https://www.cima.uevora.pt/

CIMA's Scientific Report

2022

Contents

I. Overview of research activities in 2022

In 2022, (last official actualization up to 31st December 2022) the team of the Centro de Investigação em Matemática e Aplicações (CIMA), https://www.cima.uevora.pt/, was composed of 70 members: 63 Ph.D researchers and 7 non Ph.D integrated researchers.

The scientific research developed in CIMA was addressed on several topics according to the different four research groups (DEO, LAG, DS, SSPA) and two research lines: Mathematical Modelling in Life Sciences and Applications (MMLSA) and Mathematics and Applications to Technology and Industry (MATI).

Some highlights of CIMA's 2022 activity are:

- **Organization of the following meetings** :

  - Portugal-Italy Conference on Nonlinear Differential Equations and Applications, (PICNDEA22), Évora, 4,5,6, July de 2022. https://www.picndea22.uevora.pt/
  - E-SEASON Meeting (Europe-South East Asia Science Oriented Network), Colégio do Espírito Santo, July 15, 2022, Universidade de Évora, Évora, Portugal.
  - CIMA's Annual Meeting, 7th July/2022, University of Évora. https://home.uevora.pt/~bushen/CIMA_Meeting2022/

- **Sponsorship of international and national meetings :**

  - DSABNS 2023, 14th International Conference on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS 2022), Bilbao, Spain, February 5-8, 2023, https://sites.google.com/bcamath.org/dsabns2023
  - VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), October 13-15, virtual, http://www.wcdanm.ipt.pt/2022/
  - XXII Congresso da Associação Portuguesa de Investigação Operacional, Évora, 6-8 de November, 2022, http://apdio.pt/web/io2022/home
  - Riemann International School of Mathematics (RISM) Course by Michael Struwe, The monotonicity trick and applications, Varese, 7-11 November, 2022, https://www.rism.it/events/the-monotonicity-trick-and-applications

- **Publications by CIMA's members (see Section A): 92**

- **Communications of CIMA's members in events (see Section B): 76**

- **Supervision of PhD and Master students (see Section E): 52**

- **Participation in projects of CIMA's members(see Section G): 22**

- **Communications at Joint Seminar CIMA/DMAT/PDM (see Section H): 21**

- **Internationalization :**

  - **15 Researchers of CIMA** were members of the Organizing, Scientific, Programme or Steering Committees of **27 International events** (see **section D**);
  - **14 Researchers of CIMA** were PI or team members **of 20 International Projects** (see **section G**)
  - **4 PhD Thesis of international students** were concluded, and **13 PhD Thesis of international students** are ongoing (see **section E**)
  - Many CIMA's researchers are members of International Societies, Prize Awarding Committees, International Jurys, Editorial Boards, Associated Editors, Guest Editors of Special Issues, or reviewers of international journals.
  - Most of CIMA's elements collaborate with international researchers from all over the world, in terms of publications, communications, projects, work visits,...

More details about CIMA's structure and activity can be seen at https://www.cima.uevora.pt/index.php

In what follows we give a detailed description of CIMA's actions:

II. Research Groups

1. Differential Equations and Optimization (DEO)

1.1. Boundary value problems for ordinary differential equations

- Impulsive problems with generalized impulsive conditions.
- Higher order periodic problems with parameters including differential equations and systems of equations.
- Compartmental models in epidemiology.
- Predator-Prey Models.
- Reaction-diffusion models with negative feedback: case of thyroid-pituitary homeostatic interaction.
- Novel approaches to analyse a nonlinear Schrodinger's equation with group velocity dispersion: Plasma bright solitons.
- Existence and location of solutions to fourth-order Lidstone coupled systems with dependence on odd derivatives.
- Existence of heteroclinic solutions for nonlinear second-order differential equations with generalized impulse effects.
- Impulsive Periodic Systems coupled with generalized jump conditions.

1.2. Calculus of Variations and Optimal Control

- Decomposition of L^1(a,b) functions through a convenient convergent series.
- Determination of the sign of the Lebesgue integral of a product of two functions.
- A geometric approach to the Liapunov theorem on convexity of the range of vector measures under constraints.
- Optimal design problems.
- Relaxation and homogenization of functionals.

1.3. Non-smooth Analysis

Geometric (local) properties of compact convex sets in R^n. Mainly the relationship between the existence of positive curvature and the second-order smoothness of the polar

set.

1.4. Partial Differential Equations

- Biomathematics: “waterborne disease structured models”, in coagulation-fragmentation “analysis of Smoluchowski models by conservation laws approximations”.
- Nonlinear conservation laws theory: study of dissipative-dispersive saturating effects.

1.5. Numerical methods for partial differential equations and fluid mechanics

- Research in the field Mathematical Analysis and Numerical Methods for ODE and PDE, with applications related with fluid mechanics. Development and analysis of 1D models (in particular obtained by Cosserat theory) for Newtonian and Non-Newtonian fluids, considering the flow motion in straight and curved tubes. Fluid–structure interaction problems. Applications to haemodynamics.
- Numerical stabilization methods for simulating viscoelastic fluid flows. Stability analysis of finite difference algorithms.
- Numerical Fortran code for a pressure-correction algorithm for compressible fluid flow regimes (MIAU)

1.6. Multiobjective optimization

Numerical methods of multicriteria optimization for forest management in Portugal.

2. Logic, Algebra and Geometry (LAG)

2.1. Numerical semigroups

- Frobenius number and genus.
- Invariants of numerical semigroups, multiplicity, embedding dimension, degree of singularity, conductor, Apery sets, pseudo-Frobenius number and type.

2.2. Logic

- Generalizations of the Levi and Harper Identities, which are suitable to the context of non-prioritized operators of belief change defined on belief bases.

- Contrary-to-duty conditionals: how to adjust logical models to avoid the counterintuitive results pointed out by Bjørn Kjos-Hanssen but keeping the main results of logical analysis of contrary-to-duty (CTD) scenarios.
- Equality in the context of Non-standard Analysis.
- Nature of natural numbers.
- Functional interpretations with truth.
- Proof Mining techniques on the strong convergence of the Halpern-Mann algorithm in the context of CAT(0) spaces.
- Analysis of the finite content of Dykstra's algorithm through the logic tools commonly used in the *Proof Mining*.
- Computational contents of some principles of non-standard arithmetic.
- Trichotomy in the context of o-minimal structures.
- Hybrid logic with varying domains: extension of the work in hybrid logic by Martins, Manzano and Blackburn, to show a Herbrand-like theorem that allows to characterize satisfiable sets of formulas of this logic.

2.3. Neutrices and external numbers

Convergence of flexible sequences and strong convergence in finite time.

2.4. Flexible linear algebra and optimization

Flexible linear algebra and near optimization under general conditions.

2.5. Teaching of Mathematics

Methods of active learning in Mathematics teaching in higher education.

2.6. Artinian Jordan Algebras and Algebras of Gorenstein of codimension 4

- Generalisation of results on bounds for the Jordan type of Artinian algebras, to the cases of non-graded algebras, and algebras with a non-standard grading, and free extensions.
- New invariants of Artinian algebras derived from the Jordan type, and their relation to deformations.
- Artinian Gorenstein algebras of embedding dimension four and socle degree three.
- Higher Lorentzian Polynomials, Higher Hessians, and the Hodge-Riemann relations for codimension two graded Artinian Gorenstein algebras.

2.7. Monads on smooth projective varieties

Monads on smooth projective varieties whose bounded derived category of coherent sheaves has a semi-orthogonal decomposition.

2.8. Vector bundles on the 3-dimensional projective space

Existence of vector bundles E on the 3-dimensional projective space defined by a linear resolution and homological dimension 2, and such that the Euler characteristic of the bundle End(E) is one.

2.9. Decomposition of anti-symmetric tensors

Study of the fundamental exterior system of Riemannian Geometry and applications.

3. Dynamical Systems (DS)

●Representations of Cuntz-Krieger algebras. Classification of the Cuntz-Krieger sub algebras. Branching systems and representations of graph algebras

●Cellular automata and genetic algorithms. Study of Markov networks. Evolutionary dynamics of networks of automata.

●Development of composite materials, using clay, celulosis and other raw materials, for bio-climatization of buildings.

●Mini ecosystems – Experimental setup.

●Study of robotic motion using a dynamical model. Development of the interaction model between robots. Codification of tasks and strategies. Experimental, computational and theoretical work.

●Cryptographic systems using cellular automata and chaotic discrete dynamical systems.

●Deterministic and probabilistic dynamical systems applied to image processing applied, in particular, to the image of rocks and fractures.

●Oscillations on non-homogeneous materials. Coupling of harmonic oscillators.

●Machine learning techniques applied to the study of composite materials.

●Models of metastasis of cancer cells.

●Regions of the parameter space for which the forced damped oscillator can be described by an *m*-modal map.

●Discrete dynamical systems in two or three dimensions with chaotic behavior and limit

cycles. Models of transport and movement of cargo by cranes (associated with the pendulum motion).

●Nonautonomous discrete dynamical systems generated by the sequential iteration of a family of flat top tent maps depending on one parameter u and on one binary sequence s.

●Symbolic dynamics to characterize qualitatively the complexity of the systems, such as the calculation of topological entropy and Liapunov exponent.

●Strategies of suppressing chaotic behaviour using couplings.

●Models to describe the spreading of forest fires and forest management models that address wildfire risk.

●Kneading invariants for the families of dynamical systems, their admissibility conditions, bifurcation diagrams and the emergence of Milnor attractors as accumulation points of period incrementing sequences.

4. Statistics, Stochastic Processes and Applications (SSPA)

●Integral functionals of Markov processes in $\mathbb{R}^d$ for $d \geq 3$. Compound Poisson processes, Brownian motion and diffusions.

• Currents of Brownian motion $\xi(x)$, $x \in \mathbb{R}^d$, via white noise analysis.

• Biorthogonal approach to the analysis of the infinite dimensional fractional Poisson, on the dual of Schwartz test function space.

• Factors of paths for a class of non Gaussian processes. Mittag-Leffler function and indexed by a star. Debye function. Relation between the mean square end-to-end length and the radius of gyration. Fractional Brownian motion.

• Survival Analysis.

●Stochastic differential equation models. Determination of the optimal selling age and optimal profit in bovine rearing for more complex and realistic profit functions and its application to the mertolengo and the alentejana breeds. Bootstrap and weighted maximum likelihood methods to improve the maximum likelihood estimators when there are few observations for older animals.

●Fishery models in a random environment (stochastic differential equations) with and without Allee effects.

- Conditions for existence of a stationary distribution for general models with Allee effects with constant harvesting effort. New harvesting policies and their optimization and comparison.
- Pricing and hedging bond options and sinking-fund bonds under the CIR model.
- Statistical models applied to sustainability.

- Systems to prevent environmental risks. New method to estimate the water level of stream channels from images acquired by a low-cost camera.
- Effect on the use of directive antennas in ZigBee networks under non-line-of-sight propagation conditions.
- Supervising all matters related to the scientific and applied metrology in Portugal via the National Metrology Laboratory of IPQ (National Measurement Institute of Portugal), and therefore responsible for the realization, maintenance and dissemination of the national measurement standards.
- Type I error and power of Semiparametric Approaches to two-way ANOVA in the presence of heteroscedastic errors and discrete data.

- Translation of the Pressure Ulcer Knowledge Test questionnaire into Portuguese from Portugal, assessment of its internal consistency and assessment of nurses' level of knowledge about pressure ulcers.

- MOPREVIS Project (Modelling and Predicting Road Accidents in the District of Setúbal - DSAIPA/DS/0090/2018.): identification of determining factors for the type and severity of accidents; effect of the COVID-19 pandemic on road accidents; spatial analysis for the detection of places with the occurrence of many accidents; design of a new accident severity indicator; predictive models for the occurrence of accidents on roads with high road accidents; construction of a digital decision support tool that allows the visualization of the past, present, and future.

- Characterization of the sleep habits of Portuguese elementary school children considering socioeconomic factors, daily lifestyle, presence of electronic devices in the bedrooms and practice of physical and sports activities; identification of clinical factors related to the child's insufficient sleep time.

- Characterization of 3 years of SNS24 calls; comparison of different machine learning models to select the most appropriate clinical path; ranking analysis and time performance execution, error analysis by class, explainability of decisions and meta-evaluation.

- Evaluation of the performance of tide gauges in the tide gauge network and presentation of tide control techniques quality for tide data recorded in near real-time; statistical analysis of tide gauge failure time.

- Study of Spatial Survival Analysis applied to women diagnosed with breast cancer in Angola.

- Dynamic Regression Time Series Analysis applied to the study of road accidents in Angola .

- Temporal analysis of patient and health service delays in pulmonary tuberculosis in Portugal and the evidence of the existence of a inter and intra-regional differences and inequalities between gender and age (Project PTDC/SAU-PUB/31346/2017-UrbanTB).

- Quality control, in particular in adaptive and mixed sampling types with applications in the cement industry and, in the future, in the arms industry.

- Study of infectious diseases such as Tuberculosis, HIV and Leprosy, and their determinant factors, through:
  - different types of time series models.
  - methods to detect structural changes in time series, as well as the number of these changes in order to assess the impact of control measures and/or the effectiveness of systems, as well as the impact of the COVID-19 epidemic.
  - spatial and spatiotemporal risk analysis.
  - identification of statistically significant spatial clusters of hot and cold spots using the Getis-Ord Gi* statistic.
  - Study of Spatial Variation in Temporal Trends for detect and infer clusters for significantly different time trends.

- Study the recreational fishing that occurs in Portugal, encompassing the modalities of angling and embarked line fishing, and underwater fishing: Pescardata2 Project, funded by the Directorate-General for Natural Resources, Safety and Maritime Services (DGRM) and under the responsibility of the Center for Marine Sciences (CCMAR) of the University of Algarve.

- Investigation of the structure of the genotype x environment interaction, in incomplete blocks, by techniques of regression. Maximum likelihood estimators were obtained and likelihood ratio tests were deduced.

- Behavior of the tail coefficient estimators for models in the domain of attraction of the Weibull distribution, the WTC estimators, using different classes of generalized mean estimators of the extreme value index.

- Study of new risk estimators, such as the conditional tail expectation (CTE) using adequate classes of extreme value index estimators that allow a reduction of bias and the obtainment of more stable sampling paths.

III. Research Lines

Mathematical Modelling in Life Sciences and Applications (MMLSA)

Animal Growth and Crop Production

- Optimal selling age and optimal profit in bovine rearing applied to Mertolengo and Alentejana breeds.
- Bootstrap and weighted maximum likelihood methods to improve the maximum likelihood estimators when there are few observations for older animals.
- Structure of the genotype x environment interaction, in incomplete blocks, through techniques of regression.

Sea and Fishery

- Fishery models in a random environment with and without Allee effects.
- Conditions for the existence of a stationary distribution for general models with Allee effects with constant harvesting effort.
- New harvesting policies and their optimization and comparison.
- Recreational fishing in Portugal in the modalities of angling embarked line fishing, and underwater fishing.
- Evaluation of the performance of tide gauges and statistical analysis of tide gauge failure time.

Epidemiology and Public Health

- Spatial survival analysis applied to women diagnosed with breast cancer in Angola.
- Determinant factors of infectious diseases such as Tuberculosis, HIV and Leprosy.
- Impact of COVID-19 on tuberculosis incidence and its outcomes in Brazil.
- Temporal and spatiotemporal studies related to multidrug-resistant tuberculosis and its determinants in Brazil.
- Temporal analysis of patient and health service delays in pulmonary tuberculosis in Portugal.
- Translation of the Pressure Ulcer Knowledge Test questionnaire into Portuguese from

Portugal, assessment of its internal consistency and assessment of nurses' level of knowledge about pressure ulcers.

- Study the relationship between the nursing work environment and the quality of pressure ulcer care in continuing care units in Alentejo.
- Characterization of the sleep habits of Portuguese elementary school children and identification of factors related to the child's insufficient sleep time.
- Characterization of 3 years of SNS24 calls and comparison of different machine learning models to select the most appropriate clinical path.
- Reaction-diffusion model with negative feedback: the case of thyroid-pituitary homeostatic interaction. In the disease, named periodic catatonic schizophrenia the symptoms vary with remarkably regular periodicity. The periodic third-order differential equation allows for estimating the existence of periodic solutions related to some parameter variation.

Ecosystems

- Small ecosystems where the interaction, development and change of the organisms inside are observed in a controlled manner and through a large time scale.
- Animal motion, particularly insects, using a dynamic model.

Safety and human well-being

- Development of composite materials, using, clay, cellulose, and other raw materials, for bio-climatization of buildings.
- Dynamic regression time series analysis applied to study road accidents in Angola.
- Identification of factors for the type of road traffic accidents.
- Statistical spatial analysis comparing different methodologies to detect places with the occurrence of many road traffic accidents.
- Predictive models for the occurrence of accidents in a road segment.
- Construction of a digital decision support tool that allows the police visualization of the past, present, and future of road traffic accidents.

Mathematics and Applications to Technology and Industry (MATI).

Communication networks

Motivated by data packet sampling problems in communication networks such as the Internet, the research work consists of an inversion problem. Since these problems are ill-

posed, regularization methods are needed for their solution. Through these methods, the size distribution of the Internet packet flow was estimated and a Gaussian TLC was deduced for the estimator obtained directly from the properties of the underlying operator.

Forced damped oscillator

●Regions of the parameter space for which the observed motion of the forced damped oscillator can be described by an *m*-modal map.

Complexity Laboratory

●Development of composite materials, using clay, celulosis and other raw materials for bio-climatization of buildings.

Cryptographic systems

●Study of cryptographic systems using cellular automata and chaotic discrete dynamical systems.

Image processing

●Study of dynamical systems, deterministic or probabilistic, applied to image processing. In particular applied to images of rocks to study fractures

Harmonic oscillators

●Study of oscillations on non-homogeneous materials. Coupling of harmonic oscillators.

Virtual Reality

● Project "Virtual Reality in the Social Inclusion of the Elderly" with several IPSS (Social Solidarity Private Institution): improve the physical, social and emotional conditions of the elderly. This improvement will be achieved through the implementation of a program, adapted to each reality and each individual (in depression or anxiety) through technology based on Virtual Reality, with experiences that promote the well-being and quality of life of the elderly, providing a positive social integration and promoting active and happy aging.

IV. 2022 Indicators

A – Publications

A.1. Books

Books (author) of international circulation:

A1 **F. Minhós**, **R. de Sousa**, Nonlinear higher order differential and integral coupled systems: Impulsive and Integral Equations on Bounded and Unbounded Domains, Trends in Abstract and Applied Analysis, Vol 10, World Scientific, June 2022, https://doi.org/10.1142/11961 , ISBN 978-981-122-512-3 , 242 pags.
https://www.worldscienti.c.com/worldscibooks/10.1142/11961

A2 **Ana Maria Abreu,** R. Um mundo por descobrir, First Editions, Lisbon International Press, Lisboa, Portugal, 264 pages, ISBN: 978-989-37-3061-4

Books (editor) of international circulation:

A3 Bispo, R., **Henriques-Rodrigues, L., Alpizar-Jara, R.** and de Carvalho, M., Recent Developments in Statistics and Data Science, Springer Proceedings in Mathematics & Statistics 398, 364pp, ISSN 2194- 1009; ISBN 978-3-031-12765-6, https://link.springer.com/book/10.1007/978-3-031-12766-3

A4 **F. Carapau**, A. Vaidya, Recent Advances in Mechanics and Fluid-Structure Interaction with Applications, The Bong Jae Chung Memorial Volume, Editors Fernando Carapau, Ashwin Vaidya, Springer Nature-Birkhauser,Switzerland, 2022.
https://doi.org/10.1007/978-3-031-14324-3

Books (editor) of national circulation:

A5 **F. Minhós**, **F. Carapau**, **P. Correia**, **L. Bandeira**, Book of Abstracts of International Conference on Nonlinear Differential Equations and Applications (PICNDEA22), ISBN: 978 972 778 275 8; https://www.picndea22.uevora.pt/book-of-abstracts/
http://hdl.handle.net/10174/32569

Book chapters of international circulation:

A6 **J.** Sousa-Ferreira, I., Rocha, C. e **Abreu, A. M. ,** The extended Chen-Poisson marginal rate model for recurrent gap time data in Recent Developments in Statistics and Data Science, vol. 398, Springer Proceedings in Mathematics & Statistics, First edition, Springer Cham, 15 pages, ISBN: 978-3-031-12765-6, DOI: 10.1007/978-3-031-12766-3_23

A7 **Infante, P., Afonso, A., Jacinto, G.**, Rego, L., Nogueira, P., Silva, M., Nogueira, V., Saias, J., Quaresma, P., Santos, D., Gois, P., Manuel, P.R. (2022). Some Determinants for Road Accidents Severity in the District of Setúbal. In: Bispo, R., Henriques-Rodrigues, L., Alpizar-Jara, R., de Carvalho, M. (eds) Recent Developments in Statistics and Data Science. SPE 2021. Springer Proceedings in Mathematics \& Statistics, vol 398, 203-214. Springer, https://doi.org/10.1007/978-3-031-12766-3_14

A8 Caeiro, F., Gomes, M.I. and **Henriques-Rodrigues, L**., Estimation of the Weibull Tail Coefficient through the power mean-of-order p, in Bispo et al. (eds), Recent Developments in Statistics and Data Science, Springer Proceedings in Mathematics & Statistics 398, 41–53, 2022. ISBN 978-3-031-12765-6, https://link.springer.com/chapter/10.1007/978-3-031-12766-3_4

A9 Gomes, M.I., **Henriques-Rodrigues, L**. and Pestana, D. (2022). A Generalized Mean Under a Non- Regular Framework and Extreme Value Index Estimation. Data Analysis and Related Applications 2, Volume 10, Big Data, Artificial Intelligence and Data Analysis, SET Coordinate by Jacques Janssen, 237-250. ISBN – 9781786307729, http://www.iste.co.uk/book.php?id=1928

A10 **Pereira, D.G., Afonso, A.** (2022). Comparison of Semiparametric Approaches to Two-Way ANOVA in the Presence of Heteroscedasticity. In: Bispo, R., Henriques-Rodrigues, L., Alpizar-Jara, R., de Carvalho, M. (eds) Recent Developments in Statistics and Data Science. SPE 2021. Springer Proceedings in Mathematics & Statistics, vol 398, 189-201. Springer, Cham. ISBN 978-3-031-12765-6. https: //doi.org/10.1007/978-3-031-12766-3_13

A11 **da Silva, J.L.**; **Streit, L.**; Drumond, C, Form Factors for Stars Generalized Grey Brownian Motion. In Stochastic Processes, Statistical Methods, and Engineering Mathematics; Malyarenko, A., Ni, Y., Rancic, M., Silvestrov, S., Eds.; Springer International Publishing AG: Cham, Switzerland, 2022. https://www.bookdepository.com/Stochastic-Processes-Statistical-Methods-Engineering-Mathematics-Anatoliy-Malyarenko/9783031178191?ref=grid-view

A12 **C. Ramos**, **F. Carapau**, **P. Correia** (2022). Cellular Automata Describing Non-equilibrium Fluids with Non-mixing Substances. In: Carapau, F., Vaidya, A. (eds) Recent Advances in Mechanics and Fluid-Structure Interaction with Applications. Advances in Mathematical Fluid Mechanics. Birkhäuser, Cham. https://doi.org/10.1007/978-3-031-14324-3_10

A13 **F. Carapau, P. Correia**, P. Areias (2022). Three-Dimensional Velocity Field Using the Cross-Model Viscosity Function. In: Carapau, F., Vaidya, A. (eds) Recent Advances in Mechanics and Fluid-Structure Interaction with Applications. Advances in Mathematical Fluid Mechanics. Birkhäuser, Cham. https://doi.org/10.1007/978-3-031-14324-3_2

A14 P. Areias, **F. Carapau**, J. C. Lopes, T. Rabczuk (2022). Consistent C Element-Free Galerkin Method for Finite Strain Analysis. In: Carapau, F., Vaidya, A. (eds) Recent Advances in Mechanics and Fluid-Structure Interaction with Applications. Advances in Mathematical Fluid Mechanics. Birkhäuser, Cham. https://doi.org/10.1007/978-3-031-14324-3_6

A15 **M. Pires**, T. Bodnár, Artificial Stress Diffusion in Numerical Simulations of Viscoelastic Fluids Flows. In: Carapau F., Vaidya A. (eds) Recent Advances in Mechanics and Fluid-Structure Interaction with Applications: The Bong Jae Chung Memorial Volume. Book series Advances in Mathematica Fluid Mechanics, Springer Nature. Pages 195-227, ISBN: 978-3-031-14324-3, DOI: 10.1007/978-3-031-14324-3_9

A16 Nam Van Tran, **Imme van den Berg**, On Non-linear Optimization with a Perturbed Objective Function, Ch. 3, p.41-75 of Dynamic Control and Optimization, Tchemisova, T.V., Torres, D.F.M., Plakhov, A.Y. (eds), Springer Proceedings in Mathematics & Statistics, vol 407. Springer, Cham, x+243p. ISBN 978- 3-031-17560-2, Dynamic Control and Optimization: DCO 2021, Aveiro, Portugal, February 3–5, Selected, Revised Contributions, SpringerLink, https://doi.org/10.1007/978-3-031-17558-9_3

A17 **Júlia Justino** and Silviano Rafael, How to Overcome the Difficulties Emerged When Applying Student-Centered Approach?, Lecture Notes in Networks and Systems, volume 389, Springer, pp. 134–140, ISBN: 978-3-030-93903-8, URL: https://doi.org/10.1007/978-3-030-93904-5_14

A18 Silviano Rafael and **Júlia Justino**, Conceptual Maps Applied to Remote/Virtual Laboratories for Active Learning, Lecture Notes in Networks and Systems, volume 389, Springer, pp. 361–369, ISBN: 978-3-030-93903-8. URL: https://doi.org/10.1007/978-3-030-93904-5

A19 Paula Miranda, Silviano Rafael and **Júlia Justino**, Transitioning the Teaching/Learning Process to Online Environment During the COVID-19 Pandemic, Lecture Notes in Networks and Systems, volume 389, Springer, pp. 653–660, ISBN: 978-3-030-93903-8. URL: https://doi.org/10.1007/978-3-030-93904-5_65

A.2. Scientific articles

Articles in international journals

A20 Brites, N. M.; **Braumann, C. A.** (2022). Profit optimization of stochastically fluctuating populations under harvesting: The effects of Allee effects. *Optimization* 71 (11): 3277-3293.
https://doi.org/10.1080/02331934.2022.2031191 http://hdl.handle.net/10174/32673

A21 **Jacinto, G.**; **Filipe, P. A.**; **Braumann, C. A.** (2022). Weighted maximum likelihood estimation for individual growth models. *Optimization* 71 (11): 3295-3311.
https://doi.org/10.1080/02331934.2022.2075745
http://hdl.handle.net/10174/32675

A22 **Jamba, N. T.**; **Jacinto, G.**; **Filipe, P. A.**; **Braumann, C. A.** (2022). Likelihood function through the delta approximation in mixed SDE models. *Mathematics* 2022, 10, 385. https://doi.org/10.3390/math10030385
http://hdl.handle.net/10174/31286

A23 **Larguinho, M.**; Dias, J. C.; **Braumann, C. A.** (2022). Pricing and hedging bond options and sinking-fund bonds under the CIR model. *Quantitative Finance and Economics* 6(1): 1-34. https://doi.org/10.3934/QFE.2022001
http://hdl.handle.net/10174/30859

A24 **Jacinto, G.**; **Filipe, P. A.**; **Braumann, C. A.** (2022). Profit optimization of cattle growth with variable prices. *Methodology and Computing in Applied Probability* 24: 1917-1952. https://doi.org/10.1007/s11009-021-09889-z
http://hdl.handle.net/10174/32462

A25 Brites, N. M.; **Braumann, C. A.** (2022). Moments and probability density of threshold crossing times for populations in random environments under sustainable harvesting policies. *Computational Statistics* (2022), https://doi.org/10.1007/s00180-022-01237-0

A26 Chakma, B., **Gomes, D.**, **Filipe, P.A.**, de Sousa, B., Soares, P., Nunes, C. (2022). A temporal analysis on patient and health service delays in pulmonary tuberculosis in Portugal: inter and intra-regional differences and in(equalities) between gender and age. *BMC Public Health, (2022) 22:1830*. https://doi.org/10.1186/s12889-022-14216-3

A27 Berra, T.Z., Alves, L., Ramos, A., Alves, Y., Tavares, R., Tartaro, A., Nascimento, M., Moura, H., Delpino, F., Soares, D., Silva, R., **Gomes, D.**, Monroe, A., Arcêncio, R.A. (2022). Impact of COVID-19 on tuberculosis incidence and its outcomes in Brazil: a time series study. *Trop. Med. Infect. Dis. 2022, 7 (247), 2022*. https://doi.org/10.3390/tropicalmed7090247

A28 Dias, B., Rodrigues, T., **Gomes, D.**, Arcêncio, R.A., Gir, E., Ferreira, G. N, Polaro, S., L., Botelho, E.P. (2022). Spatial and temporal analysis of HIV epidemic in the largest Brazilian rainforest capital. *Trop. Med. Infect. Dis. 2022, 7 (9), 225*. https://doi.org/10.3390/tropicalmed7090225

A29 Pedroso, A., **Gomes, D.**, Sousa, S. M., Ferreira, G. N., Ramos, A. C., Polaro, S., Nogueira, L., Botelho, E.P. (2022). Temporal and Spatial Analysis Techniques as Potential Tools on Combating HIV Epidemic among Young Brazilian Amazon People: An Ecological Study. *Tropical Medicine and Infectious Disease 7, 137 (2022)*. https://doi.org/10.3390/tropicalmed7070137

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A.3. Articles in Proceedings

Proceedings of international events

A90 **da Silva, J.L.; Streit, L.**; Drumond, C. Form Factors for Stars Generalized Grey Brownian Motion. In Stochastic Processes, Statistical Methods, and Engineering Mathematics: SPAS 2019, Västerås, Sweden, September 30-October 2; Malyarenko, A., Ni, Y., Rancic, M., Silvestrov, S., Eds.; Springer International Publishing AG: Cham, Switzerland, 2022 ISBN 303117819X.
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A.4. Edited special issues of journals

A97 Eric Benoit, **João Alves e Sousa**, Guest editors, ACTA IMEKO Special Issue related to the IMEKO TC1-TC7-TC13-TC18 joint symposium and MATHMET (European Metrology Network for Mathematics and Statistics) workshop 2022, https://acta.imeko.org/index.php/acta-imeko/announcement/view/2

B – Communications

Communications at international events

B1. Sousa-Ferreira, I., **Abreu, A. M.** e Rocha, C., *A parametric multiplicative rate model for recurrent gap time data with shared frailty,* The 43rd Annual Conference of the International Society for Clinical Biostatistics 21 to 25 of August, Home - ISCB43 - Newcastle, UK - 2022 (iscb2022.info) , .

B2. **Braumann, C. A.** (presenter; presential presentation); **Jacinto, G.**; **Filipe, P. A.,** *Stochastic differential equation models of animal growth and optimization in cattle raising,* International Conference on Mathematical Analysis and Applications in Science and Engineering - ICMAS2C'22, Porto, Portugal June 27-29, 2022, hybrid, https://www.isep.ipp.pt/Page/ViewPage/ICMASC

Extended Abstract in: *International Conference on Mathematical Analysis and Applications in Science and Engineering - Book of Extended Abstracts* (Eds: Pinto, C.M.A.; Mendonça, J.; Babo, L.; Baleau, D.), June 2022, Polytechnic of Porto. School of Engineering, ISBN: 978-989-53496-3-0, p. 27-30, ISBN: 978-989-53496-3-0.

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B3. **Braumann, C. A.** (presenter, online); **Carlos, C.**; Brites, N. M., *The effect of Allee effects and of harvesting on general population growth autonomous models in random environments: Model robust conditions for sustainability,* MPDEE 2022 – Models in Population Dynamics, Ecology and Evolution, Torino, Italy, June 13-17, 2022, hybrid, https://sites.google.com/view/mpdee2022,

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B4. **Jamba, N.T.** (presenter); **Jacinto, G.**; **Filipe, P. A.**, **Braumann, C. A.,** *Approximation methods for the likelihood function in parameter estimation for SDE mixed models*. VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), **co-organized by CIMA**, October 13-15, 2022, virtual. http://www.wcdanm.ipt.pt/2022/home/

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Working Group in Recreational Fisheries and Stocks

B5. Brites, N.M. (presenter); **Braumann, C. A.** , 13th Conference on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS 2022), February 8-11, 2022, virtual. https://sites.google.com/view/dsabns2022/ ,

Optimal sustainable harvesting policies in random environments: estimation of moments and density of first passage times.

Abstract in: *DSABNS 2022 Virtual 13th International Conference Dynamical Systems Applied to Biology and Natural Sciences (DSABNS) - Book of Abstracts*, Basque Center for Applied Mathematics, BCAM, Bilbao, Spain, ISBN: 978-989-98750-9-8, p. 108-110.

https://sites.google.com/view/dsabns2022/scientific-programme/book-of-abstracts

B6. Berra, T. (presenter); Ramos, A.; Nascimento, M.; Alves, Y., Heriederson, M.; Soares, D.; Delpino; F.,Tavares; R.; Tartaro, A.; **Gomes, D.**; Arcêncio, R. A., *Impacto da COVID-19 nos desfechos dos casos de tuberculose no Brasil*, 57º Congresso da Sociedade Brasileira de Medicina Tropical (MEDTROP), Belém, Brazil, November 13-16, 2022, https://www.medtrop2022.com.br/medtrop2022, https://www.medtrop2022.com.br/evento/medtrop2022/trabalhosaprovados/naintegra/1135

B7. Nuñez, S., Guerreiro, P. M., **Jacinto, G.**, Veiga, P., Saraiva, J., Pontes, J., Gonçalves, J., Erzini, K., Rangel, M. (presenter) (2022). Immediate & Short-Term Hooking Mortality and Sub-Lethal Effects for Two Sargo Bream Species. Working Group in Recreational Fisheries and Stocks anual meeting, 13 a 17 de junho, Las Palmas, Espanha.

https://www.ices.dk/news-and-events/meeting-calendar/Pages/ICES-CalendarDisp.aspx?sd=1135e584-bb53-ec11-9296-00155d2c0c14

B8. Nogueira, P., Silva, M. (presenter) , **Infante, P.**, Manuel, P. R., Rego, L., **Afonso, A.**, **Jacinto, G.** (2022). Combining KDE and DBSCAN clustering to understand road traffic accidents: The case of Setúbal, Portugal, 17th conference of the International Federation of Classification Societies (IFCS 2022), 19 a 23 de julho, Porto.

https://ifcs2022.fep.up.pt/#:~:text=The%2017th%20conference%20of%20the,of%20Porto%2C%20FEP%2DUP.

B9. **Infante, P., Jacinto, G., Afonso, A.**, Rego, L., Nogueira, V., Quaresma, P., Saias, J., Santos, D., Nogueira, P., Silva, M., Costa, R. P., Gois, P., Manuel, P. R. (2022). Some factors that influence the nature of road traffic accidents, 17th conference of the International Federation of Classification Societies (IFCS 2022), 19 a 23 de julho, Porto.

https://ifcs2022.fep.up.pt/#:~:text=The%2017th%20conference%20of%20the,of%20Porto%2C%20FEP%2DUP.

B10. Santos, D., Nogueira, V., Saias, J., Quaresma, P., **Infante, P., Jacinto, G., Afonso, A.**, Rego, L., Nogueira, P., Silva, M., Costa, R. P., Gois, P., Manuel, P. R. (2022). Machine learning approach to identify factors that influence accident severity. 17th

conference of the International Federation of Classification Societies (IFCS 2022), 19 a 23 de julho, Porto.

https://ifcs2022.fep.up.pt/#:~:text=The%2017th%20conference%20of%20the,of%20Porto%2C%20FEP%2DUP.

B11. Costa, R., **Infante, P.**, Rego, L., **Afonso, A.**, Santos, D., **Jacinto, G.**, Saias, J., Silva, M., Gois, P., Quaresma, P., Manuel, P.R., Nogueira, P., Nogueira, V. (2022). Menos intensidade, a mesma gravidade? Reflexões sobre sinistralidade rodoviária em tempos de pandemia a partir de um estudo de caso no Distrito de Setúbal. Seminário Internacional e Interdisciplinar: Mobilidades de Pessoas e Coisas - as [re]congurações dos consumos e modos de vida, Universidade da Beira Interior, 27 a 28 de outubro, Covilhã.

https://www.uevora.pt/ue-media/agenda?item=35353

B12. **Lígia Henriques-Rodrigues** (presenter); Caeiro; F. and Gomes, M.I.**,** VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), **co-organized by CIMA**, October 13-15, 2022, virtual. http://www.wcdanm.ipt.pt/2022/home/

Lehmeŕ s mean-of-order-p in the estimation of the Weibull tail coefficient,

Abstract in: *VIII Workshop on Computational Data Analysis and Numerical Methods - Book of Abstracts*, Instituto Politécnico de Tomar, ISBN: 978-989-8840-70-7, p. 21-22, http://www.wcdanm.ipt.pt/download//2/2/BoA_VIII_WCDANM_Out2022.pdf#page=32

B13. Gomes, M.I. (presenter), Figueiredo, F. and **Henriques-Rodrigues, L.** (2022). Alternative reliable ways to manage risks of extreme events. Book of Abstracts, 9th International Conference on Risk Analysis, 217-219. ISBN: 9789726749196, https://icra9.unipg.it.

B14. Gomes, M.I. (presenter), Caeiro, F., Figueiredo, F. and **Henriques-Rodrigues, L.** (2022). Accurate Ways to Measure Risks of Extreme Events, Book of Abstracts of the 16th International Conference on Computational and Financial Econometrics (CFE 2022) and 15th International Conference of the ERCIM (European Research Consortium for Informatics and Mathematics) Working Group on Computational and Methodological Statistics (CMStatistics 2022), pp 6, ISBN: 978-9925-7812-6-3, http://www.cmstatistics.org/CMStatistics2022/programme.php

B15. Jaime Jerónimo (presenter); **Filipe, P. A.** and **Gomes, D.,** VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), October 13-15, 2022, virtual. http://www.wcdanm.ipt.pt/2022/home/ ,.. Survival analysis of women diagnosed with breast cancer in Angola, p. 73-74,

http://www.wcdanm.ipt.pt/download//2/2/BoA_VIII_WCDANM_Out2022.pdf

B16. Lobo, M. (presenter) and **Filipe, P. A.,** VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), October 13-15, 2022, virtual. http://www.wcdanm.ipt.pt/2022/home/ Retail store object detection using Yolo. Abstract in: *Book of Abstracts*, p. 75-76,

http://www.wcdanm.ipt.pt/download//2/2/BoA_VIII_WCDANM_Out2022.pdf

B17. E. Batista, A. M. H. van der Veen, **J. A. Sousa** (2022) Dark uncertainty in volume key comparisons and satellite EURAMET comparisons, MATHMET 2022 International Workshop, 2-4 November, 2022, Paris, France

B18. Elsa Batista, **João A. Sousa**, Alistair Forbes, Álvaro Ribeiro (2022) Uncertainty calculation in the front track method applied to microflow measurements, IMEKO TC1 + TC7 + TC13 + TC18 & MATHMET Joint Symposium, "Cutting-edge measurement science for the future", Porto, 31 August – 2 September, 2022

B19. F. Saraiva, P. Neves, C. Pires, **João A. Sousa** (2022) Developments pf surface roughness measurements using different traceability routes to the SI within the scope of EMPIR ProbeTrace, IMEKO TC11 + TC24 Joint Hybrid Conference, 17 – 19 October, 2022, Croatia,

B20. Alves, J. (presenter) and **Filipe, P. A.** , VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), **co-organized by CIMA**, October 13-15, 2022, virtual. http://www.wcdanm.ipt.pt/2022/home/ Big Data Analytics in Water Consumption. Abstract in:*Book of Abstracts*, p. 67-68, http://www.wcdanm.ipt.pt/download//2/2/BoA_VIII_WCDANM_Out2022.pdf

B21. Ferreira, B.; Pinto-Moreira, P.; **Larguinho, M**.. "VIRTUAL LEADERSHIP IN PROJECT MANAGEMENT". Trabalho apresentado em *International Conference on Applied Research in Management and Economics (ICARME) - Rethinking Management and Economics in the (New) 20's*, *Leiria*, 2022. https://carme.ipleiria.pt/en/icarme/

B22. **Larguinho, M.**; Viseu, C.; Sousa, S. ; Correia, E.. "The Importance of Companies' Green Marketing Practices in College Students` Green Purchasing Behavior: An Application of the Theory of Planned Behavior.". Trabalho apresentado em *International Conference on Applied Research in Management and Economics (ICARME) - Rethinking Management and Economics in the (New) 20's,*, *Leiria*, 2022. https://carme.ipleiria.pt/en/icarme/

B23. Henriques, C.; Benzinho, J.; **Larguinho, M.**. "A POLÍTICA DE DIVIDENDOS NAS EMPRESAS PORTUGUESAS E ESPANHOLAS – FATORES EXPLICATIVOS". *XX Encuentro Internacional AECA*, *Porto*, 2022. https://www.iscap.pt/aeca/

B24. Ferreira, B.; Pinto-Moreira, P.; **Larguinho, M**.. "Virtual leadership: A study in the IT sector". *40th IBIMA Conference*, *Sevillha*, 2022. https://ibima.org/conference/40th-ibima-conference/

B25. Quelhas, A.P,; Clímaco, I, N.; **Larguinho, M**.. "Exploratory analysis of financial literacy and digital financial literacy: Portuguese case". *The 2022 International Conference on Marketing and Technologies*, *Santiago de Compostela*, 2022. http://www.icsporto.com/icmarktech/index.php/en/

B26. **Pereira, F.F.**, geOmetry, anaLysis & convExity (OLE), Sevilla (Spain), June, 2022, "Directional Curvatures of Convex Bodies in Rn". https://congreso.us.es/convie/; https://congreso.us.es/convie/talks/#pereira

B27. **Minhós, F.M.**, Equadiff 15, Brno, Czech Republic, 11th to 15th, July, 2022, "On impulsive functional coupled systems of differential equations" Minisyposium ODE-09 Topological and iterative methods on boundary value problems in https://conference.math.muni.cz/equadiff15/

B28. Drakhlin's ZOOM Seminar, new season 2022-2023, organized by Prof. Alexander Domoshnitsky, Ariel University, Israel, 07/12/2022, **Minhós, F.M.**, "Existence, non-existence and multiplicity results for some periodic third-order problems with parameters".

Invited communications at international events

B29. Brites, N. M.; **Braumann, C. A.** (invited plenary speaker), 13th Conference on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS 2022), February 8-11, 2022, virtual. https://sites.google.com/view/dsabns2022/

Harvesting profit optimization on random environments: the effects of Allee effects.

Abstract in: *DSABNS 2022 Virtual 13th International Conference Dynamical Systems Applied to Biology and Natural Sciences (DSABNS) - Book of Abstracts*, Basque Center for Applied Mathematics, BCAM, Bilbao, Spain, ISBN: 978-989-98750-9-8, p. 23-25.

https://sites.google.com/view/dsabns2022/scientific-programme/book-of-abstracts

B30. **Braumann, C. A.** (Invited talk at Mini-Symposium MS25, online); **Jacinto, G.**; **Filipe, P. A.** SIAM Conference on the Life Sciences (LS22), Pittsburgh, Pennsylvania, U.S., July 11-14, 2022, hybrid. https://www.siam.org/conferences/cm/conference/ls22

General stochastic differential equation models of animal growth with application to optimization in cattle raising.

Mini-Symposium MS25: Deterministic and Stochastic Models in Ecology and Epidemiology, organized by Maria Leite (University of South Florida, St. Petersburg, U.S.) and Natali Hritonenko (Prairie View A & M University, U.S.), program in https://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=74272

Abstract in: *Searchable Abstracts Document*, p. 195-196, https://www.siam.org/Portals/0/Conferences/AN/AN22/AN22_ABSTRACTS_V2.pdf https://meetings.siam.org/sess/dsp_talk.cfm?p=121199

B31. Gomes, M.I. (presenter), Caeiro, F., Figueiredo, F. and **Henriques-Rodrigues, L.** (2022). Further Tales of Heavy Tails and Generalized Means, Book of abstracts of the VIII Workshop on Computational Data Analysis and Numerical Methods, ISBN: 978-989-8840-70-7, pp.4-5

http://www.wcdanm.ipt.pt/download//2/2/BoA_VIII_WCDANM_Out2022.pdf#page=15

B32. **da Silva, J.L.** (presenter). Green Measures For (non)-Markov Processes with Nonlocal Jump Generator. Marrakesh International Workshop on Random Fractals and Markov Processes, November 21-26, 2022. Cadi Ayyad University, Marrakesh, Morocco. http://misrfmp2022.uca.ma.

B33. **da Silva, J.L.** (presenter). Mittag-Leffler Analysis. Mathematical Society of the Philippines: 16th Annual Convention: October 27–28, 2022. https://www.facebook.com/msp1012barmm .

B34. **da Silva, J.L.** (presenter). Green Measures for Nonlocal Diffusion Equations. Fractional kinetics, hydrodynamic limits and fractals, FD2W02 - March 21–25, 2022. https://www.newton.ac.uk/event/fd2w02/.

B35. Furtado, K., Lopes T., **Afonso, A.**, **Infante, P.**, Lopes, M. (2022). Úlceras por Pressão: Conhecimentos dos Enfermeiros a exercer funções nas Unidades de Cuidados Continuados. Um estudo transversal [Pressure Ulcer Knowledge Level of Portuguese Nurses at Long-Term Care Units: A Cross-Sectional Survey], 16th International Seminar on Nursing Research, Universidade Católica Portuguesa, 12 to 13 May, Porto. https://m.porto.ucp.pt/pt/central-eventos/16th-international-seminar-nursing-research

B36. **J. Fialho** and N. Diep, Brand equity and purchase intention for e-commerce platforms in urban Vietnam, ICASDMBW 22,India.
https://events.rdias.ac.in/inc-icasbmw-2022/

B37. **J. Fialho**., Big data in tourism - challenges and concepts ICASDMBW 22,India – Key note speaker, https://events.rdias.ac.in/inc-icasbmw-2022/

B38. **J. Fialho,** Big data in tourism - conceptual framework, Tourism Conference in Nha Trang 2022,. https://sites.google.com/ukh.edu.vn/hoi-thao-du-lich?pli=1

B39. **M. Pires**, "Osteoporosis: Mathematical models for bone density evolution!"E-SEASON Meeting (Europe-South East Asia Science Oriented Network) Évora University. July 15, 2022,

B40. **M. Pires**, T. Bodnár, "Artificial Stress Diffusion in Numerical Simulations of Viscoelastic Fluids Flows". Portugal-Italy Conference on Nonlinear Differential Equations and Applications, Universidade de Évora, July 4 - 6, 2022. https://www.picndea22.uevora.pt/,
https://www.picndea22.uevora.pt/wp-content/uploads/2022/07/Marilia-Pires.pdf

B41. **M. Pires**, T. Bodnar, “Numerical Simulations of Vanishing Diffusion Stabilization for Oldroyd-B fluid flows”. Advances in Mechanics, Modeling, computing and Statistics, BITS Pilani, Pilani Campus, Pilani-333031, India, March 19 - 21, 2022. https://www.bits-pilani.ac.in/pilani/ICAMMCS/home,
https://www.bits-pilani.ac.in/Uploads/Pilani/ICAMMCS/Schedule_conference-17-March-2022.pdf

B42. **E. Zappale**, “Periodic Homogenization in the context of Structured Deformations”. Beyond Elasticity: Advances and Research Challenges Luminy, 16/5-20/5, 2022, https://www.cirm-math.fr/Schedule/screen_display.php?id_renc=2535

B43. **E. Zappale**, “Variational Formulations for Hierarchies of Structured Deformations”. Variational Challenges in Materials Science and Imaging, Vienna, 20/6-24/6, 2022,
https://events.mcs.cmu.edu/fonseca65/wp-content/uploads/sites/27/2022/06/Titles_and_abstracts.pdf

B44. **E. Zappale**, “Power-law approximation for supremal functionals”. Portugal-Italy Conference on Nonlinear Differential Equations and Applications, Évora, 4/7-6/7, 2022, https://www.picndea22.uevora.pt/book-of-abstracts/

B45. **E. Zappale**, “Lower semicontinuity and relaxation for nonlocal supremal functionals”.Recent Advances in the Calculus of Variations in L^\infty, , University of Reading, Reading, UK, 13/7-14/7, 2022,
https://people.bath.ac.uk/rm257/l-infinity/abstracts.html

B46. **E. Zappale**, “Lower semicontinuity and relaxation for nonlocal supremal functionals”.Workshop on Nonlocality, numerics and Applications Lorentz Center, University of Leiden, 4/10-7/10, 2022,

B47. **Rodrigues, José A**. NUMERICAL STUDIES ON FLUID SHEAR STRESS EFFECT IN CANCER CELLS The International Conference Challenges in Numerical Analysis and Scientific Computing (CNASC 2022) University of Minho, Braga, Portugal, September 5 - 6, 2022.

B48. **Baptista, Alexandra** (presenter); Ferreira, Liliana; Constantino, Miguel; Marques, Susete; Martins, Isabel; Borges, Jose; **Bushenkov, Vladimir,** 32nd EURO Conference, 05/07/2022, Helsinki, Finland, https://euro2022espoo.com/. “Comparative analysis of forest ecosystem management with clearcut constraints”, https://www.euro-online.org/conf/admin/tmp/program-euro32.pdf

B49. Ferreira, Liliana (presenter); **Baptista, Alexandra**; Marques, Susete; Constantino, Miguel; Martins, Isabel; Borges, Jose, “Integrating Wildfire Resistance and Environmental Concerns Into A More Sustainable Forest Ecosystem Management

Approach”32nd EURO Conference, 05/07/2022, Helsinki, Finland, https://euro2022espoo.com/, https://www.euro-online.org/conf/admin/tmp/program-euro32.pdf

B50. **Silva, Luís**. “Period incrementing and attractors on nonautonomous flat top tent maps”27th International Conference on Difference Equations and Applications, July 18-22, Paris, France, https://icdea2022.sciencesconf.org/..

B51. **Júlia Justino** and Silviano Rafael, Which Pathway Towards Mathematics' Assessment In Engineering Education?, 25th International Conference on Interactive Collaborative Learning (ICL 2022), 27-30, September 2022, Vienna (Austria), URL: https://icl-conference.org/current/

B52. **Pedro Macias Marques**, Jordan type of Artinian algebras and related invariants, The Strong and Weak Lefschetz Properties, Istituto Nazionale di Alta Matematica “Francesco Severi”, Il Palazzone, Cortona, 12th September, https://sites.google.com/view/cortona-lp2022/home

B53. **Imme van den Berg**, João Horta, On the algebraic completeness of the structure of external numbers, Differential geometry, contact geometry, dynamical systems and beyond, Conference in memory of Robert Lutz (1943-2020), 28/6 – 1/7, 2022, Mulhouse, Colloque Lutz (uha.fr),

B54. **Marília Pires,** Artificial Stress Diffusion Applied to the Simulations of Oldroyd-B Fluid Flows, Workshop on Mathematics and Applications, San Jose, Costa Rica, Janeiro 25 - 27, 2023. http://www.cimpa.ucr.ac.cr/index.php/inicio/notice/382-workshop-mathematics-and-applications

Communications at national events

B55. Sousa-Ferreira, I., Rocha, C., **Abreu, A. M.,** A flexible parametric rate for recurrent gap time data with shared inverse Gaussian frailty. Ciência 2022 – Encontro com a Ciência e Tecnologia em Portugal, May, 16-18, 2022, Ciência 2022 - Encontro com a Ciência e Tecnologia em Portugal (encontrociencia.pt)

B56. **Braumann, C. A.** (presenter); **Carlos, C.**; Brites, N. M. , General autonomous population growth models with and without harvesting in random environments: The effect of Allee effects. III Encontro Português de Biomatemática / 3rd Portuguese Meeting in Biomathematics, FCT NOVA, Caparica, July 13-14, 2022, https://eventos.fct.unl.pt/3epb

B57. **Filipe, P. A.** (presenter); **Jacinto, G.**; **Braumann, C. A.** , Weighted maximum likelihood estimation method for SDE individual growth models. III Encontro Português de Biomatemática / 3rd Portuguese Meeting in Biomathematics, FCT NOVA, Caparica, July 13-14, 2022, https://eventos.fct.unl.pt/3epb

B58. **Braumann, C. A.** (presenter); Brites, N. M.; **Carlos, C.** , SDE harvesting models in random environments: the effect of Allee effects, model robust properties and profit optimization. Encontro Anual do CIMA, Universidade de Évora, July 7, 2022, **organized by CIMA**, https://home.uevora.pt/~bushen/CIMA_Meeting2022/

Abstract in: *Livro de Resumos*, p. 9-11, https://home.uevora.pt/~bushen/CIMA_Meeting2022/Resumos.pdf

B59. **Jacinto, G.** (presenter); **Filipe, P. A.**; **Braumann, C. A.**, **Jamba, N. T.** , Individual growth models with stochastic differential equations. Encontro Anual do CIMA, Universidade de Évora, July 7, 2022, **organized by CIMA**, https://home.uevora.pt/~bushen/CIMA_Meeting2022/

Abstract in: *Livro de Resumos*, p. 13-14, https://home.uevora.pt/~bushen/CIMA_Meeting2022/Resumos.pdf

B60. **Jacinto, G.** (presenter); **Filipe, P. A.**; **Braumann, C. A.** , Modelos de crescimento dinâmicos para a raça mertolenga e a raça alentejana Workshop BovMais (Operational Group GOBovMais), Estação Zootécnica Nacional, Fonte Boa, Santarém, March 25, 2022. https://www.bovmais.pt/conteudo.php?idm=11&idioma=pt

(integrated in the presentation of Action E project).

B61. **Henriques-Rodrigues, L.** (presenter), Semi-parametric estimation in Statistics of Extremes, Encontro Anual do CIMA, Universidade de Évora, July 7, 2022, **organized by CIMA**, https://home.uevora.pt/~bushen/CIMA_Meeting2022/

Abstract in: *Livro de Resumos*, p. 12, https://home.uevora.pt/~bushen/CIMA_Meeting2022/Resumos.pdf

B62. Gomes, M.I. (presenter), Figueiredo, F., **Henriques-Rodrigues, L.** (2022). The role of generalized means in the estimation of the conditional tail expectation. ENSPM2022: Encontro Nacional da Sociedade Portuguesa de Matemática, https://enspm2022.spm.pt/wp-content/uploads/thwcfe_uploads/83a756fa8f50cc9a785cec08083bf87a/Ivette_abstract.pdf

B63. **da Silva, J.L.** (presenter). Green Measures for Nonlocal Diffusion Equations. CIMA Annual Meeting, Évora, July 7, 2022.

B64. Carinhas, D., Alves, M., **Infante, P.**, Martinho, A., Vasquez, F. (2022). Harvesting profit optimization on random: estação de Viana do Castelo. 7as Jornadas de Engenharia Hidrográfica / 2as Jormadas Luso-Espanhola de Hidrografia}, Instituto Hidrográfico, 21 to 23 june, Lisbon.

https://jornadas.hidrografico.pt/

B65. **Jacinto, G** (presenter) , Antunes, N., Pacheco, A. (2022). Inference of the workload moments in a piecewise-stationary Mt/Gt/1 queue with probing, Encontro Nacional da SPM, 18 a 20 de julho, Instituto Politécnico de Tomar, Tomar. Comunicação convidada para a sessão temática de Statistical modelling, extremes and stochastic processes. https://enspm2022.spm.pt/

B66. E. Eloy, **V. Bushenkov**, S. Abreu, "Gestão florestal multiobjetivo baseada em Constraints de domínio finite", oral communication, XXII Congresso da Associação Portuguesa de Investigação Operacional, Évora, 6-8 November, 2022,.
http://apdio.pt/web/io2022/home

B67. **V. Bushenkov**, R. Fragoso, A. Vieira, "Aplicação de DEA para avaliação do impacto da pandemia da COVID-19 na eficiência de unidades hospitalares dos países europeus", poster, XXII Congresso da Associação Portuguesa de Investigação Operacional, Évora, 6-8 November, 2022, http://apdio.pt/web/io2022/home

B68. **C. Carlota** and **A. Ornelas**, "On the Liapunov convexity theorem". CIMA's Annual Meeting, 7th July/2022, University of Évora,
https://home.uevora.pt/~bushen/CIMA_Meeting2022/

B69. **J. Correia**, "Dissipation". CIMA's Annual Meeting, 7th July/2022, University of Évora
https://home.uevora.pt/~bushen/CIMA_Meeting2022/

B70. **F. Minhós,** "Impulsive coupled systems with functional boundary conditions". CIMA's Annual Meeting, 7th July/2022, University of Évora,
https://home.uevora.pt/~bushen/CIMA_Meeting2022/

B71. **F. Minhós**, "On periodic third-order Ambrosetti-Prodi-type problems". Encontro Nacional da Sociedade Portuguesa de Matemática, 18th to 20th July, 2022, Instituto Politécnico de Tomar, https://enspm2022.spm.pt/programa-sessoes-paralelas

B72. **Diogo Baptista** (presenter), **Alexandra Nascimento Baptista**, **C. Correia Ramos**, *Measure the complexity of Nicholson-Bailey type biological dynamical systems using symbolic dynamics*III Encontro Português de Biomatemática / 3rd Portuguese Meeting in Biomathematics, FCT NOVA, Caparica, July 13-14, 2022, https://eventos.fct.unl.pt/3epb

B73. **C. Correia Ramos** (presenter), *Kinematics, dynamics and complex motion in biology.* III Encontro Português de Biomatemática / 3rd Portuguese Meeting in Biomathematics, FCT NOVA, Caparica, July, 13-14, 2022, https://eventos.fct.unl.pt/3epb

B74. **Rui Albuquerque**, *Sobre o volume de campos vetoriais unitários em dimensões 2 e 3,* Encontro Anual do CIMA, 7/07/2022, Universidade de Évora.

B75. **M. Garapa**, On the Dynamics of Beliefs, Encontro Anual 2022 – CIMA, Évora, 7th July, 2022, https://home.uevora.pt/~bushen/CIMA_Meeting2022/Resumos.pdf

B76. **Andre Carmo**, Modal logics and applications, CIMA Annual Meeting 2022, July 7, https://home.uevora.pt/~bushen/CIMA_Meeting2022/Resumos.pdf

B77. **Bruno Dinis**, The Halpern-Mann iteration in CAT(0) spaces, Days in Logic, 30 Junho - 2 Julho, Universidade do Algarve. Faro , http://daysinlogic2022.ualg.pt/

C – Reports

C1 Guimarães, M. H., Esgalhado, C., Nobre, C. e **Jacinto, G.**. TERTÚLIAS DO MONTADO 2016-2019, Avaliação e Síntese. ISBN: 978-972-778-277-2 https://drive.google.com/file/d/1-YANNop0Ky4yF6265V7ytd7vfTA8mvuW/view

C2 **Infante, P.** (2022). Estratégia da Saúde na Área das Demências: Questionário para Diagnóstico da Situação. Administração Regional de Saúde do Alentejo e Universidade de Évora.

C3 **Frade, A., Rodrigues, J., Abrantes, P e Micaelo, R.**,Evaluation report of the Nuno Gonçalves group of schools in Lisbon, Protocol IPL-IGEC (General Inspection of Education and Science), 2022.

D – Organization of conferences and seminars

International Meetings

D1. **Carlos A. Braumann**. DSABNS 2022 - Virtual, 13th International Conference on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS 2022), hosted by the Basque Centre for Applied Mathematics, Bilbao, Spain, February 8-11, 2022, virtual, https://sites.google.com/view/dsabns2022/

Member of the International Organizing Committee (also functions as Scientific Committee): https://sites.google.com/view/dsabns2022/organizing-committe

D2. **Carlos A. Braumann**. DSABNS 2023, 14th International Conference on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS 2022), Bilbao, Spain, February 5-8, 2023, https://sites.google.com/bcamath.org/dsabns2023

Member of the International Organizing Committee (also functions as Scientific Committee): https://sites.google.com/bcamath.org/dsabns2023/organizing-committee

D3. **Carlos A. Braumann**. 4º Encontro de Biomatematica (4 EncBioMat), CEFET-RJ, April 26-29, 2022, Rio de Janeiro, Brasil, https://encbiomat.wixsite.com/encbiomat

Member of the Scientific Committee,
https://encbiomat.wixsite.com/encbiomat/comissoes

D4. **Carlos A. Braumann**. VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), October 13-15, virtual, http://www.wcdanm.ipt.pt/2022/home/

Member of the Scientific Committee: http://www.wcdanm.ipt.pt/2022/committees/

D5. **Dulce Gomes**. 11th International Conference on Teaching Statistics (ICOTS11), September 11-16, 2022, Rosario, Argentina. https://icots.info/11/?abouticots

Member of the International Programme Committee

D6. **Dulce G. Pereira**. The 51th International Biometrical Colloquium, Szamotuly (Poland), September 11-14, 2022, URL: https://www1.up.poznan.pl/cb51/komitet-naukowy-cb51/. Member of the Scientific Committee

D7. **Patrícia A. Filipe**. III Encontro Português de Biomatemática/ 3rd Portuguese Meeting in Biomathematics, FCT NOVA, Caparica, July 13-14, 2022

Member of the Scientific Committee https://eventos.fct.unl.pt/3epb

D8. **da Silva, J.L.** Recent Developments in Stochastics with Applications in Mathematical Physics and Finance. Hammamet, October 17-21, 2022, Tunisia. http://pinguim.uma.pt/Investigacao/Ccm/rdsamff22/

D9. **João Alves e Sousa**, Chairman of the IMEKO TC1 + TC7 + TC13 + TC18 & MATHMET Joint Symposium, “Cutting-edge measurement science for the future”, held in, Porto, 31 August – 2 September, 2022, Portugal

D10. **V. Bushenkov**, XIII International Conference Optimization and Applications (OPTIMA-2022), Petrovac, Montenegro, September 26 - 30, 2022, Member of the Program Committee.
https://agora.guru.ru/display.php?conf=OPTIMA-2022&page=organizers&PHPSESSID=fe7pln1aj5kd1ochb81j71l3c7

D11. **J. Correia** (Proponent and Coordinator). "Complex Singularities and Regularisations of Conservation Laws", RIGs (Research-in-Groups), ICMS (International Centre for Mathematical Sciences) Bayes Centre, March 28-April 03, 2022, Edinburgh, UK,

D12. **J. Correia** (Organiser and Coordinator), E-SEASON Meeting (Europe-South East Asia Science Oriented Network), Colégio do Espírito Santo, July 15, 2022, Universidade de Évora, Évora, Portugal,

D13. **J. Correia** (Organiser and Participant), IYBSSD 2022 (International Year of Basic Sciences for Sustainable Development 2022) "Tea Time Talks on Basic Sciences, Education & Sustainable Development", UNESCO's IYBSSD 2022 event, Caraga State University, August 22, 2022, Butuan City, Philippines,

https://sites.google.com/view/cimpaschool-csu2022/large-audience-event?authuser=0
https://www.iybssd2022.org/en/events/tea-time-talks-on-basic-sciences-education-sustainable-development-2/

D14. **J. Correia** (Proponent, Scientific Coordinator, member of Scientific Committee, member of the Jury for Participants Selection). CIMPA's (Centre International de Mathématiques Pures et Appliquées, centre UNESCO of Category 2) Research School 2022 "Mathematical Modeling of Ecosystems", August 22-September 02, 2022, Caraga State University, Butuan City, Philippines https://sites.google.com/view/cimpaschool-csu2022/home?authuser=0

D15. **F. Minhós**, **F. Carapau**, **P. Correia** and **L. Bandeira,** Organizing Committee, . Portugal-Italy Conference on Nonlinear Differential Equations and Applications, (PICNDEA22), Évora, 4,5,6, July de 2022. https://www.picndea22.uevora.pt/

D16. Executive Committee: A. Mubayi, **F. Carapau**, L. Grilo, M. Stehlik. VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), October 13-15, 2022, Polytechnic Institute of Tomar (PIT), Tomar, http://www.wcdanm.ipt.pt/2022/

D17. **F. Minhós**, Member of Scientific Committee and Chair. Portugal-Italy Conference on Nonlinear Differential Equations and Applications, (PICNDEA22), Évora, 4,5,6, July de 2022, http://www.picndea22.uevora.pt/

D18. **F. Minhós**, Member of the Scientific Committee, VIII Workshop on Computational Data Analysis and Numerical Methods (WCDANM), (video conference), October 13-15, 2022, Polytechnic Institute of Tomar (PIT), Tomar, http://www.wcdanm.ipt.pt/2022/committees/

D19. **F. Minhós**, Member of the Steering Committee. The 14th International Conference on Pure Mathematics, Applied Mathematics and Computational Methods, Dubai, United Arab Emirates, May, 23-25, 2022,

http://www.inase.org/conferences/2022/may/pmamcm.htm

D20. **F. Minhós**, Member of the Steering Committee, The 14th International Conference on Mathematical Models and Methods in Applied Sciences, Sofia, Bulgaria, April, 24-26, 2022,. http://www.inase.org/conferences/2022/march/pm.htm#tpc

D21. **F. Minhós**, Member of the Program Committee, The 14th International Conference on Pure Mathematics-Applied Mathematics, Athens, Greece, January 26-28, 2022,. http://www.inase.org/conferences/2022/january/pm-am.htm

D22. **F. Minhós**, Member of the Steering Committee, The 13th International Conference on Mathematical Methods, Mathematical Models and Simulation in Science and Engineering, Athens, Greece, January 26-28, 2022, http://www.inase.org/conferences/2022/january/mmsse.htm

D23. Anthony Iarrobino, **Pedro Macias Marques**, Maria Evelina Rossi, and Jean Vallès, organizing committee of the special session on "Deformation of Artinian algebras and Jordan type"; in the joint international meeting of the American Mathematical Society, the European Mathematical Society, and the Société Mathématique de France, Université de Grenoble-Alpes, Grenoble, 18th to 22nd July, https://www.ams.org/meetings/international/2269_special.html

D24. **Andre Carmo**, Member of the Program Committee of SOCREAL 2022, 6th International Workshop on Philosophy and Logic of Social Reality, Hokkaido University, Japan, 28 February - 1 March, 2022, On-Line.

D25. **Marco Garapa,** and **Maurício Reis**, 21st EPIA Conference on Artificial Intelligence (EPIA 2022), Instituto Superior Técnico, August 31-September 2, 2022, Member of the Program Committee of the Knowledge Representation and Reasoning (KRR) Thematic Track https://epia2022.inesc-id.pt/,

D26. **Marco Garapa,** 36th AAAI Conference on Artificial Intelligence (AAAI-22), A Virtual Conference, February 22–March 1, 2022, https://aaai.org/Conferences/AAAI-22/, Program Committee member;

D27. **Marco Garapa,** 31st International Joint Conference on Artificial Intelligence and 25th European Conference on Artificial Intelligence (IJCAI-ECAI 2022), Messe Wien, Vienna, Austria, July 23-29, 2022, https://ijcai-22.org/, Program Committee member.

National Meetings

D28. **Lígia Henriques-Rodrigues** and Regina Bispo, Organizers of the Parallel session, Statistical modelling, extremes and stochastic processes, Parallel Session of the

ENSPM2022: Encontro Nacional da Sociedade Portuguesa de Matemática, https://enspm2022.spm.pt,
https://enspm2022.spm.pt/programa-sessoes-paralelas/#TU15

D29. **V. Bushenkov**, XXII Congresso da Associação Portuguesa de Investigação Operacional, Évora, 6-8 de November, 2022, Member of the Organizing Committee. http://apdio.pt/web/io2022/home

D30. **V. Bushenkov**, **Jorge Santos, José Luis da Silva, Marília Pires,** CIMA's Annual Meeting, 7th July/2022, University of Évora, Member of the Organizing Committee.
https://home.uevora.pt/~bushen/CIMA_Meeting2022/

D31. **J. Correia** (Organizer). ENSPM 2022 (Encontro Nacional Sociedade Portuguesa de Matemática 2022), Sessão Paralela TU10:00 "Mathematical modeling of biological systems (E-SEASON Session 1)", July 19, 2022, Instituto Politécnico de Tomar, 18-20 julho 2022, Tomar, Portugal, https://enspm2022.spm.pt/programa-sessoes-paralelas/

D32. **J. Correia** (Organizer).ENSPM 2022 (Encontro Nacional Sociedade Portuguesa de Matemática 2022), Sessão Paralela TU11:30 "Coagulation-Fragmentation Models (E-SEASON Session 2)", July 19, 2022, Instituto Politécnico de Tomar, 18-20 julho 2022, Tomar, Portugal, https://enspm2022.spm.pt/programa-sessoes-paralelas/

D33. **J. Correia** (Organizer). ENSPM 2022 (Encontro Nacional Sociedade Portuguesa de Matemática 2022), Sessão Paralela TU15:30 "Nonlinear Evolution PDEs (E-SEASON Session 3)", July 19, 2022, Instituto Politécnico de Tomar, 18-20 julho 2022, Tomar, Portugal, https://enspm2022.spm.pt/programa-sessoes-paralelas/

D34. **C.Ramos** (Organizer), Cryptomeeting - no reservations, 13 January 2022, Room: XCYH45JHF4KG7, seminário de divulgação engenharia informática , Universidade de Évora

D35. **Alexandra Baptista** (Organizer), 14.ª edição do *MAT-OESTE: Matemática na Região Oeste*, com o tema *"Matemática: e se a tirarmos da equação?",* Escola Superior de Tecnologia e Gestão do Instituto Politécnico de Leiria, 08/07/2022.

D36. **Marco Garapa,** and **Maurício Reis**, Local Organizing Committee member of 5th Madeira Workshop on Belief Revision, Argumentation, Ontologies, and Norms (BRAON 2022), Madeira, Portugal, March 27-31, 2022, http://www4.uma.pt/braon/

D37. **Bruno Dinis** (co-organizador com Gilda Ferreira) Seminário de Lógica Matemática, Faculdade de Ciências da Universidade de Lisboa (de Janeiro a Julho de 2022)

D38. **Julia Justino,** organizing committee member of Jornadas Pedagógicas da ESTSetúbal/IPS 2022, Setúbal, 27/06/2022, URL: http://hdl.handle.net/10400.26/41489

E – Advanced training

PhD Thesis (Concluded)

E1 Thaís Zamboni Berra, *O impacto do GeneXpert MTB/RIF na detecção da Tuberculose e da Tuberculose multidroga-resistente e seu padrão espacial em Ribeirão Preto-SP*. Supervisors: Ricardo A. Arcêncio, **Gomes, D.**. PhD in Public Health Nursing, University of São Paulo at Ribeirão Preto School of Nursing, Brazil. Completed in March 28, 2022.

E2 Jerome B. Bendong. A BIORTHOGONAL APPROACH TO FRACTIONAL POISSON ANALYSIS, Department of Mathematics and Statistics College of Science and Mathematics MSU-Iligan Institute of Technology Iligan City. October 2022. Supervisors: **José L. da Silva** and Sheila Menchavezz

E3 Mahdi Rahimi Pordanjani, "*A Comparative Study of Impacts and Implications of Climate Change on Tourism in Portugal and Iran*", PhD in Tourism at the Faculty of Economics of the Universidade do Algarve, Faro. Completed in December 2022. Supervisors: **Manuel do Carmo** and **Antónia Correia**

E4 Infeliz Carvalho Coxe, "Lower and upper solutions method on higher order boundary value problems including differential equations and coupled systems", Supervisor: **F. Minhós**, Universidade de Évora, 2022.

E5 Armando Alexandre, Estimadores Otimais em Modelos Bi-aditivos e Suas Famílias, PhD Program in Mathematics, University of Évora Advisers : João Tiago Mexia, **Manuela Oliveira**.

Master Thesis (Concluded)

E6 João André Santos Brás, "Sistema Automático de Medição do Nível de Água em Ribeiras do Funchal através de Videovigilância", Supervisor: **Joaquim Amândio Azevedo** (October 2022).

E7 Miguel Costa Lima Lobo, "Aplicação de algoritmos de *deep learning*: Modelo de reconhecimento de imagem e análise do comportamento dos consumidores em lojas de

checkout autónomo", Mestrado em *Business Analytics*. Iscte-Instituto Universitário de Lisboa. Supervisor: **Patrícia A. Filipe** (December 2022).

E8 João Miguel Grácio Alves "*Big Data Analytics* na Gestão de uma Rede de Distribuição de Água", Mestrado em *Business Analytics*. Iscte-Instituto Universitário de Lisboa. Supervisor: **Patrícia A. Filipe** (December 2022).

E9 Roberta França "O impacto da pandemia COVID-19 no mercado financeiro brasileiro", Mestrado em Análise Financeira, Coimbra Business School|ISCAC. Supervisor: **Manuela Larguinho** (December 2022)

E10 NGUYEN QUOC TRUNG, "Customer analysis on My Chu – an alternative to instant noodle". British University of Vietnam, Supervisor: **J. Fialho**

E11 LE VIET HA, "The impact of internal audit on organizational culture in Vietnamese private groups". British University of Vietnam, Supervisor: **J. Fialho**

E12 TRAN KHANH NGOC, "Offline or online word-of-mouth marketing should prevail in Food and Beverage segment in Vietnam now when e-commerce seems dominant". British University of Vietnam, Supervisor: **J. Fialho**

E13 NGUYEN MINH HIEU, "Should Vietnam's life insurance companies apply big data in developing new products and services for Vietnamese consumers?" British University of Vietnam, Supervisor: **J. Fialho**

E14 TRUONG THI HANG NGA, "Factors affecting sale revenue in Vietnamese SME entrepreneurs." British University of Vietnam, Supervisor: **J. Fialho**

E15 Andreia Sofia da Silva Jerónimo, Modelação 3D no tratamento cirúrgico de lesões subclínicas da mama, Supervisor: **José Alberto Rodrigues.** ISEL, 2022.

E16 Ana Paula Aarão Teixeira Videiros Frederico, Modelação Matemática de Doenças Infeciosas, Supervisor: **Ana Isabel Santos,** Universidade de Évora (2022).

Curricular and Scientific Internships (Concluded)

E17 Bernardo Stoffel, Estudo do Posicionamento do Preço do Produto Multiriscos habitação face às Congéres em Análise, Ageas Portugal Companhia de Seguros, S.A., Supervisors: **Infante, P.**, Dionísio, A.

E18 Andreia Santos, Análise e Previsão do Caudal Diário da Etar de Santarém, Águas de Santarém S.A, Supervisors: I**nfante, P., Afonso, A.**

E19 Irina Gonçalves, Índice Case-Mix do Hospital do Espírito Santo de Évora, EPE, Hospital do Espírito Santo de Évora, EPE, Supervisors: **Infante, P.**, Dionísio, A. -

E20 Gonçalo Pereira, Caraterização dos Alumni da Universidade de Évora, Divisão de Inovação, Cooperação, Empreendedorismo e Empregabilidade da Universidade de Évora, Supervisor: **Infante, P.**

E21 Inês Samarra, Caracterização do Empreendedor Social incubado no Centro de Inovação Social da Fundação Eugénio de Almeida, Fundação Eugénio de Almeida, Supervisors: **Infante, P.,** Dionísio, A.

E22 Marta Soares - Hábitos de Sono e de Atividade Física e Desportiva praticados pelas crianças do 1º e 4º ano do ensino básico do concelho de Évora, Câmara Municipal de Évora, Supervisors: **Infante, P., Afonso, A.**

E23 (Postdoc) Prof. Doutor Teófilo D. Chihaluca, Dept. Ciências Exatas da Escola Superior do Bié, Angola, "Iniciação à análise matemática e/ou às equações diferenciais parciais aplicadas", 3ª ed. ECA (Estágios Científicos Avançados) em Matemática—PALOP, Fundação Calouste Gulbenkian, Parcerias para o Desenvolvimento, April-November 2022. Supervisor: **J. Correia**

E24 (BII) Ricardo M. L. Dias, BSc. in Matemática Aplicada à Economia e Gestão, UÉvora, "Mathematical Analysis--Traffic Models", February-April 2022. Supervisor: **J. Correia**

E25 (BSc) Ricardo M. L. Dias, BSc. in Matemática Aplicada à Economia e Gestão, UÉvora, Project Erasmus+ programme "Advanced Computing Consortium on HPC, HPDA, AI & HPV(ACC)", with Jean-Paul Chehab and Paul Vigneaux, Département de Mathématiques, Université de Picardie Jules Verne, France. Organiser: **J. Correia**

E26 (Postdoc)Dr. Pornsarp Pornsawad, Dept. Mathematics, Faculty of Science, Silpakorn University, Thailand, "Data Science for Osteoporosis Screening in Thailand", Project Erasmus+ Programme and Partner Countries 2019-1-PT01-KA107-060423 Mobility In, July 11-20, 2022, Departamento de Matemática, Universidade de Évora, Portugal. Contact and Responsible Person: **J. Correia**

E27 Mini-Project Facilitator (six participants), "Heat Propagation", August 27-September 02, 2022, Caraga State University, Butuan City, Philippines, **J. Correia**, Universidade de Évora, Évora, Portugal. https://sites.google.com/view/cimpaschool-csu2022/Lectures/mini-projects?authuser=0

E28 (Mini-Project Facilitator (five participants), "Nonlinear Wave Equation", August 27-September 02, 2022, Caraga State University, Butuan City, Philippines, **J. Correia**, Universidade de Évora, Évora, Portugal.
https://sites.google.com/view/cimpaschool-csu2022/Lectures/mini-projects?authuser=0

E29 Prof. Robert de Sousa, Cabo Verde, "Uma introdução ao Método dos Elementos Finitos", Advanced Scientific Internships in Mathematics PALOP (Fundação Calouste Gulbenkian). Supervisors: **P. Correia** and **F. Carapau**

E30 Francisco Cardoso, BII scholarship, scientific area: Mathematics of Fluid Mechanics, Finite Element Method. Supervisors: **P. Correia** and **F. Carapau**

E31 João Pedro Guerreiro Peixeiro, "System of differential equations: Lotka-Volterra model for competition between two species", Graduation Project in Mathematics Applied to Economy and Management, University of Évora. Supervisor: **F. Minhós**, 2022.

E32 João Pedro Guerreiro Peixeiro, "Compartmental Mathematical Models", CIMA BII Grant UIDP/04674/2020, Ref.1, Research Initiation Scholarship, University of Évora. Supervisor: **F. Minhós**, 2022.

E33 Alberto Sancho Noé, "Numerical Analysis of Differential Equations", within the framework of Advanced Scientific Internships in Mathematics for teachers of PALOP higher education institutions, funded by the Calouste Gulbenkian Foundation. Supervisors: **M. Pires** and Nuno Brites, 2022.

E34 Madalena Ascenção, *Iteradas de aplicações. Aplicação de Lozi e de Hénon,* Bolsa de Iniciação à Investigação em Matemática- Dynamical systems (I&D UIDB/04674/2020-CIMA BII 2) Supervisors: **Alexandra Nascimento Baptista, Carlos Ramos** e **Diogo Baptista**

E35 Madalena Ascensão, Cinemática e movimento complexo em dimensão três. Projeto final de curso 1º ciclo em matemática aplicada à economia e gestão, Supervisor: **Carlos Ramos** Universidade de Évora. (2022)

E36 **Sara Perestrelo**, The monotonicity trick and applications, RISM Course by Michael Struwe, Varese, 7-11 November, 2022, https://www.rism.it/events/the-monotonicity-trick-and-applications

E37 **Marília Pires**, Mini-Project Facilitator (six participants), "A model of Earthquake-generated tsunami over a subsea hill", August 27- September 02, 2022, Caraga State University, Butuan City, Philippines, https://sites.google.com/view/cimpaschool-csu2022/Lectures/mini-projects

PhD Thesis (ongoing)

E38 Ivo Miguel Sousa Ferreira, Modelos de Sobrevivência Paramétricos para Acontecimentos Múltiplos.

Supervisors: Cristina Maria Tristão Simões Rocha and **Ana Maria Abreu**

E39 Luana Sales Alves, *A comorbidade tuberculose-diabetes mellitus e seus determinantes no Estado de São Paulo: uma abordagem geoepidemiológica*. PhD in Public Health Nursing, University of São Paulo at Ribeirão Preto School of Nursing, Brazil.

Supervisors: Ricardo Alexandre Arcêncio and **Dulce Gomes**.

E40 Jaime Jerónimo, *Análise de sobrevivência de mulheres diagnosticadas com cancro de mama em Angola no período de 2013 a 2017*, PhD in Mathematics at the University of Évora.

Supervisors: **Patrícia A. Filipe** and **Dulce Gomes**.

E41 Manuel Ana Alberto, Séries temporais: uma aplicação à sinistralidade rodoviária em Angola 2002---2015, PhD in Mathematics at the University of Évora.

Supervisors: **Dulce Gomes** and **Patrícia A. Filipe**

E42 Nelson T. Jamba. Modelos mistos de crescimento individual em ambiente aleatório. Doutoramento em Matemática, Universidade de Évora.

Supervisors: **Jacinto, G.** and **Filipe, P. A.**

E43 Samira Velaquez. Marine recreational shing in Portugal: Estimating ecological, biological and economic impacts and unnacounted shing mortality. Doutoramento em Biologia Marinha, Universidade do Algarve.

Supervisors: Rangel, M.., Guerreiro, P. and **Jacinto, G.**.

E44 Hugo Salgueiro. Funcionalidade, Saúde e Qualidade de Vida na População Mais Velha com Multimorbilidade da Região do Alentejo Central, Doutoramento em Ciências da Saúde e Bem Estar, Universidade de Évora e Universidade Nova de Lisboa. Supervisors: Lopes, M. and **Afonso, A**.

E45 Ana Costa. Determinantes da Depressão e Ansiedade na Qualidade de Vida e Funcionalidade da População Adulta Portuguesa. Doutoramento em Ciências da Saúde e Bem Estar, Universidade de Évora e Universidade Nova de Lisboa. Supervisors: Lopes, M. and **Afonso, A**.

E46 Maria João Inácio, Cartas de Controlo: Monitorização de Perfis e Risco Ajustado, Doutoramento em Matemática, Universidade de Évora. Supervisors: **Infante. P**.,Figueiredo, F. O.

E47 Dora Carinhas, Modelação Estatística das Marés, Doutoramento em Matemática, Universidade de Évora. Supervisors: **Infante, P.**, Martinho, A.

E48 Cláudia Pereira, Novas Abordagens a Modelos de Mistura em Análise de Sobrevivência, Doutoramento em Matemática, Universidade de Évora. Supervisors: **Infante. P.**, Mendonça, S.

E49 Sónia Barbosa. Monitorização do desempenho escolar dos alunos do ensino básico. Doutoramento em Matemática, Universidade de Évora. Supervisors: **Infante, P.**, **Afonso, A.**

E50 Mário Eduino Pina dos Santos Lopes, "Nonconvex differential inclusions", Doctoral Program in Mathematics of University of Évora. Supervisors: **C. Carlota** & **A. Ornelas**

E51 Khankham Vongsavang, "Diffusive-Dispersive Conservation Laws in Coagulation-Fragmentation", 2nd year, Supervisor: **J. Correia,** co-advised with F. P. da Costa, Universidade Aberta, Portugal.

E52 Gnord Maypaokha, "The Effect of Saturating Diffusion on Hyperbolic Partial Differential Equations", 2nd year, Supervisor: **J. Correia** , co-advised with N. Bedjaoui, Université de Picardie Jules Verne, France.

E53 Bouasy Doungsavanh, "Mathematical Analysis of Structured Models of Waterborne Diseases: Application to Laos", 2nd year, Supervisor: **J. Correia** , co-advised with Y. Mammeri, Université Jean Monnet, France.

E54 Nuno Miguel Granja de Oliveira, "Higher order boundary value problems with parameters", Doctoral Program in Mathematics of University of Évora. Supervisor: **F. Minhós**.

E55 Sara Isabel Aleixo Perestrelo, "Periodic coupled systems and synchronization", Doctoral Program in Mathematics of University of Évora. Supervisors: **F. Minhós,** Henrique Oliveira, Instituto Superior Técnico da Universidade de Lisboa.

E56 Gracino Francisco Rodrigues**, "**Existence, non existence and multiplicity of solutions for higher order boundary value problems"**,** Program in Mathematics of University of Évora. Supervisor: **F. Minhós,** Co-Supervisor: Fernando Carapau, University of Évora.

E57 Nada El Bouziani, Simulation of material blocks using automated methods, Supervisors **: Carlos Ramos**, M. Tlemçani (2022).

E58 João Horta, Números externos complexos. Raízes de polinómios e aplicações, awaits discussion, Supervisor: **Berg, Imme van**

E59 Imaddine Berrabah, Canard cascades in singular perturbations, Univ. M'Sila, Algeria, Supervisors: Abdelmadjid Boudaoud, **Berg, Imme van**.

E60 Márcio André Traesel, Estudo de algumas variedades do número de Frobenius Programa de Doutoramento em Matemática da Universidade de Évora, Supervisors **:** José C. Rosales , **Manuel Branco.**

E61 Maria Isabel de Magalhães Colaço, Betti numbers of some semigroup rings em curso, Programa de Doutoramento em Matemática da Universidade de Évora, Supervisors **:** **Manuel Branco** , Ignácio Ojeda.

E62 Manuel António Caldas Faria, Semigrupos numéricos, Doutoramento em Matemática da FCT- Universidade Nova de Lisboa, Supervisors **:** José C. Rosales, **Manuel Branco.**

E63 Ana Maria Calado Meireles Martins, *Contributions to Latent Trait Theory Models: Applications to Health and Social Science Problems*. External member of the PhD Program in Mathematics (Specialty in Statistics and Risk Management), of the NOVA School of Science and Technology. External supervisor: **Dulce Gomes.** Supervisors: Bruno de Sousa and Isabel Natário.

Master Thesis (ongoing)

E64 Vânia Domingas de Sousa Figueira, Métodos geradores de distribuições de probabilidade. Supervisor: **Ana Maria Abreu**

E65 Fligencio Ermogenes Gomes, *Análise e previsão do número de casos e de mortes por COVID-19 na Guiné-Bissau: Estudo comparativo entre modelos ARIMA e modelos de redes neuronais (LSTM)*. Master's Course in Statistical Modeling and Data Analysis at the University of Évora. Supervisor: **Dulce Gomes**

E66 Teotónio Gaspar Feliciano, *Modelação e previsão das taxas de mortalidade infantil nos países da CPLP entre 1985 e 2020 usando modelos de Séries Temporais*. Master's Course in Statistical Modeling and Data Analysis at the University of Évora.
Supervisor: **Dulce Gomes**

E67 Francisco José Correia Sardinha, "Recolha de dados meteorológicos utilizando LoRa", Supervisor: **Joaquim Amândio Azevedo**.

E68 Loide Ascenso. Modelação Estatística da frequência ao Serviço de Urgência do HESE. Master's Course in Statistical Modeling and Data Analysis at the University of Évora.
Supervisors: **Infante, P.** and **Jacinto, G.**

E69 Catarina Wengorovius Viana de Sousa, Análise de indicadores sobre o acesso a equipamentos sociais e a igualdade de género: Modelos de Análise de Regressão e Correlação, e Modelos Estatísticos de Previsão. Master's Course in Statistical Modeling and Data Analysis at the University of Évora.

Supervisor: **Dulce G. Pereira**

E70 Ricardo Manuel Sampaio Jorge Rolim. Automatização de vendas de produtos farmacêuticos e previsões para apoio em gestão e serviços de farmácias. Masters Course in Data Science. Iscte-Instituto Universitário de Lisboa. Supervisor: **Patrícia A. Filipe**

E71 Nuno Miguel Martins da Fonseca. Previsão de Vendas de Grupos Farmacêuticos para Auxílio da Gestão de Stock - Abordagem Low-Code. Masters Course in Data Science. Iscte-Instituto Universitário de Lisboa. Supervisor: **Patrícia A. Filipe**

E72 Sofia Guerreiro. Qualidade de vida em Portugal e Regiões ao longo do tempo. Mestrado em Modelação Estatística e Análise de Dados, Universidade de Évora. Supervisor: **Afonso, A.**

E73 Alexandre Marques. Os novos hábitos alimentares de consumo dos imigrantes na Suíça: os desafios que os portugueses encontram ao chegar a um país estrangeiro. Mestrado em Modelação Estatística e Análise de Dados, Universidade de Évora. Supervisor: **Afonso, A.** and Ribeiro, F.

E74 Miguel Matias Reis, “Numerical analysis of methods applied to optimization and control of harvesting models”, ISEG-ULisboa. Adviser: N. Brites, Co-adviser: **M. Pires**

Curricular and Scientific Internships (Ongoing)

E75 José Adilson Rodrigues Alves, *Tradução, Adaptação Transcultural e Validação de um Questionário de Avaliação de Satisfação de Médicos com o Laboratório de Pa*tologia Clínica. Postgraduate course in Management of Health Units National School of Public Health and Sagrada Esperança Clinic (Luanda, Angola) - FOGUS III. Supervisors: **Dulce Gomes** and Emanuel Catumbela.

E76 Michelle Lins Moraes, "*Capacidade de Absorção no Setor do Turismo: uma análise mixed-method*", Pos Doc in Tourism at the Faculty of Economics of the Universidade do Algarve. External supervisor: **Manuel do Carmo**. Supervisor: Antónia Correia.

E77 Pedro Valente, Prevenção e Alerta da Sinistralidade Rodoviária com o Contributo da Inteligência Artificial. Projeto de Investigação do Curso de Estado-Maior Conjunto, Instituto Universitário Militar, Supervisors: **Paulo Infante** and Mário Guedelha.

F – Invited talks and seminars

F1 **Dulce Gomes**. Seminário: Desafios no diagnóstico da tuberculose em Portugal. Planear o futuro, Escola Nacional de Saúde Pública, Universidade Nova de Lisboa, June 2, 2022, Lisboa. (Integrated in the presentation of Urban TB project).

F2 **Dulce Gomes**. Palestra: Diagnóstico situacional da incidência e mortes por COVID-19 nos países europeus com o recurso da estatística: Reflexões e desdobramentos. July 30, 2022, School of Nursing of Ribeirão Preto, Ribeirão Preto, Brasil. (Integrated Graduate Program in Public Health Nursing on Health Policies)

F3 **da Silva, J.L.** Fractional Poisson Analysis in Dimension one. Universidade de Évora. april 20, 2022. https://www.dmat.uevora.pt/informacoes/seminarios/Fractional-Poisson-Analysis-in-one-Dimension.

F4 **da Silva, J.L.** Beyond fBm: Generalized Grey Brownian Motion (ggBm). University of Southern Philippines in Science and Technology (USTP), Cagayan de Oro City, October 25, 2022.

F5 **da Silva, J.L.** Non-Gaussian Analysis: An Overview and Concrete Examples , Department of Mathematics and Statistics, MSU-IIT, Iligan City, Philippines. October 25, 2022.

F6 **Infante, P.** Algumas Considerações sobre Explicação e Predição da Sinistralidade Rodoviária. 4th Edition of a Monographic Course on Homeland Security, Military University Institute, 24 november, Lisbon.

F7 **C. Carlota**, "On existence of solutions for optimal control problems with nonconvex lagrangian". Webinar, Functional Analysis and Applications Group, CIDMA (Centro de Investigação e Desenvolvimento em Matemática e Aplicações), University of Aveiro, November 2022, https://cidma.ua.pt/files/events/group_seminars/FAAG/GAFAWebinar24-11-2022.pdf

F8 **J. Correia**, "Basic, Not Elementar". CIMPA 2022 School Mathematical Modeling of Ecosystems, Caraga State University, September 1, 2022, Butuan City, Philippines, https://sites.google.com/view/cimpaschool-csu2022/Lectures/scientific-talks?authuser=0

F9 **Carlos Ramos**, Operator algebras, representations and discrete dynamical systems, June 7, 2022, Universidade da Beira Interior.

F10 **Diogo Baptista,** Discovering Mathematics in various professions, Colégio Dinis de Melo, Amor, Leiria, 4/04/2022. Relate various topics in mathematics to some professions.

F11 **Diogo Baptista,** Discovering Mathematics in various professions, Escola Secundária José Loureiro Botas, Vieira de Leiria, 7/06/2022. Relate various topics in mathematics to some professions.

F12 **Diogo Baptista,** Discovering Mathematics in various professions, Escola Secundária José Loureiro Botas, Vieira de Leiria, 14/06/2022. Relate various topics in mathematics to some professions.

F13 **Diogo Baptista,** Discovering Mathematics in various professions, Agrupamento de Escolas de Pombal, 15/06/2022. Relate various topics in mathematics to some professions.

F14 **Luís Silva, "**Nonautonomous attractors and bifurcation structures on nonautonomous families of flat topped tent maps", Mathematica Seminaria, ISEL, Departamento de Matemática, 15 de junho de 2022.

F15 **Marília Pires**, "Osteoporosis: Mathematical models for bone density evolution!?" em E-SEASON Meeting (Europe-South East Asia Science Oriented Network), Universidade de´Evora. Julho 15, 2022.

F16 **Marília Pires**, " Artificial Stress Diffusion in Numerical Simulations of Viscoelastic Fluids Flows" , Portugal-Italy Conference on Nonlinear Differential Equations and Applications, Universidade de´Evora, Julho 4 - 6, 2022. https://www.picndea22.uevora.pt/invited-speakers/

F17 **Marília Pires**, " "Numerical Simulations of Vanishing Diffusion Stabilization for Oldroyd-B fluid flows" , International Conference in Advances in Mechanics, Modeling,computing and Statistics, BITS Pilani, Pilani Campus, Pilani-333031, India, Março, 19 - 21, 2022. https://www.bits-pilani.ac.in/pilani/ICAMMCS/TentativeInvitedSpeakers

G. Projects and scientific contracts

FCT Projects

G1 PTDC/SAU-PUB/31346/2017 *Urban TB - From symptoms to diagnosis of Urban Tuberculosis, considering individual and contextual factors. What are the determinants and critical points of this delay's pathway?* 01/01/2018 - 30/09/2022. PI: Carla Nunes (National School of Public Health of the New University of Lisbon). **Dulce Gomes** (leader of the partnership with the University of Évora) and **Patrícia A. Filipe,** . Link: https://www.uevora.pt/investigar/projetos?id=3742

G2 MOPREVIS - Modelation and Prediction of road traffic accidents in the district of Setúbal. DSAIPA/DS/0090/2018. Participants: Universidade de Évora (leader) and Guarda Nacional Republicana (Comando Territorial de Setúbal). PI: **Infante. P.**, other members: **Afonso, A., Jacinto, G.** Financing: 299.986,25€ (280.480,00€ UÉ) - ends December 2022

G3 SNS24.Scout.AI - Application of Artificial Intelligence and Natural Language Processing Methodologies in the Screening, Counselling, and Referral Service of the SNS 24. DSAIPA/AI/0040/2019. Participants: Universidade de Évora (leader) and Serviços Partilhados do Ministério da Saúde, E.P.E. (SPMS). PI: Gonçalves, T., Other members: **Infante, P, Afonso, A,, Jacinto, G**. Financing: 239.320,50€ (167.792,50€} UÉ) - ends June 2022

G4 João Alves e Sousa MATHMET 18NET05

G5 João Alves e Sousa CLEAN ENERGY 20NET01

G6 PCIF/MOS/0217/2017, "MODFIRE, A multicriteria approach to integrate wildfire behavior in forest management planning", PI: Susete Marques, **V. Bushenkov**, responsible for the team at the University of Évora, **Alexandra Baptista**; Fundação para a Ciência e a Tecnologia (2019-2023). https://www.uevora.pt/investigar/projetos?id=4044

G7 **M. Pires**: Member of the funded project EXPL/EGE-IND/0351/2021, SDEFish: Sustainable Fisheries Management through Stochastic Differential Equations. Period of execution: January 1, 2022 - June 30, 2023. Project funding: 31,765 Euros.

G8 AdaptAlentejo – POCI-01-0145-FEDER-030793– Predicting ecosystem-level responses to climate change. PI: Miguel Matias, **C. Correia Ramos**, Rede de Investigação em Biodiversidade e Biologia Evolutiva. (2019-2022)

G9 JuPy | High Level Languages on HPC Fundação para a Ciência e Tecnologia, 4 months. **Nuno Franco**

International projects

G10 PDR2020-1.0.1-FEADER-031128 (PDR2020-101-031130), GoBov+, Productivity

improvement in the system of bovine raising for meat, 2017-21, extended to 2022, PI: Nuno Carolino (INIAV). Action E – Growth models. **Gonçalo Jacinto** (coordinator), **Patrícia A. Filipe** (consultant), **Carlos A. Braumann** (consultant http://www.bovmais.pt. Financing 477.650,00€ (68.967,32€ UÉ). Link: https://www.uevora.pt/investigar/projetos?id=36777

G11 FAPESP Processo 2021/08263-7, Termômetro social COVID-19: fatores associados à percepção de risco, aos padrões de comportamento e à adesão às medidas de proteção que influenciam no combate à pandemia no Brasil, 01/03/2022 - 29/02/2024, PI: Ricardo A. Arcêncio (Public Health Nursing, University of São Paulo at Ribeirão Preto College of Nursing, Brazil). No direct funding.

G12 Projeto Bolsa Produtividade CNPq - Processo 304483/2018-4 - Modalidade PQ - Nível 1C, Os determinantes da tuberculose multidroga-resistente no estado de São Paulo: um estudo misto, 01/03/2019 a 28/02/2023, PI: Ricardo A. Arcêncio. No direct funding.

G13 Universal CNPq/ MCTI/ FNDCT Edital N 18/2021 - Faixa B - (Processo 405902/2021-2), Impacto da COVID-19 na prevenção e controle da Tuberculose no Brasil: Análise das políticas de proteção social, da situação epidemiológica e de incorporação tecnológica, 16/03/2022 - 31/03/2025, PI: Ricardo A. Arcêncio. No direct funding.

G14 Projeto CAPES - Processo: 88887.657730/2021-00, Termômetro Social COVID-19: Análise da percepção de risco, dos padrões de comportamento da população, violência e adesão às medidas de proteção consideradas no combate à pandemia no Brasil, 01/03/2022 to 01/02/2026, PI: Ricardo A. Arcêncio. No direct funding.

G15 FAPESP, Custo e efetividade da estratégia de Sistema de Telecuidado de Pessoas Acometidas por Tuberculose (VDOT) em município do estado de São Paulo. 2022 to 2024, PI: Ione Carvalho Pinto. No direct funding.

G16 **J. Correia**: Preparation and participation at Project S2R (Soutien au Rayonnement de la Recherche) “Doctoral Network with South-East Asia”, 2022, LAMFA (Laboratoire Amiénois de Mathématique Fondamentale et Appliquée), UMR CNRS 7352, UPJV, Amiens, France.

G17 **J. Correia**: Preparation, participation and coordination of RIGs (Research-in-Groups) Project “Complex Singularities and Regularisations of Conservation Laws” (Univ. Évora, Portugal; Univ. Strathclyde, UK; Univ. Picardie Jules Verne, France; Univ. Stellenbosch, South Africa), ICMS (International Centre for Mathematical Sciences) Bayes Centre, March 28-April 03, 2022, Edinburgh, UK.

G18 **Júlia Justino,** 2021-1-PT01-KA220-HED-000032138, Training for Sustainable and Healthy Building for 2050 (BUILD2050), 2022-2024, Susana Lucas, Erasmus+.

G19 **Marco Garapa,** and **Maurício Reis**, Project PTDC/CCI-COM/30990/2017, "Revisão de Crenças aplicada a Terapias de Neurorehabilitação"/"Belief Revision applied to Neurorehabilitation Therapy". Execution Period: from 01-10-2018 to 30-09-2022. PI: Prof. Dr. Eduardo Fermé. Total Funding: 238.396,31€. ()

G20 **Marco Garapa,** and **Maurício Reis,** Project PTDC/CCI-COM/4464/2020, "Dinâmica de Perfis baseada em Conhecimento"/"Knowledge- Driven Profile Dynamics". Execution Period: from 29-03-2021 to 28-03-2024. PI: Prof. Dr. Eduardo Fermé. Total Funding: 154.922,26€.

Bilateral Projects

G21 PESCARDATA2 - Recolha de dados sobre a pesca recreativa em Portugal. Projeto financiado pela DGRM. Participantes: CCMAR/ Universidade do Algarve, 2020-2022., PI: Rangel,M. participant: **Jacinto, G**

Contracts with Industry

G22 ALT20-06-4740-FSE-001662 Alentejo 2020, **Nuno Franco**, Project "Virtual Reality in the Social Inclusion of the Elderly" with several IPSS (Social Solidarity Private Institution) and Santa Casa da Misericórdia (SCM) :

- 2022 Projetos inovadores/experimentais na área social C.M.C. Sousel Proj nº ALT20-06-4740-FSE-001662 Alentejo 2020, 9 meses
- 2022 Projetos inovadores/experimentais na área social: A.B. Pedrogão Proj nº ALT20-06-4740-FSE-001711 Alentejo 2020, 5 meses
- 2022 Projetos inovadores/experimentais na área social: S.C.M. Cuba Proj nº ALT20-06-4740-FSE-001745 Alentejo 2020, 7 meses
- 2022 Projetos inovadores/experimentais na área social: S. C. da M. de Azaruja Proj nº ALT20-06-4740-FSE-001739, Alentejo 2020, 5 meses
- 2022 Projetos inovadores/experimentais na área social: S.C.M. Montemor-o-Novo Proj nº ALT20-06-4740-FSE-001735, Alentejo 2020, 5 meses
- 2022 Projetos inovadores/experimentais na área social: S.C.M. Vidigueira Proj nº ALT20-06-4740-FSE-001750 Alentejo 2020, 5 meses
- 2022 Projetos inovadores/experimentais na área social: ABSA Selmes Proj nº ALT20-06-4740-FSE-001748 Alentejo 2020, 5 meses
- 2022 Projetos inovadores/experimentais na área social: S. C. M. Portel Proj nº ALT20-06-4740-FSE-001740 Alentejo 2020, 5 meses
- 2022 Projetos inovadores/experimentais na área social: C.S.P. Azambuja Proj nº ALT20-06-4740-FSE-001726 Alentejo 2020, 5 meses

H. Joint Seminar CIMA/DMAT/PDM

H1 *Sandra Ferreira, Review of certain results on cumulants and higher order probability distribution cumulants, Center of Mathematics and Applications, University of Beira Interior, Covilhã, 16/02/2022 – 15h,*

https://www.cima.uevora.pt/index.php?view=article&id=73:joao-fialho-british-university-of-vietnam-cima&catid=38:seminars

H2 *António Araújo, Euclides Taylor, e a perspectiva esférica enquanto objecto matemático, Universidade Aberta, 23/02/2022 – 15h,*

https://www.dmat.uevora.pt/informacoes/seminarios/Euclides-Taylor-e-a-perspectiva-esferica-enquanto-objecto-matematico

H3 *Lucía Fernández Suárez, Categoria de Lusternik-Schinrelmann e Grupos de Lie, Departamento de Matemática, Instituto Superior de Engenharia de Lisboa, 09/03/2022 – 15h*
https://www.dmat.uevora.pt/informacoes/seminarios/Categoria-de-Lusternik-Schinrelmann-e-Grupos-de-Lie

H4 **Nuno Franco**, *Classificação de uma família de nós de Lorenz redutíveis, Departamento de Matemática, CIMA, Escola de Ciências e Tecnologia, Universidade de Évora, 16/03/2022 – 15h*

https://www.dmat.uevora.pt/informacoes/seminarios/Classificacao-de-uma-familia-de-nos-de-Lorenz-redutiveis

H5 **Nelson Tchingui Jamba**, *A Delta approximation method on estimation for SDE mixed models, CIMA, IIFA, Universidade de Évora, Évora, Portugal; Liceu nº 918 do município dos Gambos, Chiange, Gambos, Angola, 23/03/2022 – 15h*

https://www.dmat.uevora.pt/informacoes/seminarios/A-Delta-approximation-method-on-estimation-for-SDE-mixed-models

H6 **Manuel Branco**, *Almost-positioned numerical semigroups, Departamento de Matemática, CIMA, Universidade de Évora, 30/03/2022 – 15h ,*

https://www.dmat.uevora.pt/informacoes/seminarios/ALMOST-POSITIONED-NUMERICAL-SEMIGROUPS

H7 *Paula Patrício, Mathematics driven by epidemics, Centro de Matemática e Aplicações & Departamento de Matemática, Nova School of Science and Technology, Universidade Nova, 06/04/2022 – 15h.*

https://www.dmat.uevora.pt/informacoes/seminarios/Mathematics-driven-by-epidemics

H8 **José Luís da Silva**, *Fractional Poisson Analysis in one Dimension, CIMA, Universidade da Madeira, Campus Universitário da Penteada, 9020-105 Funchal, Portugal, 20/04/2022 – 15h,*

https://www.dmat.uevora.pt/informacoes/seminarios/Fractional-Poisson-Analysis-in-one-Dimension

H9 **Carlos Correia Ramos**, *Kinematics: classification methods and combinatorial invariants for complex motion in biology, CIMA, DMAT, ECT, Universidade de Évora, 04/05/2022, 15h (presencial), https://www.dmat.uevora.pt/informacoes/seminarios/Kinematics-classification-methods-and-combinatorial-invariants-for-complex-motion-in-biology*

H10 **Luís Bandeira**, *A brief survey of the vector case of the Calculus of Variation, Departamento de Matemática, CIMA, Escola de Ciências e Tecnologia, Universidade de Évora, 11/05/2022 – 15h ,*

https://www.cima.uevora.pt/index.php?view=article&id=77:a-brief-survey-of-the-vector-case-of-the-calculus-of-variation&catid=38

H11 *Jack Xin, DeepParticle: deep-learning invariant measure by minimizing Wasserstein distance on data generated from an interacting particle, Department of Mathematics, University of California, Irvine, CA 92697, USA, 19/05/2022 – 15h*

https://www.dmat.uevora.pt/informacoes/seminarios/DeepParticle-deep-learning-invariant-measure-by-minimizing-Wasserstein-distance-on-data-generated-from-an-interacting-particle

H12 **R. Sousa**, The finite elements method and Freefem software, Faculdade de Ciências e Tecnologia, Núcleo de Matemática e Aplicações (NUMAT) e Centro de Investigação em Matemática e Aplicações (CIMA), September 21, 2022 Portugal. https://educast.fccn.pt/vod/clips/1qwe7s5zmt/link_box_h?locale=en

H13 **Jacinto, G**. Abordagem : Multidisciplinary approach for a real problem: modeling road traffic accidents, Departamento de Matemática, Escola de Ciências e Tecnologia, Universidade de Évora, Centro de Investigação em Matemática e Aplicações, Instituto de Investigação e Formação Avançada, Universidade de Évora, 29 de setembro, Universidade de Évora, Évora.

https://www.dmat.uevora.pt/informacoes/seminarios/Multidisciplinary-approach-for-a-real-problem-modeling-road-traffic-accidents

H14 **C. Braumann** Stochastic differential equations models of animal growth and profit optimization in cattle raising. Departamento de Matemática, Escola de Ciências e Tecnologia, Universidade de Évora, Centro de Investigação em Matemática e Aplicações, Instituto de Investigação e Formação Avançada, Universidade de Évora, 12 October 2022,

https://www.dmat.uevora.pt/informacoes/seminarios/Stochastic-differential-equations-models-of-animal-growth-and-profit-optimization-in-cattle-raising

H15 **F. Minhós**, "Existence, non-existence and multiplicity results for some third-order periodic problems". Departamento de Matemática, Escola de Ciências e Tecnologia, Universidade de Évora, Centro de Investigação em Matemática e Aplicações, Instituto de Investigação e Formação Avançada, Universidade de Évora 16/11/2022 University of Évora, https://www.cima.uevora.pt/index.php?view=article&id=172:existence-non-existence-and-multiplicity-results-for-some-third-order-periodic-problems&catid=38

H16 **Rodrigues, José A.** Isogeometric Analysis: mathematical and implementational aspects, with applications, Departamento de Matemática, Instituto Superior de Engenharia de Lisboa, Instituto Politécnico de Lisboa, Centro de Investigação em Matemática e Aplicações, Instituto de Investigação e Formação Avançada, Universidade de Évora, 23 de novembro de 2022, https://www.dmat.uevora.pt/informacoes/seminarios/Isogeometric-Analysis-mathematical-and-implementational-aspects-with-applications

H17 **Bruno Dinis,** Convergence: what's logic got to do with it? , University of Évora, Department of Mathematics, and CIMA, and CMAFcIO, Portugal, 02/11/2022, https://www.cima.uevora.pt/attachments/article/169/Seminario_BrunoDinis.pdf .

H18 Filipe Ribeiro, Old-age mortality deceleration and the modal age at death: insights from dynamic laws of adult mortality, Laboratory of Demography, CIDEHUS.UE, University of Évora, LifeSpan Chair, University of Évora, 19/10/2022, https://www.dmat.uevora.pt/informacoes/seminarios/Old-age-mortality-deceleration-and-the-modal-age-at-death-insights-from-dynamic-laws-of-adult-mortality

H19 Regina Bispo, The Mathematics of Fires, Departamento de Matemática, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, 26/10/2022, https://www.dmat.uevora.pt/informacoes/seminarios/The-Mathematics-of-Fires

H20 **Russell Alpizar-Jara**, Sampling elusive populations methods and applications , Departamento de Matemática, Escola de Ciências e Tecnologia, Centro de Investigação em Matemática e Aplicações, Instituto de Investigação e Formação Avançada, Universidade de Évora, 16/11/2022 https://www.dmat.uevora.pt/informacoes/seminarios/Sampling-elusive-populations-methods-and-applications

H21 **Sara Dimas Fernandes** , Iterated Systems, Networks and Applications, Departamento de Matemática, Escola de Ciências e Tecnologia, Universidade de Évora, Centro de Investigação em Matemática e Aplicações, Instituto de Investigação e Formação Avançada, Universidade de Évora, 30/11/2022,

https://www.dmat.uevora.pt/informacoes/seminarios/Iterated-Systems-Networks-and-Applications

Summary of CIMA 2022 indicators

A.1. Books	Books	**5**
	Chapters	**14**
A.2. Papers	Internationals	**67**
	Nationals	**3**
A.3. Proceedings	Internationals	**7**
	Nationals	**0**
A.4. Special Issues Edited		**1**
Total Publications		**97**
B. Comunications	Internationals	**55**
	Nationals	**23**
Total Comunications		**78**
C. Reports		**3**
D. Organization of events	Internationals	**27**
	Nationals	**11**
E. Advanced Training	PhDs	**31**
	Masters	**22**
	Others	**22**
F. Invited Seminars		**17**
G. Projects		**22**
H. Joint Seminar CIMA/DMAT/PDM		**21**