020).
6. **Finalist** of the hackathon "Hack to Emerge 3" by TERINOV (21–22 October 2022), with Event Builder, the Localy subsystem with which event organisers manage their events.
7. **Incubated** at StartUp Angra, the business incubator of Angra do Heroísmo, 2020.
8. **Mathematical and computational methods**: geohash spatial indexing and proximity queries on a cloud database, spherical-geodesy computations (geodesic distances and destination points from bearing and distance), and geofencing.

Co-author, with Renato Silva, of the project "App ArquivoPT" (2019), an iOS app (iPhone and iPad) that complements the Arquivo.pt web archive (FCT), with search, filtering and consultation of a curated selection of archived websites, organised by category, with a chronological navigator through the archived versions of each website.

1. **Finalist** of the Arquivo.pt Award 2019 (*Prémio Arquivo.pt 2019*), as one of the 8 applications, out of 23, selected for presentation to the jury (FCCN/FCT, Lisbon, 30 May 2019).

Founder and **Lead Software Developer** of the project "Bullfight Finder" (2021 – present), developed within PROSI.

1. **Finalist** of the hackathon "Hack 2 [RE] Emerge" by TERINOV (9 October 2021).
2. **Released** in the App Store (June 2023) and on Google Play (May 2024).
3. **Mathematical and computational methods**: geohash spatial indexing, geodesic distance computation, geofencing, and estimation of event attendance from dwell times.

Author and **Developer** of the game "Earth Quiz" (2026), for iPhone and iPad.

1. Quiz game on world rankings, in which the player guesses in which category each country has its best position (population, GDP, tourism, football and others), with three game modes (classic, reverse and time trial), in Portuguese and English.
2. **Released** in the App Store (January 2026).

C-2 Knowledge transfer and valorisation

1. **Bullfight Finder** (iOS and Android), mobile platform for the *touradas à corda* of Terceira Island (Azores), a local cultural tradition with about 250 events per season. 9,780 installations by 8,472 users and an estimated 371,200 sessions since 2023, with about 510 active users per day during the 2026 season. Economic valorisation through a sponsorship programme with local companies and through partnerships. The sponsorship programme has been running since 2023 and was promoted among the members of the Câmara do Comércio de Angra do Heroísmo (2023) and the companies hosted at TERINOV (2026). Current sponsors and partners: Aldeia das Próteas, Explore Terceira, Ganadaria José Albino Fernandes, Ganadaria Rego Botelho, Luis Silva (RE/MAX agent), Rota do Leite, Touradas à Corda da Ilha Terceira and Trust My Words.
2. **Member of the Network of Mentors and Partners** (*Rede de Mentores e Parceiros*) of PRAIA LINKS, the business incubator of the Municipality of Praia da Vitória (Azores), by invitation, 2021.
3. **Mentor** of the start-up BeeWisee, a platform of structured mentoring programmes that connects university students, alumni and companies, at the invitation of TERINOV, Science and Technology Park of Terceira Island (Azores), 2024 – 2025. Advice on the product concept and on the software of the platform. Introduction of the start-up to the direction of the Escola de Tecnologias Digitais Aplicadas, Iscte-Sintra (October 2025).

C-3 Outreach, training and community service

Non-university training and teaching

1. **Instructor at Academia J**, an initiative of the Direção Regional de Juventude dos Açores (DRJ), in the courses Programação para Gamers and Programação de Aplicações (2021).

2. **Instructor at Câmara do Comércio de Angra do Heroísmo (CCAH)**: Microsoft 365, for the staff of Cáritas Açores (2023), and "Como utilizar a Inteligência Artificial?" (online, February 2024).

3. **Tutor** at Ginásio de Educação Da Vinci (Angra do Heroísmo), 2015 – 2019: Mathematics and Physics-Chemistry for lower-secondary students (7th to 9th grades) and university-level courses (Calculus, Mathematical Analysis, Statistics, Applied Mechanics and Thermodynamics).

4. **Private Tutor** with experience in Mathematical Analysis, Calculus, Linear Algebra, Statistics, Mechanics, Electromagnetism and Python Programming.

Invited talks and outreach

1. **Invited speaker** at the *Tertúlia de Investigadores n.º 2*, a session for the general public and young researchers organised by the Instituto Histórico da Ilha Terceira at TERINOV – Parque de Ciência e Tecnologia da Ilha Terceira (hybrid format), 2 October 2024. Talk on research in optimal stochastic control.

2. **Invited speaker** in the panel "Inteligência Artificial ao Serviço do Turismo" of the conference *Azores Tourism Talks – A Sustentabilidade, a Digitalização e as Empresas*, organised by AHRESP and the Câmara do Comércio de Angra do Heroísmo, Angra do Heroísmo, 13 September 2023.

3. **Panel member** in the round table on research of the *Jornadas de Matemática em Ciências 2021*, for undergraduate students considering a research career, Departamento de Matemática, Faculdade de Ciências da Universidade de Lisboa, 13 March 2021.

D Participation in university management bodies and activities

1. **Coordinator** of the working group on the Probability and Statistics courses, Departamento de Ciências Sociais e Empresariais, Escola de Tecnologias Digitais Aplicadas (ETDA), Iscte-Sintra, 2025/26. The group, with five lecturers, prepared the proposal *Projeto de Apoio ao Sucesso Académico em Unidades Curriculares de Estatística* (March 2026), to improve student success in the statistics courses of ETDA. The proposal includes common course notes for these courses, interactive online materials with quizzes and videos of worked examples, and pedagogical training for the lecturers.

2. **Organiser** of a study visit to Iscte-Sintra by a class from the Escola Profissional da Praia da Vitória (Terceira Island, Azores), 2025/26.

3. **PhD students' representative** in the Pedagogical Committee of the PhD programme in Mathematics (*Comissão Pedagógica do 3.º ciclo em Matemática*), Faculdade de Ciências da Universidade de Lisboa, elected by the PhD students in Mathematics for 2020/21, 2022/23 and 2023/24.

Other information

Software skills

Operating Systems: MacOS, Windows, Linux Ubuntu.

Computer software: M. Word, M. Excel, M. PowerPoint, Octave, Matlab, Mathematica, Scilab, Emacs, Visual Studio Code, xmgrace, Xcode, Android Studio.

Web frameworks: Vue.js, Bootstrap.

Programming Languages: Python, R, C, C++, JavaScript, Swift, Kotlin, FreeFem++, LaTeX.

Spoken Languages

Portuguese	Native language.
English	Advanced.
Spanish	Intermediate.
Italian	Basic.