Curriculum Vitae

of

Rui Manuel Agostinho Dilão

Résumé of Rui Dilão

Rui Dilão is Professor of Mathematical Physics and Dynamical Systems at Instituto Superior Técnico of the Technical University of Lisbon. In 1986, he obtained the PhD in Physics (Mathematical Physics) from the Technical University of Lisbon and, in 1997, the Habilitation from the same university. In the period 1986-1988 he has been fellow at CERN, where he collaborated in the planning of the Large Hadron Collider. He has been collaborator of the scientific program associated with the Portuguese satellite PoSAT-1 (1992-93). In 1999, together with two colleagues, he received the LabMed prize for original research work on laboratorial research medicine. He is author of more than 70 research publications, distributed among dynamical systems theory, chaos theory, celestial mechanics, ecological and economic modelling, mathematical biology, biophysics, morphogenesis and nonlinear reaction-diffusion equations. He has presented more than 100 research lectures or communications in the academia and research meetings. He has supervised 4 PhD thesis, more than 50 students at the master level, and has served as advisor of 4 postdoc researchers. He coordinated and participated in 18 research projects. He wrote a book on dynamical systems, co-authored a book on dynamical system techniques for the design of particle accelerators. He wrote two books and several monographs for undergraduate teaching, and a two-booklet set with a kit for the awareness of the concepts of latitude and longitude, at the middle school level. On a regular basis, he serves as referee for several academic journals, served as member of the steering committees of two research programs of the European Science Foundation and participates as expert in the evaluation of the Marie Sklodowska-Curie Individual Fellowships. He participated as principal investigator in one of the work packages of the project GENNETEC (2006-2009) supported by the European Commission. He organized several research meetings in Portugal and abroad and has edited several proceedings monographs. He is member of several professional societies.

Name: Rui Manuel Agostinho Dilão

Date of Birth: 13 July, 1955, Lisbon, Portugal

Profession: Mathematical Physicist, Theoretical Physicist
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Education:

1997	Habilitation in Physics, Instituto Superior Técnico, Technical University of Lisbon.
1986	PhD in Physics, Instituto Superior Técnico, Technical University of Lisbon.
1984	Master in Physics (scientific and pedagogic), Instituto Superior Técnico, Technical University of Lisbon.
1980	"Licenciatura" in Physics (5 years of University Studies), Faculty of Sciences, Classical University of Lisbon.

Professional History:

2023	Evaluation of Reasearch Projects: BrainMap call PCE-2021, Romanian Ministry of Education and Research, C9. Support for the private sector, research, development and innovation, February, 2023.
2021-2022	European Comission Expert, call H2020-MSCA-2021-PF-01, 5 November - 31 January, 2022.
2021-2022	Evaluation of projects for Paris Region Fellowship Programme, December -March, 2022.
2021	Evaluation of projects for Domaines de Recherche et d'Innovation Majeurs (DRIM) 2022-2026, December 2021.
2021-2022	Evaluation of Reasearch Projects: BrainMap call PCE-2021, Romanian Ministry of Education and Research, Postdoctoral and Exploratory Research projects, September-March, 2022.

2021	Evaluation of projects for ANR-generic call for proposals 2021, panel CE490-Mathématiques, May 2021.
2020-2021	Service de la Recherche et Culture Scientifique (Region Île de France), Evaluation of projects, Dec. 2020-Feb. 2021.
2020	European Comission Expert, call H2020-MSCA-IF-2020, 2 October - 4 December, 2020.
2020	Evaluation of Reasearch Projects : BrainMap call PCE-2020, Romanian Ministry of Education and Reserch, October, 2020.
2020-2024	Member of the Scientific Advisory Board of Labex SIGNALIFE, Université Nice Sophia Antipolis.
2019	European Comission Expert, call H2020-MSCA-IF-2019,1 October - 5 December, 2019.
2019	Visitor of the Institut des Hautes Études Scientifiques, Bures-sur-Yvette, Paris, March-May.
2018	European Comission Expert, call H2020-MSCA-IF-2018, 5 October- 2 December, 2018.
2015	Visitor of the Institut des Hautes Études Scientifiques, Bures-sur-Yvette, Paris, December.
2014	Member of the Scientifique International board of the Workshop sur les Mathématiques pour les Sciences de la Vie, Sidi Bel Abbès, Algeria, 14^{th}-16^{th} September.
2013	Visitor of the Institut des Hautes Études Scientifiques, Bures-sur-Yvette, Paris, January-July.
2011	Lecturer of the "Workshop Science and Technology", Portuguese Parliament, 21 November 2011, Course for the development of expertise for senior administrators of the Portuguese Parliament.
2011	Organizer and member of the Scientific Committee of the Workshop "Basic Experimental Techniques in Biological Dynamics", 5-9 September 2011, ITQB-ESF, Oeiras, Portugal.
2010	Organized with Felix Ritort the session of Biological Physics of the IV Spanish-Portuguese Biophysical Congress, 7-10 July, 2010, Zaragoza, Spain.
2009	Member of the Organizing Committee of the conference "From Biological Networks to Cellular Function: Evolution, Dynamics and Spatial Organization", 8-12 June 2009, ICTP, Trieste, Italy.
2009-2010	Member of the European Science Foundation Pool of Reviewers.
2009	Organizer of the Third European Science Foundation Conference on Functional Dynamics, 2-5 March 2009, Cascais, Portugal.
2009	Visitor of the Biophysics Group of the Otto-von-Guericke University, Magdeburg, Germany.
2008	Member of the Scientific Committee of the GENNETEC International Conference, Gene Regulatory Networks: Dynamics, Spatial Organization and Inference, Institute for Scientific Interchange Foundation, Torino, Italy.

2006-2011	Member of the Steering Committee of the Project "FUNCDYN, Functional dynamics in Complex Chemical and Biological Systems", European Science Foundation.
2006-2009	Member of the Steering Committee of the Project "GENetic NETworks: Emergence and Complexity (GENNETEC)", The sixth framework programme, European Commission.
2006	Member of the Editorial board of BIOMAT 2006, International Symposium on Mathematical and Computational Biology.
2005	Member of the Editorial board of the 5th Brazilian Symposium on Mathematical and Computational Biology and 2nd International Symposium on Mathematical and Computational Biology.
2004	Member of the Editorial board of the 4th Brazilian Symposium on Mathematical and Computational Biology and 1st International Symposium on Mathematical and Computational Biology.
2004	Visitor of the Institut des Hautes Études Scientifiques, Bures-sur-Yvette, Paris, May.
2003	Visitor of the Institut des Hautes Études Scientifiques, Bures-sur-Yvette, Paris, March-May.
2000	Invited Professor of the Center for Complex and Nonlinear Sciences, Technical University of Budapest, September.
2000	Invited Professor of the Fritz Haber Institut der Max Planck Gesellchaft, July.
2000-2004	Member of the Steering Committee of the Project "REACTOR, Nonlinear Chemistry in Complex Reactors: Models and Experiments", European Science Foundation.
1997	Founded the Non-Linear Dynamics Group of the Instituto Superior Superior Técnico.
1997-	Auxiliary Professor with Habilitation at the Department of Physics of the Instituto Superior Técnico.
1992-1993	Collaborator of the scientific program associated with the Portuguese satellite PoSAT-1.
1987-1988	Senior Fellow at CERN.
1986-1987	Fellow at CERN.
1986-1997	Auxiliary Professor at the Department of Physics of the Instituto Superior Técnico.
1985-	Reviewer of Mathematical Reviews.
1984-1986	Assistant Professor at the Department of Physics of the Instituto Superior Técnico.
1981-1984	Stagier Assistant Professor at the Department of Physics of the Instituto Superior Técnico.

Prizes:

1999	Prize LabMed 1999, Isabel Alcobia, **Rui Dilão** and Leonor Parreira. Original research work in laboratorial medicine. http://www.labmed.pt/premiolab\-med/venc-p99.htm.

Research

Research Experience:

The main research experience is on Dynamical Systems, Mathematical Physics, Mathematical Biology and Theoretical Physics. He has also experience on general computational techniques, and on mathematical techniques in finance and economics.

Academic Monographs:

1. **R. Dilão**, "Ergodic Properties of Dynamical Systems" (in Portuguese). Graduation thesis monograph, Faculty of Sciences of the Classical University of Lisbon, 1980.

2. **R. Dilão**, "Maps of an Interval: Symbolic Dynamics and Topological Entropy" (in Portuguese). MA Thesis (scientific), Instituto Superior Técnico, Technical University of Lisbon, 1984.

3. **R. Dilão**, "Parametric Resonance in the pendulum" (in Portuguese). MA Thesis (pedagogic), Instituto Superior Técnico, Technical University of Lisbon, 1984.

4. **R. Dilão**, "Maps of an Interval: Symbolic Dynamics, Topological Entropy and Periodic Behaviour" (in Portuguese). PhD Thesis, Instituto Superior Técnico, Technical University of Lisbon, 1985.

5. **R. Dilão**, "Dynamical Systems Techniques for the Design of Particle Accelerators" (in Portuguese). Habilitation Thesis (scientific), Instituto Superior Técnico, Technical University of Lisbon, 1997.

6. **R. Dilão**, "The Curriculum of Mathematical Techniques of Physics in the Physical Engineering Course of Instituto Superior Técnico" (in Portuguese). Habilitation Thesis (pedagogical), Instituto Superior Técnico, Technical University of Lisbon, 1997.

7. **R. Dilão**, "The Curriculum of Mathematical Techniques of Physics" (in Portuguese). Report for a position of Associated Professor, Instituto Superior Técnico, Technical University of Lisbon, 2004.

Publications (Journal Articles, Peer Reviewed):

1. J. Dias de Deus, **R. Dilão** and J. Taborda Duarte, Topological Entropy and Approaches to Chaos in Dynamics of the Interval, *Physics Letters A*, **90** (1982) 1-4.

2. J. Dias de Deus, **R. Dilão** and J. Taborda Duarte, Topological Entropy, Characteristic Exponents and Scaling Behaviour in Dynamics of the Interval, *Physics Letters A*, **93** (1982) 1-3.

3. J. Cascais, **R. Dilão** and A. Noronha da Costa, Chaos and Reverse Bifurcations in a RCL circuit, *Physics Letters A*, **93** (1983) 213-216, DOI: 10.1016/0375-9601(83)90799-5.

4. J. Dias de Deus, **R. Dilão** and A. Noronha da Costa, Intermittency and Sequences of Periodic Regions in One Dimensional Maps of the Interval, *Physics Letters A*, **101** (1984) 459-463.

5. R. Cordovil, **R. Dilão** and A. Noronha da Costa, Periodic Orbits for Additive Cellular Automata, *Discrete and Computational Geometry*, **1** (1986) 277-288.

6. J. Dias de Deus, **R. Dilão** and A. Noronha da Costa, Scaling Behaviour of Windows and Intermittency in One-Dimensional Maps, *Physics Letters A*, **124** (1987) 433-436.

7. **R. Dilão**, Periodic Points and Entropies for Cellular Automata, *Complex Systems*, **3** (1989) 117-128.

8. J. Dias de Deus, **R. Dilão** and A. Noronha da Costa, Phenomenology of Periodic Windows in One-Dimensional Maps, *Europhysics Letters*, **9** (1989) 303-308.

9. R. Alves Pires and **R. Dilão**, Elimination of Transverse Beam Instabilities in Accumulation Rings by Application of an External Periodic Force, *Physical Review A*, **45** (1992) 2567-2571.

10. **R. Dilão**, Nonlinear Phenomena in Circular Accelerators I: Sextupolar Nonlinearities, *International Journal of Bifurcation and Chaos*, **3** (1993) 1083-1102.

11. R. Alves Pires and **R. Dilão**, Nonlinear Phenomena in Circular Accelerators II: Beam-Beam Interaction, *International Journal of Bifurcation and Chaos*, **3** (1993) 1411-1422.

12. C. Underwood, D. Brock, P. Williams, S. Kim, **R. Dilão**, P. Ribeiro Santos, M. Brito, C. Dyer and A. Sims, Radiation Environment Measurements with the Cosmic Ray Experiments On-Board the KITSAT-1 and PoSAT-1 Micro-Satellites, *IEEE Transactions on Nuclear Sciences*, **41** (1994) 2353-2360.

13. **R. Dilão** and R. Schiappa, Stable Knotted Strings, *Physics Letters B*, **404** (1997) 57-65, DOI: 10.1103/PhysRevLett.80.5216.

14. **R. Dilão** and J. Sainhas, Validation and Calibration of Models for Reaction-Diffusion Systems, *International Journal of Bifurcation and Chaos*, **8**, n. 6 (1998) 1163-1182.

15. R. Alves Pires and **R. Dilão**, The Design of Synchrotron Accelerators, *Mathematica in Education and Research*, **7** (1998) 6-11.

16. J. Sainhas and **R. Dilão**, Wave Optics in Reaction-Diffusion Systems, *Physical Review Letters*, **80** (1998) 5216-5219.

17. R. Schiappa and **R. Dilão**, The Dynamics of Knotted Strings Attached to D-Branes, *Physics Letters B*, **427** (1998) 26-32.

18. I. Alcobia, **R. Dilão** and L. Parreira, Spatial Association of Centromeres in the Nuclei of Hematopoietic Cells: Evidence for cell-type-specific organizational patterns, *Blood*, 95 (2000) 1608-1615. Erratum: *Blood*, **96** (2000) 987.

19. **R. Dilão** and T. Domingos, A General Approach to the Modelling of Trophic Chains, *Ecological Modelling*, **132**, n. 3 (2000) 191-202.

20. **R. Dilão** and T. Domingos, Periodic and Quasi-Periodic Behavior in Resource Dependent Age Structured Population Models, *Bulletin of Mathematical Biology*, **63** (2001) 207-230.

21. **R. Dilão** and A. Volford, Excitability in a Model with a Saddle-Node Homoclinic Bifurcation, *Discrete and Continuous Dynamical Systems - series B*, **4** (2004) 419-434.

22. **R. Dilão**, T. Domingos and E. Shahverdiev, Harvesting in a resource dependent age structured Leslie type population model, *Mathematical Biosciences*, **189** (2004) 141-151.

23. **R. Dilão** and J. Sainhas, Modelling butterfly wing eyespot patterns, *Proceedings of the Royal Society of London: Biological Sciences*, **271 B** issue 1548 (2004) 1565-1569.

24. **R. Dilão**, Turing Instabilities and Patterns Near a Hopf Bifurcation, *Applied Mathematics and Computation*, **164** issue 2 (2005) 391-414.

25. F. Alves and **R. Dilão**, A simple framework to describe the regulation of gene expression in prokaryotes, *Comptes Rendus - Biologies*, **328** (2005) 429-444.

26. F. Alves and **R. Dilão**, Modeling segmental patterning in Drosophila: maternal and gap genes, *Journal of Theoretical Biology,* **241** (2006) 342-359.

27. **R. Dilão** and A. Lakmeche, On the weak solutions of the McKendrick equation: Existence of demography cycles, *Mathematical Modelling of Natural Phenomena*, **1** (2006) 1-32.

28. **R. Dilão**, Anti-phase and in-phase synchronization of nonlinear oscillators: The Huygens's clocks system, *Chaos*, **19** (2009) 023118, DOI: 10.1063/1.3139117.

29. **R. Dilão** and J. Graciano, Evaluating deterministic policies in two-player iterated games, *International Journal of Bifurcation and Chaos*, **19,** nº12 (2009) 4039-4053.

30. J. Amaro de Matos, **R. Dilão** and B. Ferreira, The Exact Value of European Options on a Stock Paying a Discrete Dividend, *Journal of Modelling in Management*, **4**, nº3 (2009) 235-248.

31. P. Brito and **R. Dilão**, Equilibrium price dynamics in an overlapping-generations exchange economy, *Journal of Mathematical Economics*, **46** (2010), 343-355.

32. **R. Dilão** and D. Muraro, mRNA diffusion explains protein gradients in *Drosophila* early development, *Journal of Theoretical Biology, 264* (2010) 847-853, DOI:10.1016/j.jtbi.2010.03.012.

33. **R. Dilão** and D. Muraro, A software tool to model genetic regulatory networks. Applications to the modeling of threshold phenomena and of spatial patterning in Drosophila, *PLoS ONE*, **5** (5) (2010) 1-10 (e10743).

34. **R. Dilão** and D. Muraro, Calibration and validation of a genetic regulatory network model describing the production of the protein Hunchback in Drosophila early development, *Comptes Rendus – Biologies,* 333 (2010) 779-788, DOI:10.1016/j.crvi.2010.09.003.

35. **R. Dilão** and J. Amigó, Computing the topological entropy of unimodal maps, *International Journal of Bifurcation and Chaos*, **22**(6) (2012) 1-14 (125052).

36. J. Amigó, **R. Dilão** and A. Giménez, Computing the topological entropy of multimodal maps via min-max sequences, *Entropy,* **14(4)** (2012) 742-768, DOI:10.3390/e14040742.

37. D. Muraro and **R. Dilão**, A parallel multi-objective optimization algorithm for the calibration of mathematical models, *Swarm and Evolutionary Computation*, **8** (2013) 13-25, DOI:10.1016/j.swevo.2012.07.004.

38. **R. Dilão** and M. Hauser, Chemotaxis and directional sensing during *Dictyostelium* aggregation, *Comptes Rendus - Biologies*, **336** (2013) 565-571, DOI: 10.1016/j.crvi.2013.10.008.

39. **R**. **Dilão**, The regulation of gene expression in eukaryotes: bistability and oscillations in repressilator models, *Journal of Theoretical Biology,* **340** (2014) 199-208, DOI: 10.1016/j.jtbi.2013.09.010.

40. **R**. **Dilão**, Anti-phase synchronisation and ergodicity in arrays of oscillators coupled by an elastic force, *European Physical Journal Special Topics*, **223** (2014) 665-676, DOI: 10.1140/epjst/e2014-02132-0.

41. **R**. **Dilão**, Bicoid mRNA diffusion as a mechanism of morphogenesis in Drosophila early development, *Comptes Rendus - Biologies*, **337** (2014) 679-682, DOI: 10.1016/j.crvi.2014.09.004.

42. **R**. **Dilão**, Chemotherapy in heterogeneous cultures of cancer cells with interconversion, *Physical Biology*, **12** (2015) 016002, DOI: 10.1088/1478-3975/12/1/016002.

43. **R**. **Dilão** and J. Fonseca, Dynamic guidance of gliders in planetary atmospheres, *Journal of Aerospace Engineering*, 29(1) (2016) 04015012, DOI:10.1061/(ASCE)AS.1943-5525.0000499.

44. S. Almeida and **R. Dilão**, Directional sensing and streaming in *Dictyostelium* aggregation, *Physical Review E,* 93(5) (2016) 052402, DOI:10.1103/PhysRevE.93.052402.

45. G. Cano and **R. Dilão**, Intermittency in the Hodgkin-Huxley model, *Journal of Computational Neuroscience*, 43 (2017) 115-125, DOI: 10.1007/s10827-017-0653-9, 2017.

46. E. Rognoni, A. O. Pisco, T. Hiratsuka, K. Sipilä, J. Belmonte, S. A. Mobasseri, **R. Dilão** and F. M. Watt, Fibroblast state switching orchestrates dermal maturation and wound healing, *Molecular Systems Biology*, 14 (2018) e8174, DOI: 10.15252/msb.20178174.

47. J. Fonseca and **R**. **Dilão**, Dynamic guidance of orbiter gliders: Alignment, final approach and landing, CEAS Space Journal, 11(2) (2019) 123-145, DOI:10.1007/s12567-018-0219-3.

48. **R. Dilão** and B. Mota, The transcriptional regulation of PER protein in Drosophila, *Journal of Theoretical Biology,* 469 (2019) 12-17, DOI:10.1016/j.jtbi.2019.02.022.

49. **R. Dilão** and M. Murteira, Principal periodic orbits of the Keplerian dumbbell system, SIAM Journal on Applied Dynamical Systems, 19(1) (2020) 181-207, DOI:10.1137/19M1260955.

50. R. Almeida and **R. Dilão**, Adaptive Hagen-Poiseuille flows on graphs, Physica D, 436 (2022) 133322, DOI: 10.1016/j.physd.2022.133322.

51. **R. Dilão**, M. Fernandes and M. Sá, Satellite transfers between Keplerian orbits, Celestial Mechanics and Dynamical Astronomy, 134-45 (2022), DOI: 10.1007/s10569-022-10102-7.

Publications (Chapters in books, Peer Reviewed):

52. J. Dias de Deus, **R. Dilão** and J. Taborda Duarte, Topological Entropy and Scaling Behaviour. *In* L. Garrido (ed), "*Dynamical Systems and Chaos*", *Lecture Notes in Physics*, **179** (1983) 225-226.

53. R. Alves Pires and **R. Dilão**, Dynamical Systems Methods in Accelerator Physics: The Dynamic Aperture Problem. In R. Lima, L. Streit and R. Vilela Mendes (eds.), "*Dynamics and Stochastic Processes Theory and Applications*", *Lecture Notes in Physics*, **355** (1990) 251-259.

54. J. Toste-Rêgo and **R. Dilão**, A fast parallel computing machine for real time decision making: Applications to real time processing, war games, forest fire and fluid dynamics models, *Advisory Group for Aerospace Research & Development (AGARD) Conference 557, Tactical Aerospace C^3I in Coming Years*, AGARD-CP-557 (1995) 29.1-29.6. North Atlantic Treaty Organization (NATO), Paris, 1995.

55. R. Alves-Pires, **R. Dilão**, H. Neves, L. Parreira and J. Sainhas, Anisotropy-free Laplacian filters, contour detection, and 3D image reconstruction for confocal microscopy imaging, In F. Muge, M. Piedade and J. C. Pinto (ed.), "*Proceedings of the RecPad98, 10th Portuguese Conference on Pattern Recognition"*, CVRM/IST, pp. 247-251, 1998, ISBN: 972-97711-0-3.

56. **R. Dilão** and A. Lakmeche**,** Diffusion in McKendrick-von Foerster equation. In, *Proceedings of Dynamic Systems & Applications IV*, 2004, pp. 647-653, Dynamic Publishers, Atlanta, USA.

57. **R. Dilão**, The reaction-diffusion approach to morphogenesis. *In* R. Mondaini (ed.), "*Proceedings of the Fourth Brazilian Symposium on Mathematical and Computational Biology, and First International Symposium on Mathematical and Computational Biology"*, vol.1, pp. 325-364, ISBN: 85-7650-026-4, e-papers serviços editoriais, Rio de Janeiro, 2005.

58. **R. Dilão**, Mathematical Models in Population Dynamics and Ecology. *In* J. C. Misra (ed.), "*Biomathematics: Modelling and Simulation*", chapter 15, pages 399-449, World Scientific, 2006, ISBN: 981-238-110-4.

59. F. Alves and **R. Dilão,** A software tool to model genetic regulatory networks: applications to segmental patterning in Drosophila. *In* R. P. Mondaini and R. Dilão (eds.), *"BIOMAT 2005, Proceedings of the International Symposium on Mathematical and Computational Biology"*, pp. 71-88, ISBN: 981-256-797-6, World Scientific, 2006.

60. **R. Dilão**, Emergence of a collective steady state and symmetry breaking in systems of two identical cells. *In* R. P. Mondaini and R. Dilão (eds.), *"BIOMAT 2006, International Symposium on Mathematical and Computational Biology"*, pp. 25-36, ISBN: 981-270-768-9, World Scientific, 2007.

61. **R. Dilão** and Rui Alves-Pires, Chaos in the Störmer problem. *In* V. Staicu (ed.), "*Differential Equations, Chaos and Variational Problems*", *Progress in Nonlinear Differential Equations and Their Applications*, vol. 75, chapter 14, pp. 175-194, ISBN: 978-3-7643-8481-4, Birkhäuser, 2008.

62. **R. Dilão**, D. Muraro, M. Nicolau and M. Schoenauer, Validation of a morphogenesis model of *Drosophila* early development by a multi-objective evolutionary optimization algorithm. *In* C. Pizzuti, M.D. Ritchie, and M. Giacobini (eds.), "*Evolutionary Computation, Machine learning and Data Mining in Bioinformatics*", *Lecture Notes in Computer Science* Vol. 5483, pp. 176–190, 2009. **Best Paper Nomination EvoBIO2009.**

63. **R. Dilão**, On the problem of synchronization of identical dynamical systems: The Huygen's clocks. *In* A. Frediani and G. Butazzo (Eds.), "*Variational Methods in Aerospace Engineering*", *Springer Optimization and its Applications*, Vol. 33, Cap. 10, pp. 163-181, Springer-Verlag, ISBN: 978-0-387-95856-9, 2009.

64. **R. Dilão**, From the glycolytic oscillations to the control of the cell cycle: a minimal biological oscillator. *In* P. Amar, F. Képès and V. Norris (Eds*.), "Modelling Complex Biological Systems in the Context of Genomics"*, EDP Sciences, Vol. 10, pp. 127-142, ISBN: 978-2-7598-0644-7, 2011.

65. J. Amigó, **R. Dilão** and A. Giménez, An algorithm for the computation of the topological entropy of multimodal maps, *In* Proceedings of the "2012 IFAC Conference on Analysis and Control of Chaotic Systems", pp. 25-29, International Federation of Automatic Control, Cancún, México, 2012.

66. **R. Dilão** and J. Fonseca, Dynamic trajectory control of gliders, *In* Advances in Aerospace Guidance, Navigation and Control, Selected papers of the 2nd CEAS Specialist Conference on Guidance, Navigation & Control, Q. Chu, B. Mulder, D. Choukroun, E. van Kampen, C. Visser and G. Looye (Ed.), pp. 373-386, ISBN: 978-3-642-38253-6, Springer, 2013.

67. S. Almeida and **R. Dilão**, Modelling *Dictyostelium discoideum* aggregation through a discrete excitability model with directional sensing. *In* P. Amar, F. Képès and V. Norris (Eds*.), "Advances in Systems and Synthetic Biology"*, pp. 125-137, 2015.

68. **R. Dilão**, Mathematical models of morphogenesis, Proceedings of the Workshop on Mathematics for Life Sciences 2014, ITM Web of

Conferences **4**, 01001 (2015) DOI: 10.1051/itmconf/20150401001, EDP Sciences.

69. B. Mota, J. G. Freire, M. Oliveira, S. A. Nunes, **R. Dilão**, C. C. DaCamara, Using cellular automata to assess the role played by wind direction in two large fire episodes in Portugal, in D. X. Viegas & L.M. Ribeiro (Ed.), Advances in Forest Fire Research 2022, Chapter 1 - Decision Support Systems and Tools, 431-435 (2022), DOI:10.14195/978-989-26-2298-969.

Publications (National Journal Articles, Peer Reviewed):

70. **R. Dilão**, From Charles Darwin to evolutionary genetic algorithms, Memórias da Academia das Ciências de Lisboa, Classe de Ciências, 2009.

Other Scientific Publications (internal reports and pre-prints):

71. **R. Dilão**, J. M. Ferreira and J. Taborda Duarte, On the Existence of Invariant Cones, *CFMC*, E6/83 (1983).

72. J. Dias de Deus, **R. Dilão** and J. Taborda Duarte, On the Construction of Graphs of the Iterates of One Dimensional Maps on the Interval, *CFMC*, E3/84 (1984). With several citations.

73. J. Dias de Deus, **R. Dilão** and A. Noronha da Costa, Binary Numbers and One Dimensional Deterministic Dynamical Systems, *CFMC*, E13/84 (1984).

74. **R. Dilão** and F. Schmidt, Reconstruction of Phase Space from Time Series in Accelerator Beam Dynamics, *CERN Report*, SPS/88-48 (AMS) (1988).

75. **R. Dilão**, An electrophysiology model for cells and tissues, IHES preprint P-19-09, 2019.

76. G. Cano and **R. Dilão**, Action potential solitons and waves in axons, IHES preprint P-19-10, 2019. DOI: 10.48550/arXiv.2207.05491

77. **R. Dilão** and N. Teixeira, A soluble walking model for a two-legged robot, preprint 2022. DOI: 10.48550/arXiv.2207.05774, SSRN: https://ssrn.com/abstract=4251027 or http://dx.doi.org/10.2139/ssrn.4251027

Scientific Books:

1. **R. Dilão** and R. Alves Pires, "Nonlinear Dynamics in Particle Accelerators", World Scientific Series in Nonlinear Science, Series A, World Scientific Publishing, ISBN: 981-02-2517-2, 1996.

2. **R. Dilão,** Dynamical Systems and Chaos. An Introduction with Applications, Stringer (UNITEXT for Physics), ISBN: 978-3-031-25153-5 (978-3-031-25154-2 e-book), 2023.

Proceedings Books:

1. R. P. Mondaini and **R. Dilão** (eds.), "*BIOMAT 2005, Proceedings of the International Symposium on Mathematical and Computational Biology*", World Scientific Publishing, Singapore, ISBN: 981-256-797-6, 2006.

2. R. P. Mondaini and **R. Dilão** (eds.), *Proceedings of the 2005 International Symposium on Mathematical and Computational Biology*, BIOMAT 2005, E-papers serviços editoriais, Rio de Janeiro, 2006. ISBN: 85-7650-064-7.

3. R. P. Mondaini and **R. Dilão** (eds.), "*BIOMAT 2006, International Symposium on Mathematical and Computational Biology*", World Scientific Publishing, Singapore, ISBN: 981-270-768-9, 2007.

4. R. P. Mondaini and **R. Dilão** (eds.), "*BIOMAT 2007, International Symposium on Mathematical and Computational Biology*", World Scientific Publishing, Singapore, ISBN: 981-281-232-2, 2007.

Referee of Institutions and Journals:

Institutions: Agence Nationale de la Recherche, American Mathematical Society, European Science Foundation, World Scientific and Engineering and Physical Sciences Research Council, Leading Fellows Postdoc Programme (TU Delft), European Commission (Marie Skłodowska-Curie Individual Fellowships), Romanian Ministry of Education and Research, Service de la Recherche et Culture Scientifique (Region Île de France).

Journals: Applied Mathematics and Computation, Cellular and Molecular Life Sciences, Communications in Numerical Methods in Engineering, Journal of Biological Physics, Journal of Computational Interdisciplinary Sciences, Mathematical Reviews, Journal of Theoretical Biology, Mathematical Biosciences, Bulletin of the Malaysian Mathematical Sciences Society, Physica D, Bioinformatics, International Journal of Bifurcation and Chaos, Nonlinearity, International Journal of Information Technology & Decision Making, IET Systems Biology, Journal of Physics A: Mathematical and Theoretical, Swarm and Evolutionary Computation, Physical Biology, European Physical Journal, Mathematical Medicine and Biology, Physica Scripta, Journal of Applied Mathematics, Journal of Control Theory and Applications, Journal of Nonlinear Mathematical Physics, PLoS One, Chaos, Solitons & Fractals, Journal of Mathematical Biology, Bulletin of Mathematical Biology, MAYFEB Journal of Mathematics, Electronic Journal of Mathematical Analysis and Applications, International Journal of

Dynamical Systems and Differential Equations, Physical Review Letters, Development, Physical Review E, Shock and Vibration, Biophysical Journal, Physical Reviews Research, Methods, Sensors, Electronics, Frontiers, Mathematics, Aerospace.

Impact of the Research Work in the International Scientific Publications:

1. The article published in the *Physical Review Letters,* vol. 80 (1998) 5216-5219, has been chosen as the paper of week by the American Physical Society, M. Antia, Waves Will be Waves, Physical Review Focus, 8 June 1998, http://publish.aps.org/FOCUS/v1/st19.html.

2. The article published in the *Physical Review Letters,* vol. 80 (1998) 5216-5219, is one of the 8 papers quoted in the entry "BELOUSOV–ZHABOTINSKY REACTION" of the Encyclopedia of Nonlinear Science, (A. Scott, Ed.), Routledge, New York, (2005).

3. The article by R. Dilão, D. Muraro, M. Nicolau and M. Schoenauer, LNCS 5483, pp. 176–190, 2009, got a “Best Paper Nomination” in the International conference EvoBIO2009, Tübingen, 2009.

4. The article by S. Almeida and R. Dilão, Directional sensing and streaming in *Dictyostelium* aggregation, *Physical Review E,* 93(5) (2016) 052402, has been cited in the Kaleidoscope of Physical Review E, May 2016, https://journals.aps.org/pre/kaleidoscope/May2016.

Funding (Coordination and Participation in National Research Projects):

1. MATER Program: "Real time decision taking machines: Cellular Automata models for real time analysis of systems”, IST-LNETI-Ministry of Defence, 1991-1995.

2. "Dynamical Systems Techniques for the Design of Particle Accelerators", CERN/P/CA/6/90, JNICT, 1991-1992.

3. "Collective Phenomena in Particle Accelerators", CERN/C/FAE/73/91, JNICT, 1992-1995.

4. "Dynamical Systems Techniques in Accelerator Physics ", STRIDE, STRD/C/FAE/1000/92, JNICT, 1992-1995.

5. "Program of Scientific Exploration of PoSAT-1 Satellite”, PoSAT-1 Consortium, Ministry of Industry and Energy, 1993-1994.

6. "Reaction-Diffusion Systems: Simulations and Experiments ", PRAXIS, PCEX/P/FIS /26/96, Praxis XXI, 1997-2002.

7. "Mathematical Analysis and Image Processing in Confocal Microscopy", PRAXIS, PSAU/C/SAU/30/96, Praxis XXI, 1997-1998.

8. “Pattern formation through reaction-diffusion mechanisms”, PRAXIS XXI, PRAXIS/P/FIS/13161/1998, 1999-2004.

9. “BIOMAT 2005”, Fundação para a Ciência e a Tecnologia, 2005-2006.

10. “FUNCDYN 2009”, Fundação para a Ciência e a Tecnologia, 2009.

Funding (Participation in International Research Projects):

"REACTOR, Nonlinear Chemistry in Complex Reactors: Models and Experiments", European Science Foundation, 2000-2004.

"GENetic NETworks: Emergence and Complexity (GENNETEC)”, The sixth framework programme, Information Society Technologies, Simulating Emergent Properties in Complex Systems, FP6-2005-IST-5-FET/034952/STREP, European Commission, 2006-2009.

"Pattern transitions tuned by an inhibitor of cAMP in the *Dictyostelium Discoideum* colony aggregation”, European Science Foundation, 2009.

"FUNCDYN, Functional dynamics in Complex Chemical and Biological Systems”, European Science Foundation, 2006-2011.

Funding (Coordination of International Research Projects):

FUNCDYN 2009, Third European Science Foundation Conference on Functional Dynamics, ESF, 2009.

Basic Experimental Techniques in Biological Dynamics, European Science Foundation, 2011.

Investigation of the autocatalytic enzyme reaction of hydrogenase enzyme in hydrogen uptake direction, FCT-NKTH, Hungarian-Portuguese intergovernmental S&T Cooperation Program, 2013-2014.

Funding (Participation in National Research Projects):

"Predicting Radiation Doses in the Internal Van Allen Radiation Belt", PRAXIS XXI, PRAXIS/P/FIS/10117/1998, 1999-2004.

Seminars in International Conferences, Schools and Academies:

1. Rui Dilão, Topological Entropy and Scaling Behaviour in Maps of the Interval, Sitges Conference on Dynamical Systems, Barcelona, June 1982.

2. Rui Dilão, Topological Entropy and Lyapunov Exponents in Maps of the Interval, Copenhaga, June 1983, Nordita Workshop on Chaos, Niels Bohr Institute.

3. Rui Dilão, The measure of complexity in cellular automata, 1988 SIAM Annual Meeting, July 11-15, Minneapolis, Minnesota.

4. J. Toste-Rêgo and R. Dilão, A fast parallel computing machine for real time decision making: Applications to real time processing, war games, forest fire and fluid dynamics models, Conference 557, Tactical Aerospace C^3I in Coming Years, North Atlantic Treaty Organization (NATO), Instituto de Defesa Nacional, 15-18 May, 1995.

5. Rui Dilão, Chaos, CERN School on Particle Accelerators, Cascais, September 1-15, 1996.

6. Rui Dilão, Morphogenese of natural patterns, a theoretical approach to developmental biology, Primeiro Forum da Sociedade das Ciências Médicas, Academia Portuguesa de Medicina, Lisboa, 8 February 1997.

7. Rui Dilão and Tiago Domingos, A generic model for population dynamics, International Society for Ecological Modelling, Meeting 1997, Montreal, Quebec, Canada, 3-7 August 1997.

8. Tiago Domingos and Rui Dilão, A mechanistic deduction for a trophic interaction model, International Society for Ecological Modelling, Meeting 1997, Montreal, Quebec, Canada, 3-7 August 1997.

9. Joaquim Sainhas and Rui Dilão, Simulating chemical waves in extended systems, Second European Conference on Computational Chemistry, EUCO-CC2, 2-6 September, 1997, Faculty of Sciences, Lisbon.

10. Rui Dilão and Joaquim Sainhas, Validation and Calibration of Models for Reaction-Diffusion Systems, "Patterns, Non-Linear Dynamics and Stochastic Behaviour in Spatially Extended, Complex Systems", Budapest, Hungary, 24-28 October 1997.

11. Joaquim Sainhas and Rui Dilão, Wave Optics in Reaction-Diffusion Systems, "Patterns, Non-Linear Dynamics and Stochastic Behaviour in Spatially Extended, Complex Systems", Budapest, Hungary, 24-28 October 1997.

12. Rui Alves-Pires, Rui Dilão, Hélia Neves, Leonor Parreira and Joaquim Sainhas, Anisotropy-free Laplacian filters, contour detection, and 3D image reconstruction for confocal microscopy imaging, RecPad' 98, 10th Portuguese Conference on Pattern Recognition, Lisboa, March 26-27, 1998.

13. Joaquim Sainhas and Rui Dilão, A model for the development of butterfly eyespot patterns, "The Mathematical Biology of Pattern and Process", University of Bath, 5-9 April 1998.

14. Tiago Domingos and Rui Dilão, A General Model for Trophic Chain Dynamics, 1998 Meeting, International Society for Ecological Modelling, Baltimore, Maryland, USA, 2-6 August, 1998.

15. Rui Dilão, Waves, spirals and pinwheels in non-linear reaction-diffusion systems, Symposium Engineering of Chemical Complexity, Fritz Haber Institute der Max Planck Gesellschaft, Berlin, 14-16 June 2000.

16. Filipa Alves and Rui Dilão, Segmentation through a reaction-diffusion mechanism in *Drosophila* early development, Berkeley, 14-16 July 2000.

17. Filipa Alves and Rui Dilão, Segmentation through a reaction-diffusion mechanism in *Drosophila* early development, International Conference on Mathematics in Biology, Annual Meeting of The Society for Mathematical Biology, August 3-5, 2000, Salt Lake City, Utah.

18. Rui Dilão, Pattern formation near a Hopf singularity. Center for Complex and Nonlinear Systems, Technical University of Budapest, Budapest, 19 de September 2000, Budapest.

19. Rui Dilão, Pattern formation in biology. Center for Complex and Nonlinear Systems, Technical University of Budapest, Budapest, 20 September 2000, Budapest.

20. Rui Dilão, The morphogenesis problem in biology. Case studies: The Drosophila segmentation and Butterfly patterns. Mathematical Models in Biology. Instituto Gulbenkian de Ciência, 9-14 October 2000.

21. Rui Dilão, Nonlinearity, chaos, robustness, sensitivity to initial conditions and strange attractors: their importance in life sciences. Mathematical Models in Biology. Instituto Gulbenkian de Ciência, 9-14 October 2000.

22. Rui Dilão, Does chaos exists in population dynamics? Mathematical Models in Biology. Instituto Gulbenkian de Ciência, 9-14 October 2000.

23. Rui Dilão, Activity waves from excitable dynamics in extended chemical and neuronal systems. 4th Gulbenkian Autumn Meeting/1st Portuguese Meeting on Theoretical and Computational Biology, 23rd-26th of October 2001, Instituto Gulbenkian de Ciência, Oeiras.

24. Filipa Alves and Rui Dilão, Mathematical models for positive and negative regulation of gene expression. 4th Gulbenkian Autumn Meeting/1st Portuguese Meeting on Theoretical and Computational Biology, 23rd-26th of October 2001, Instituto Gulbenkian de Ciência, Oeiras.

25. Rui Dilão, Mathematical models in ecology and population dynamics. Departamento de Física da Universidade do Porto, 11 January 2002.

26. Rui Dilão, Diffusion and Reaction-Diffusion in Physics, Chemistry and Biology: The BZ paradigm. Instituto Gulbenkian de Ciência, Programa de Formação em Biologia Teórica. 26 March 2002.

27. Rui Dilão, Reaction-Diffusion models for the understanding of morphogenesis. Instituto Gulbenkian de Ciência, Programa de Formação em Biologia Teórica. 26 March 2002.

28. Rui Dilão, The different approaches in the mathematical modelling of biological systems. Bioinformática 2002. 10 April 2002.

29. Filipa Alves and Rui Dilão, Mathematical models for the regulation of gene expression in prokaryotes, Gordon Research Conference on Theoretical Biology and Biomathematics, June 9-14, 2002, Tilton, NH, USA.

30. Rui Dilão, Turing patterns in the neighbourhood of a Hopf bifurcation, 12th International Workshop on Dynamics and Control of Complex Systems in Nature and Society, August 19-21, 2002, Los Angeles, CA, USA.

31. Rui Dilão and Abdelkader Lakmeche, On the McKendrick-von Foerster equation, Summer School on Mathematical Biology, Lisbon, July 15-21, 2002.

32. Rui Dilão, Patterns and forms in Physics, Chemistry and Biology. Instituto Superior Técnico. 17 October 2002.

33. Rui Dilão and Abdelkader Lakmeche, On the McKendrick-von Foerster equation, Mathematical and numerical methods for modelling in the life sciences. University of Gent, Belgium, November 28 - 29, 2002.

34. Rui Dilão, Control techniques for the mathematical modelling of macroeconomic systems. An application to the Ramsey-Koopman-Cass model, Aveiro, Dep. de Física, 7 February 2003.

35. Rui Dilão, A theoretical approach to biology: How to understand biological processes from mathematical modelling. Faculdade de Engenharia, Universidade Católica, 19 February 2003.

36. Rui Dilão, From mathematical models to theoretical biology, or the origin of forms in biology. Complexo II (IFM), 12 March 2003.

37. Rui Dilão, Population cycles in the age dependent McKendrick model, VVW03, Viennese Vintage Workshop 2003, "Age-Structured Models in Population Dynamics and Economics", Vienna, October 27-28, 2003.

38. Rui Dilão, Biomathematics, theoretical biology, computational methods, mathematics and biology. Instituto Gulbenkian de Ciência, Doctoral Program in Theoretical Biology, 24 March 2004.

39. Rui Dilão, Growth models, from bacteria to population dynamics. Which modelling approach? Instituto Gulbenkian de Ciência, Doctoral Program in Theoretical Biology, 24 March 2004.

40. Rui Dilão, From reaction-diffusion to pattern formation in biological systems. Introduction to diffusion and case studies. Instituto Gulbenkian de Ciência, Doctoral Program in Theoretical Biology, 24 March 2004.

41. Rui Dilão, New systems, new problems, new approaches. Biology inspiring mathematics or, mathematical thinking with biology. Instituto Gulbenkian de Ciência, Doctoral Program in Theoretical Biology, 24 March 2004.

42. Rui Dilão, A general framework to describe the regulation of gene expression. Modelling applications: (a) Development of stripe patterns in the embryo of *Drosophila*; (b) Morphogenesis of butterfly wing eyespot patterns. Institut des Hautes Études Scientifiques, Bures-sur-Yvette, Paris, 12 May 2004.

43. Rui Dilão, Turing instabilities and patterns in reaction-diffusion equations. "Fourth World Congress of Nonlinear Analysts" (WCNA-2004), Orlando, Florida, June 30 to July 7, 2004, invited 45 minute talk.

44. Rui Dilão, The reaction-diffusion approach to morphogenesis. "4th Brazilian Symposium on Mathematical and Computational Biology, 1st International Symposium on Mathematical and Computational Biology, Ilhéus, Bahia, Nov 27 to Dec 1, 2004, keynote speaker.

45. Rui Dilão, Option pricing: The exact value for European Options on a stock paying a discrete dividend. Instituto Superior Técnico, CFIF, 15 Março 2005.

46. Rui Dilão, Statistical Mechanics of Two-players Iterated Games, 2nd Shanghai International Symposium on Nonlinear Science and Applications - 2005 (Shanghai NSA'05), June 3-7, 2005, Chinese Academy of Science, Shanghai, China.

47. Rui Dilão, Morphogenesis, 2nd Shanghai International Symposium on Nonlinear Science and Applications - 2005 (Shanghai NSA'05), June 3-7, 2005, Chinese Academy of Science, Shanghai, China.

48. Filipa Alves and Rui Dilão, Modeling segmental patterning in Drosophila: from maternal to segment polarity genes, 2005 Annual Meeting of The Society of Mathematical Biology, ECMTB05, Dresden, Germany, July 18-22, 2005.

49. Paulo Brito and Rui Dilão, Economic-demographic cycles and economic growth, Vintage Modelling in Economics and Economic Demography, European University Institute, Villa Schifanoia, September 26-27, 2005.

50. Paulo Brito and Rui Dilão, An overlapping generations model in continuous time for an age-structured population, Viennese Vintage Workshop, 24-25 November 2005.

51. Filipa Alves and Rui Dilão, A software tool to model genetic regulatory networks: applications to segmental patterning in Drosophila. "5th Brazilian Symposium on Mathematical and Computational Biology, and 2st International Symposium on Mathematical and Computational Biology, Petrópolis, Rio de Janeiro, 3-8 December, 2005.

52. Rui Dilão, Morphogenesis or the development of form and shape in organisms. Trends in Chemistry and Biology, Seminar Series at ITQB, ITQB, 15 February 2006, Oeiras.

53. Rui Dilão, Chaos in the Störmer problem. "Views on ODEs, in honour of Arrigo Cellina and James A. Yorke on the occasion of their 65 birthday", Aveiro, 21-24 June 2006, Portugal.

54. Rui Dilão, A general framework to describe the regulation of gene expression: Applications to segmental patterning in Drosophila, and to eyespot pattern formationin butterflies. GENetic NETworks: Emergence and Complexity, Evry, Genopole, 9-13 October 2006.

55. Rui Dilão, Realistic population dynamics models: demography cycles, chaos and resources. "BIOMAT 2006, International Symposium on Mathematical and Computational Biology", Manaus, Amazonas, 25-26 November 2006, tutorial lecture.

56. Rui Dilão, Emergence of a collective steady state and symmetry breaking in plexus of two and three identical cells. "BIOMAT 2006, International Symposium on Mathematical and Computational Biology", Manaus, Amazonas, 27-30 November 2006, keynote speaker.

57. Rui Dilão, A general framework to describe the regulation of gene expression: Applications to segmental patterning in Drosophila, and to eyespot pattern formation in butterflies. "FUNCDYN Workshop 2007" (Functional dynamics in Complex Chemical and Biological Systems), Haslev, Haslev Udvidede Højskole, Copenhagen, Denmark, 2-5 May 2007.

58. Rui Dilão, On the transition to turbulence in reaction-diffusion systems. Fourteenth International Workshop on Dynamics and Control, dedicated to Professor Angelo Miele on the occasion of his 85th birthday, Zvenigorod, Moscow, Russia, May 28 – June 2, 2007.

59. Rui Dilão, On the problem of synchronization of identical dynamical systems: The Huygens's clocks. International School of Mathematics "Guido Stampacchia", 47th Workshop, "Variational Analysis and Aerospace Engineering", dedicated to Professor Angelo Miele on the occasion of his 85th birthday, Erice, Sicily, 8 - 16 September 2007.

60. Rui Dilão and João Graciano, Evaluating deterministic policies in two-player iterated games. ECCS 2007, European Conference on Complex Systems, Dresden, 1-5 October, 2007.

61. Rui Dilão, A general framework to describe the regulation of gene expression: Applications to segmental patterning in Drosophila. ECCS 2007, European Conference on Complex Systems, Satellite Conference "Genetic and Biological Networks: Models, Dynamics and Simulations", Dresden, 1-5 October, 2007.

62. Rui Dilão, Synchronizing Huygens's clocks. II Meeting on Modelling of Complex Systems, Universidad Rey Juan Carlos, Móstoles, Madrid, 25-27 October 2007.

63. Rui Dilão and Daniele Muraro, A software package for the modelling of genetic regulatory networks. Gene Regulatory Networks: Dynamics, Spatial Organization and Inference, Torino, April 23-24, 2008.

64. Rui Dilão, Anti-phase and in-phase synchronization, quasi-periodicity and energy distribution in arrays of oscillators coupled by elastic forces, First American Academy of Mechanics Conference 2008, New Orleans, 17-20 June, 2008.

65. Rui Dilão, Synchronizing Huygens's pendulum clocks. "Fifth World Congress of Nonlinear Analysts" (WCNA-2008), Orlando, Florida, 2-9 de July, 2008.

66. Rui Dilão, Calibrating two reaction-diffusion models describing the formation of the gradient of protein Bicoid in the Drosophila embryo. Second European Science Foundation Conference on Functional Dynamics, Rothenburg ob der Tauber, 15-18 September, 2008.

67. Rui Dilão, Morphogenesis: The origins of butterfly eyespot patterns and of segment patterning in Drosophila. Workshop Physics of Biological Systems, From Genes to Societies, Complexo Interdisciplinar da Universidade de Lisboa, 2-3 October, 2008.

68. Rui Dilão, Modeling, Simulating and Calibrating Genetic Regulatory Networks. A Training Course organized and funded by GENNETEC: Genetic Regulatory Networks and other Complex Systems. Institut Henri Poincaré, 19-23 January, 2009.

69. Rui Dilão, Modeling, Calibration of a mathematical model describing the gradient of Bicoid in the embryo of *Drosophil*a: The mRNA diffusion hypothesis. Otto-von-Guericke University, Magdeburg, Biophysics Group, 18 February, 2009.

70. Rui Dilão, mRNA diffusion in Drosophila early development: multi-objective optimization techniques, and general computational tools for the modeling of genetic regulatory networks. Methodological challenges for Systems Biology: linking networks, crossing scales, designing experiments, BioSim Network of Excellence, Palazzo Pesaro-Papafava, 30 March - 4 April 2009, Venice.

71. Rui Dilão, Daniele Muraro, Miguel Nicolau, Marc Schoenauer, Validation of a morphogenesis model of Drosophila early development by a multi-objective evolutionary optimization algorithm (Best Paper Nomination), EvoBIO 2009, Tübingen, Germany, 15-17 April, 2009.

72. Rui Dilão, De Charles Darwin aos algorítmos evolucionários de optimização, Academia das Ciências de Lisboa,"Comemoração do Bicentenário de Darwin: O Darwinismo 200 anos depois; V-Modelos matemáticos na evolução", 7 May 2009.

73. José Amigó, Rui Dilão, A simple way of calculating the topological entropy for interval maps, ICCSA 2009, The 3rd International Conference on Complex Systems and Applications, University of Le Havre, Normandy, France, June 29-July 2, 2009.

74. Rui Dilão, Anti-phase, in-phase, bifurcation and robustness of nonlinear interacting oscillators, ICCSA 2009, The 3rd International Conference on Complex Systems and Applications, University of Le Havre, Normandy, France, June 29- July 2, 2009.

75. Rui Dilão, mRNA diffusion explains protein gradients in Drosophila early development, "Dynamics in Systems Biology", Aberdeen University, Scotland, 14-18 September 2009.

76. José Amigó, Rui Dilão, Computing the topological entropy of unimodal interval maps, "The 8th AIMS Conference on Dynamical Systems, Differential Equations and Applications", Dresden, Germany, May 25-28, 2010.

77. Rui Dilão, Modeling, Simulating and Calibrating Genetic Regulatory Networks: An Application to Drosophila Development with Multi-Objective Optimization Techniques, 1st Conference of Computational Interdisciplinary Sciences (CCIS), Instituto Nacional de Pesquisas Espaciais (INPE), São José dos Campos, Brasil, 23-27 August 2010.

78. Rui Dilão, Modeling, Simulating and Calibrating Genetic Regulatory Networks: A tutorial on Computational Biophysics, 1st Conference of Computational Interdisciplinary Sciences (CCIS), Instituto Nacional de Pesquisas Espaciais (INPE), São José dos Campos, Brasil, 23-27 August 2010.

79. R. Dilão, From the glycolytic oscillations to the control of the cell cycle: a minimal biological oscillator, invited lecture at Séminaire BIOCORE, Sophia-Antipolis, 20 May 2011, Sophia-Antipolis, France.

80. R. Dilão, From the glycolytic oscillations to the control of the cell cycle: a minimal biological oscillator, Modelling Complex Biological Systems in the Context of Genomics, 10th edition, Sophia-Antipolis Spring School, 23-27 May 2011, Sophia-Antipolis, France.

81. R. Dilão, Mathematical complexity theory in systems biology: several success stories and new problems, From Chaos to Complexity, University of Warwick, 6-8 July 2011.

82. R. Dilão, The chemotactic movement in *Dictyostelium discoideum* aggregation, Fourth European Science Foundation Conference on Functional Dynamics, Prague, 21-24 September 2011.

83. Rui Dilão, Mathematical problems in *Drosophila* morphogenesis. Institut des Hautes Études Scientifiques, Bures-sur-Yvette, 25 January 2013, Bures-sur-Yvette.

84. Rui Dilão and João Fonseca, Dynamic trajectory control of gliders, 2nd CEAS Specialist Conference on Guidance, Navigation & Control, Delft, 10-12 April 2013.

85. Rui Dilão, Morphogenesis. Institut des Hautes Études Scientifiques, Bures-sur-Yvette, 7 May 2013, Bures-sur-Yvette, France.

86. Rui Dilão, Modelling Drosophila early development: the patterning effect of diffusion of mRNA of maternal origin, Laboratoire de Mathématiques Appliqués aux Sistèmes (MAS), École Centrale Paris, 20 June 2013, Paris.

87. Rui Dilão, Gradient formation in regeneration, Interdisciplinary Workshop on Stem Cells and Regeneration, IHÉS, 24-29 June 2013, Bures-sur-Yvette, France.

88. Rui Dilão, Models of gene regulatory networks and signalling pathways in development, Interdisciplinary Workshop on Stem Cells and Regeneration, IHÉS, 24-29 June 2013, Bures-sur-Yvette, France.

89. Rui Dilão, Chemotherapy in heterogeneous cultures of cancer cells with interconversion, Genopole, ISSB, University of Évry, 5 July 2013.

90. Rui Dilão, Developing a mathematical model for tissue formation, autopoiesis, regeneration and morphogenesis (partial results), Biologically Inspired Information Processing 2014, Mathematical Models of Pattern Formation, Tufts University, 14th-16th May, 2014.

91. Rui Dilão, Drosophila Morphogenesis: what can we learn from mathematical modelling (public lecture), Biologically Inspired Information Processing 2014, Mathematical Models of Pattern Formation, Tufts University, 14th-16th May, 2014.

92. Rui Dilão, Mathematical models in morphogenesis and bioelectricity (two plenary lectures), Workshop sur les Mathématiques pour les Sciences de la Vie, Sidi Bel Abbès, Algeria, 14th-16th September, 2014.

93. Rui Dilão, Turing instabilities and patterns, National Meeting of the Portuguese Mathematical Society, 9-11 July, 2018.

94. Rui Dilão, Modelling the circadian rhythm of Drosophila, 7th Iberian Mathematical Meeting, 12-14 October, 2018.

95. Rui Dilão, Modelling the circadian rhythm of Drosophila. A compartment approach, INRIA, Biocore, Sophia-Antipolis, 18 December 2018.

96. Rui Dilão, The mechanism of wound healing through the fibroblast switching between two states, CNC.IBILI Seminars, UC-Biotech, Cantanhede, 9 January 2019.

97. Rui Dilão, An electrophysiology model for cells and tissues, IHÉS, 5 April 2019, Bures-sur-Yvette, France.

98. Rui Dilão, Action potential waves ans solitions generated inside axons, Third Workshop of Maths-Physics-Bio Club, Institut Curie, 25th June 2019, Paris.

99. Rui Dilão, Diffusion as a morphogenesis mechanism. Two case studies: Drosophila early development, and fibroblast dermal maturation and wound healing, Escola de Verão em Biologia Computacional, Departamento de Física da Universidade de Coimbra, 7 September 2019.

Posters in Conferences:

1. Rui Dilão, Non-linear Phenomena in Particle Accelerators, Dynamics Days 1993, Poznam, July 8-11, Poland.

2. Tiago Domingos and Rui Dilão, A General Approach to the Modelling of Trophic Chains, 1999 SMB Annual Meeting, Theory and Mathematics in Biology and Medicine, Amsterdam, Netherland, 29 June-3 July, 1999.

3. Rui Dilão and Joaquim Sainhas, Modelling the development of butterfly wing eyespot patterns. Gordon Research Conference on Nonlinear Science, June 17-22, 2001, Mount Holyoke College, South Hadley, MA.

4. Filipa Alves and Rui Dilão, Mathematical models for positive and negative regulation of gene expression. International Conference on Mathematical and Theoretical Biology, Annual Meeting of The Society for Mathematical Biology, July 16-19, 2001, University of Hawaii at Hilo, Hawaii.

5. Rui Dilão and Tiago Domingos, Periodic and quasi-periodic behaviour in resource dependent age structured population models. International Conference on Mathematical and Theoretical Biology, Annual Meeting of The Society for Mathematical Biology, July 16-19, 2001, University of Hawaii at Hilo, Hawaii.

6. Rui Dilão, Tiago Domingos and Elman M. Shahverdiev, Harvesting in a resource dependent age structured population model. International Conference on Mathematical and Theoretical Biology, Annual Meeting of the Society for

Mathematical Biology, July 16-19, 2001, University of Hawaii at Hilo, Hawaii.

7. Rui Dilão, Emergence of a collective steady state and symmetry breaking in plexus of two and three identical cells. "FUNCDYN Workshop 2007" (Functional dynamics in Complex Chemical and Biological Systems), Haslev, Haslev Udvidede Højskole, Copenhagen, Denmark, 2-5 May 2007.

8. Rui Dilão, Emergence of a collective steady state and symmetry breaking in plexus of two and three identical cells. ECCS 2007, European Conference on Complex Systems, Dresden, 1-5 October, 2007.

9. Rui Dilão, Marc Schoenauer and Miguel Nicolau, A tool to analyze genetic regulatory networks: regulation of gene expression and protein production. "CRP Forum Dresden 2007, European Complexity Research Projects, Dresden, 6 October, 2007.

10. Rui Dilão and Daniele Muraro, A multi-objective optimization algorithm for the calibration of a reaction-diffusion model of a genetic network process. Second European Science Foundation Conference on Functional Dynamics, Rothenburg ob der Tauber, 15-18 September 2008.

11. Rui Dilão and Daniele Muraro, Modeling, Calibration of a mathematical model describing the gradient of Bicoid in the embryo of *Drosophil*a: The mRNA diffusion hypothesis. "Third European Science Foundation Conference on Functional Dynamics", Cascais, 2-5 March, 2009.

12. Rui Dilão, Daniele Muraro, Miguel Nicolau and Marc Schoenauer, Validation of a morphogenesis model of Drosophila early development by a multi-objective evolutionary optimization algorithm. "Third European Science Foundation Conference on Functional Dynamics", Cascais, 2-5 March, 2009.

13. R. Dilão and D. Muraro, mRNA diffusion explains protein gradients in *Drosophila* early development. IV Spanish-Portuguese Biophysical Congress, 7-10 July, 2010, Zaragoza, Spain.

Teaching

Teaching Experience:

Before the PhD, he has been assistant professor of General Mechanics (1981-1986) and History of Science (1981-1982) and Linear Algebra (1983-1984). After the PhD, he taught Laboratory of Electromagnetism (1988). After 1989, he has been professor in charge of Analytical Mechanics (1989), Thermodynamics (2000-2002), Mathematical Techniques of Physics (1990-1999; 2002-2018), Dynamical Systems (1990-), Special Topics on Dynamical Systems (2001-2003), Thermodynamics and the Structure of Matter (2007-2012, 2014-2016, 2019-), Physics of Continuous Matter (2017-2018).

Technical Books for University Courses:

1. **R. Dilão**, "Thermodynamics and the physics of the structure of matter" (in Portuguese), Escolar Editora, Lisboa, 2011. ISBN: 978-972-592-317-7. Second edition 2014, ISBN: 978-972-592-453-2.

2. **R. Dilão,** "Mathematical Techniques of Physics", (in Portuguese), IST Press, Lisboa, 2019. ISBN: 978-989-8481-73-3.

Texts for University Courses:

1. **R. Dilão**, "Analytical Mechanics" (in Portuguese), Instituto Superior Técnico, 1989, 2007.

2. **R. Dilão**, "Feynman Path Integrals" (in Portuguese), Instituto Superior Técnico, 1992.

3. **R. Dilão**, "The mathematical techniques of physics" (in Portuguese), Instituto Superior Técnico, 1990, 1995, 2004, 2010.

4. **R. Dilão,** "An introduction to dynamical systems and chaos" (in Portuguese), Instituto Superior Técnico, 1990, 1995, 2004, 2010, 2018.

Computational Applications:

1. R. Alves-Pires and **R. Dilão**, "Design.m" Software for the design of particle accelerators, 1998, https://sd.ist.utl.pt/Download/download.html.

2. **R. Dilão**, "Synchronizing Pendulum Clocks" from The Wolfram Demonstrations Project: http://demonstrations.wolfram.com/SynchronizingPendulumClocks/, 2008.

3. R. Alves-Pires, **R. Dilão** and D. Muraro, "Kinetics.m", A Mathemativa package to calculate and to analyze the equations of chemical kinetics, 2007-2008, https://sd.ist.utl.pt/Download/download.html.

4. **R. Dilão** and D. Muraro, "GeneticNetworks.m", A software package for the modeling and simulation of genetic regulatory networks, GENNETEC, 2009, https://sd.ist.utl.pt/Download/download.html.

Experimental Prototypes:

1. J. Cascais, **R. Dilão** e A. Noronha da Costa, Experimental realization of a RCL chaotic circuit with a varicap diod, IST, 1983 (paper nº 3).

2. J.Toste Rêgo, **R. Dilão** e A. Noronha da Costa, Construction of a Cellular Automata Computing Machine, IST, 1990, https://sd.ist.utl.pt/Varia/lab.html

3. J. Sainhas e **R. Dilão**, Experimental Implementation of the Implementation of the Belousov-Zhabotinsky reaction, IST, 1998, https://sd.ist.utl.pt/Varia/lab.html.

4. **R. Dilão** e A. Almeida, Construction of a vertical oscillating device to study the Faraday instability and the wave propagation in narrow channels, IST, 2000, https://sd.ist.utl.pt/Varia/lab.html.

Supervision of PhD Thesis:

1. Rui Alves Pires, "Nonlinear Transverse Beam Dynamics in Synchrotron Accelerators (with Emphasis on the Interaction of the Beam with Pockets of Ions)". Instituto Superior Técnico, Technical University of Lisbon, 1992.

2. Joaquim Sainhas, "Morphogenesis in Reaction-Diffusion Systems". Instituto Superior Técnico, Technical University of Lisbon, 1999.

3. Tiago Delgado Domingos, "Theory and Modelling of Ecological Systems". Instituto Superior Técnico, Technical University of Lisbon, 2001.

4. Rosa Filipa Penha Alves, "A mathematical model for segment formation in *Drosophila melanogaster*". Instituto Superior Técnico, Technical University of Lisbon, 2006.

Pos-Doc Training:

1. Elman Shahverdiev, October 2000 to December 2000.

2. András Volford, May 2001 to July 2001.

3. Abdelkader Lakmeche, October 2001 to June 2003.

4. Daniele Muraro, December 2007 to September 2009.

Supervision of Master Thesis:

1. Luís Carlos Gomes Pereira, "Modelling the eukaryotic cell cycle". Instituto Superior Técnico, Technical University of Lisbon, November 2012.

2. João Luís Pinto da Fonseca, "Trajectory generation for non-powered lift-enabled vehicles in planetary atmospheres". Instituto Superior Técnico, Technical University of Lisbon, February 2013.

3. João Paulo Parreira Lourinho Graciano, "Long-range trajectory generation for unpowered reusable launch vehicles". Instituto Superior Técnico, Technical University of Lisbon, May 2013.

4. João David Caixinha Mateus, “Optimal control of orbit transfers in celestial mechanic”. Instituto Superior Técnico, Technical University of Lisbon, May 2013.

5. Sofia José Figueiredo Almeida, “Dictyostelium aggregation: from simplicity to complexity”. Instituto Superior Técnico, Technical University of Lisbon, October 2013.

6. Vasco Guilherme Ramilo Caetano Pesquita, “Analysis of bacterial two-component systems in Mycobacterium tuberculosis”. Co-supervision Clemens Kuhn. Instituto Superior Técnico, Technical University of Lisbon, November 2014.

7. Gaspar Filipe Santos Magalhães Gomes Cano, “Intermittency and Diffusion in the Hodgkin-Huxley Model”. Instituto Superior Técnico, Technical University of Lisbon, May 2016.

8. Pedro Corrêa Pereira Vasco de Lacerda, “A deep learning assessment of spike detection with multi-electrodes arrays”. Co-supervision Adam Kampff. Instituto Superior Técnico, Technical University of Lisbon, May 2016.

9. José Miguel Filipe Antunes, “Multiagent System Optimization”. Co-supervision João Xavier. Instituto Superior Técnico, Technical University of Lisbon, May 2016.

10. André Marques, “Neural encoding of motion visual cues in horizontally sensitive neurons of Drosophila”. Co-supervision Eugenia Chiappe, Technical University of Lisbon, November 2016.

11. João Ferreira, “Pattern formation during growth of *Physarum*”. Instituto Superior Técnico, Technical University of Lisbon, May 2017.

12. Manuel Murteira, “Spin-orbit interaction and chaos in celestial mechanics”. Instituto Superior Técnico, Technical University of Lisbon, May 2017.

13. Mariana Fernandes, “Orbit transfers between Keplerian orbits”. Instituto Superior Técnico, Technical University of Lisbon, October 2017.

14. Miguel Ribeiro, “Volatility models in option pricing”. Co-supervision Cláudia Philippart. Instituto Superior Técnico, Technical University of Lisbon, September 2018.

15. Bárbara Mota, “Modelling propagation of wildfires using cellular automata”. Co-supervision Carlos Câmara. Instituto Superior Técnico, Technical University of Lisbon, June 2019.

16. Nuno Teixeira, “Control of a robotic leg for walking on irregular surfaces”. Instituto Superior Técnico, Technical University of Lisbon, July 2020.

17. Ana Rita Gonçalves, “Bacterial growth in the presence of several resources”. Co-supervision Isabel Gordo. Instituto Superior Técnico, Technical University of Lisbon, July. 2020.

18. Beatriz Albergaria, “Morphogenesis of Drosophila early development: the even-skipped protein”. Instituto Superior Técnico, Technical University of Lisbon, September 2020.

19. Mariana Sá, “Low-thrust orbit transfers between two-body Keplerian orbits”. Instituto Superior Técnico, Technical University of Lisbon, December 2020.

20. Mariana Mota, “Data-driven discovery of the mechanism of the Belousov-Zhabotinsky”. Instituto Superior Técnico, Technical University of Lisbon, January 2021.

21. João Lousada, “Test case prioritization optimization with machine”. Instituto Superior Técnico, Technical University of Lisbon, January 2021.

22. João Cruz, “Stability of Circular Orbits in the Three-Body Problem. Dynamical characterisation of planetary systems”, Technical University of Lisbon, June 2021.

23. Rodrigo Almeida, “Formation and Optimization of Vein Networks in *Physarum*”, Technical University of Lisbon, July 2021.

24. Vânia Nunes, “Voltage dynamics and statistics in balanced networks”, Technical University of Lisbon, November 2021.

25. Raul Pombeiro, “Towards end-to-end speech-to-text summarisation”. Co-supervision Diogo Pernes da Cunha. Technical University of Lisbon, April 2023.

Supervision of Graduation Thesis

1. Miguel Lobo, "Synchronization of Chaotic Systems", 1994.

2. Ricardo Schiappa, "The Cauchy problem for non-linear relativistic strings", 1994.

3. João Correia, "The large scale structure of the universe", 1994.

4. Tiago Delgado Domingos, "A game theory approach to ecology", 1994.

5. Ruy Ribeiro, "Classification of patterns in reaction-diffusion systems ", 1994.

6. Pedro Ribeiro Santos, "The cosmic ray experiment on PoSat1", 1994.

7. Miguel Centeno Brito, "The cosmic ray experiment on PoSat1, data analysis", 1994.

8. Madalena Chaves, "Shock waves in extended systems with dry damping: Theory", 1995.

9. Miguel Preto, "Shock waves in extended systems with dry damping: numerical simulations", 1995.

10. Francisco Dionísio, "Phyllotaxy: principles of auto-organization ", 1995.

11. Tiago Simas, "Installing a local area network with non-trademark hardware", 1995.

12. Jorge Rebelo, "The thermodynamic equilibrium of stars", 1996.

13. Sofia Isabel Sousa, "Human Lymphocytes: volume and genic distance", 1999.

14. Nuno Loureiro, "Algorithm for the simulation of microwave reflectometry processes in one-dimensional non-homogeneous plasmas", 2000.

15. João Graciano, "Some problems in game theory and population dynamics", 2001.

16. Tiago Paixão, "Equilibrium states in the Frenkel-Kontorova model and the transition to the continuum", 2001.

17. Pedro Torres, "Neuron tissues", 2001.

18. Miguel Atanásio Carvalho, “Optimal control and macroeconomic growth: existence of economic-demographic cycles”, 2002.

19. José Carlos Brás, “A model for blood circulation”, 2002.

20. Bruno Ferreira, “Valuation of European options on underlying paying discrete dividends”, 2002.

21. Margarida Sousa, “Turing Patterns in the 2-repressilator model of genetics”, 2015.

22. Gaspar Cano, “Propagation of electrical signals in neurons”, 2015.

23. João Ferreira, “Pattern formation during the growth of physarum”, 2016.

24. André Marques, “Neural encoding of motion visual cues in horizontally sensitive neurons of Drosophila”, 2016.

25. Manuel Murteira, “Spin-Orbit Interaction and Chaos in Celestial Mechanics”, 2016.

26. Mariana Fernandes, “Orbit Transfers Between Keplerian Orbits”, 2017.

27. Martim Pardal, “Growth, Division and Instabilities in Morphogenesis,” 2018.

28. Bárbara Mota, “Modelling fire propagation using cellular automata”, Co-supervision with Carlos da Câmara, 2018.

29. Nuno Teixeira, “Control of a robotic leg for walking, running and hopping in irregular surfaces”, 2019.

30. Beatriz Albergaria, “Morphogenesis of Drosophila early development: the even-skipped protein”, 2019.

31. Rita Gonçalves, “Bacterial growth in the presence of several resources”. Cosupervision with Isabel Gordo, 2019.

32. João Lousada, “Keeping master green with machine learning”. Co-supervision with Miguel Ribeiro, 2020.

33. Mariana Mota, “Data-driven discovery of the mechanism of the Belousov-Zhabotinski reaction”, 2020.

34. Mariana Sá, “Orbit transfers between three-dimensional two-body Keplerian orbits”, 2020.

35. Rodrigo Almeida, “Formation and optimization of vein networks in *Physarum polycephalum*”, 2020.

36. Vânia Nunes, “Voltage dimensionality and statistics in balanced network models”. Cosupervision with Christian Machens, 2020.

37. João Cruz, “Stability of circular orbits in the three body problem”, 2020.

38. Pedro Duarte (87347). “The diffusion of information in social media – How much complexity do we need?, 2022.

39. Ana Filipa Valente, Applications to biological networks of adaptive Hagen-Poiseuille flow on graphs, 2022.

40. Catarina Dias, Morphogenesis of Drosophila early development: calibration of the distribution of pair-rule family of proteins, 2022.

41. Lízia Branco, The role of ion channels in the transmissions of signals along axons, 2022.

42. Nyvenn Castro A model for the propagation of electric signals in ventricular myocardial cells. Calibration with patient data. Cosupervision with Teresa Pinheiro, 2022.

Supervison of Research Projects for Undergraduates:

1. Pedro Pinto (29779), “Julia sets in rational maps of the complex plane”, 1990.

2. José Amaral (25037), “Abundance of apperiodic behaviour in the map of the interval f(x)2 m x+1-2m”, 1990.

3. José Vera (29849), “Perturbation theory for non-linear ordinary differential equations”, 1990.

4. Bruno Oliveira (30645), “The Hopf bifurcation”, 1990.

5. Carlos Florentino (30646), “Wild hyperbolic sets”, 1990.

6. Carlos Lourenço (30647), “Stochasticity in a resonante particle-wave system”, 1990.

7. Fernão Abreu (30648), “Bifurcations of interval maps”, 1990.

8. João Nunes (30649), “On a Silnikov theorem”, 1990.

9. Manuel Prata (30654), “On an article of Karney about stochasticity in plasmas”, 1990.

10. Pedro Silva (30656), “Image coding through iterated function systems”, 1990.

11. Pedro Monteiro (33312), “Invariant measures and maps of the circle in the van der Pol oscillator”, 1990.

12. Pedro Novo (33313), “Numerical experiments with the Fermi model”, 1990.

13. Armando Vieira (32227), “The phase space of a Hamiltonian system”, 1990.

14. Zeferino Orlando (30659), “The numerical analysis of the Hénon map”, 1990.

15. Pedro Ferreira (30657), “Structural stability”, 1990.

16. Vasco Guerra (30658), “Stochasticity in the standard map”, 1990.

17. João Ferreira (33310), “Homeomorphisms of the circle and orbits of Hamiltonian systems”, 1990.

18. Luís Silva (31726), “Diffusion in maps with stochastic webs, Arnold diffusion in dimension 1+1/2”, 1991.

19. João Maia (31718), “The Hopf bifurcation in the Lorenz system”, 1991.

20. Fernando Lau (31712), The Frenkel-Kontorova model, 1991.

21. Rui Carvalho (31733), “Phase transitions: the Ising model”, 1991.

22. Filomena Nunes (31714), “Caustics and particle diffusion on the surface of crystals”, 1991.

23. Duarte Borba (31711), “A non-linear model for the saturation of fishbones in MHD”, 1991.

24. Luís Bettencourt (31725), “Quantification of elementary classical systems”, 1991.

25. António Figueiredo (31706), “Order in pre-turbulence: stochastic webs and quasi-symmetry”, 1991.

26. Joaquim Chamiço (31719), “The dynamics of Potts model with infinite range”, 1991.

27. Luís Lapão (31728), “Simulation of an ecosystem with three species”, 1992.

28. Tiago Domingos (34036), “The cooperation dilemma”, 1993.

29. Miguel Brito (34023), “The transfer of angular momentum in accretion disks”, 1993.

30. Pedro Santos (34031), “The equilibrium and evolution of a star”, 1993.

31. Diogo Gomes (35462), “Solitons, back scattering and numerical simulation”, 1993.

32. Ricardo Patraquim (31732), “Natural convection in a cavity with a square symmetry”, 1994.

33. Francisco Dionísio (34227), “Pattern formation in systems away from equilibrium: a model with active walkers”, 1995.

34. Tiago Simas (33042), “Celluar automata GHM and CCA”, 1995.

35. Sandra Silva (33991), “Simulation of a system of ten coupled harmonic oscillators with dry damping”, 1995.

36. Madalena Chaves (35480), “Synchronization in a one-dimensional lattice of non-linear oscillators”, 1995.

37. Luís Ribeiro (41247), “The Delaunay triangulation in the Small Worlds theory”, 2002.

38. Ana Silva (78919), “Some physics of hard disks in a box”, 2017.

39. Pedro Gomes (78790), “Estimating the Swedish population using the Leslie matrix model”, 2018.

40. Rita Gonçalves (87811), "The dynamics of growth and form in plants", 2018.

41. Gonçalo Castro (78497), "Emergence of localization due to randomness and geometry", 2018.

42. Bárbara Mota (86296), "Modeling circadian rhythms in Drosophila melanogaster", 2018.

43. Diogo Silva (56845), "Dynamics of chemotherapy with mechanisms of dosing and interconversion", 2018.

44. Francisco Faro (81253), "Flutter, tumble and chaos in a falling paper", 2018.

45. João Cruz (84395), "Orbit Stability of 3 Body Planetary Systems", 2018.

46. Nuno Teixeira (75494), "Equilibrium of a Spherical Pendulum by Energy Control", 2018.

47. Rafaela Ribeiro (90826), "Emergence and Evolution of Cooperation", 2018.

48. Mariana Sá (90824), "Antiphase and in-phase synchronization of three nin-linear oscillators", 2019.

49. João Lousada (84574), "Mackey-Glass Time Series Prediction using Machine Learning", 2019.

Transfer of knowledge and awareness of science

Participation and Organization of Scientific Fairs:

1. "What things are made of?" ("De que são feitas as coisas"), Instituto Superior Técnico, Lisbon, 8-20 July 1981, (participation).

2. "Teaching, research and development - retrospective", Instituto Superior Técnico, Lisbon, 23-30 de May 1998 (collaboration).

3. "Find your way in Expo 98", Pavilhão do Território, Expo98, Lisbon, 1 September 1998, (participation and organisation).

4. "Guided visits to the Exploratorium of Pavilhão do Conhecimento", Lisbon, 23 November 2001 (participation and organisation of the visits).

Journal Articles for the Public Awareness of Science:

1. **R. Dilão**, From cellular automata to the connection machine (in Portuguese), *Futuro*, ano 1 n. 7 (1987) 22-25.

2. R. Alves Pires and **R. Dilão**, How to build a particle accelerator? (in Portuguese), *Gazeta de Física*, **15** (1992) 56-66.

3. **R. Dilão**, Cellular automata, Turing machines, or the nature as a calculating machine (in Portuguese), *Colóquio Ciências*, **12** (1993) 3-20.

4. **R. Dilão**, The science of complex systems (in Portuguese), Técnica, **1/95** (1995) 1-15.

5. R. Alves Pires and **R. Dilão**, The Design of Particle Accelerators, *IST Science and Technology*, **3** (1998). 13-15.

6. J. Sainhas and **R. Dilão**, Morphogenesis in Reaction-Diffusion systems (in Portuguese), *Ciência*, **9** (1998) 35-40.

7. **R. Dilão** and J. Sainhas, Morphogenesis: an interdisciplinary scientific field, *Boletim de Biotecnologia*, n. **63** (1999) 2-4.

8. **R. Dilão**, Art as a social language and an element of cultural identity (in Portuguese), Revista Proformar On-line, nº14, March 2006 (http:// www.proformar.org/revista/edicao_14/ pag_1.htm).

Science and Society:

1. **R. Dilão**, "Workshop Science and Technology: ", Portuguese Parliament, 21 November 2011, Course for the development of expertise for senior administrators of the Portuguese Parliament.

Books for the Public Awareness of Science:

1. **R. Dilão**, "Where are you?, Materials for Observing and Experimenting", Ministry of Science and Technology, Ciência Viva Agency, ISBN: 972-97805-7-9, 1999. Portuguese version: "Onde Estás?, Materiais para Observar e Experimentar", ISBN: 972-97805-1-X, 1999.

2. **R. Dilão**, "Latitudes and Longitudes", Ministry of Science and Technology, Ciência Viva Agency, 1999, ISBN: 972-97805-8-7. Portuguese version: "Latitudes e Longitudes", ISBN: 972-97805-2-8, 1999.

Author Rights:

1. **Rui Dilão** and Pedro Dias, "FASTGRAF 1.0", DGE n. 25938, 1995. Graphical subroutines to build graphic interfaces in ANSI C.

2. Rui Alves-Pires and **Rui Dilão**, "Design.m", Ministério da Cultura n. 51776, 18/3/1998, accepted in 23 April 1998, n. 1001 IGAC. Software for the design of particle accelerators.

Consulting:

1. Rui Alves-Pires and **Rui Dilão**, "Technical consulting about the installation in Portugal of the 1 GeV electron synchrotron accelerator of Nikhef". Ministry of Science and Technology, December 1997.

2. "Latitudes and Longitudes- Instruments and Measures. Pedro Nunes memorial activities". Agência Ciência Viva, Ministry of Science and Technology, Lisbon, 2001.

Management

Management:

1997-	Coordinator of the Non-Linear Dynamics Group of Instituto Superior Técnico.
1990-1998	Representative of the Department of Physics to the Council of Libraries of Instituto Superior Técnico.
1989-1992; 1994-1998	Coordinator of the Library of the Department of Physics of Instituto Superior Técnico.

Member of the Jury of Habilitations:

-Nadya Morozova, Formalization, modeling and analysis of cell fate decision mechanisms in normal and cancer cells. Université Paris-Sud XI, April, 2014.

Member of the Jury of PhD Thesis (no supervision):

-Ana Jacinta Soares, Discrete Kinetic Theory of Chemically Active Gases. Detonation Waves. Dep. of Mathematics, University of Coimbra, 1997.

-Manfred Niehus, Disorder-Related Optical Properties and Electronic Transport in Gallium Nitride, Dep. of Physics, IST, Technical University of Lisbon, 2005.

-Sara Pinto Correia, Phase Space Reconstruction of Multivariate Time Series from Molecular and Field Biology, ITQB, New University of Lisbon, 2005.

-Alena Aleksenko, Problems of Minimal Aerodynamic Resistance, Dep. of Mathematics, University of Aveiro, 2010.

-Rui Pedro Matias Gama Mota, Modeling and measuring sustainability in dynamic economies, Instituto Superior Técnico, 24 October 2011.

-Paulo Ricardo Ferreira Pinto, Density of first Poincaré returns and periodic orbits, Departamento de Matemática, Faculdade de Ciências da Universidade do Porto, 11 de Junho de 2012.

-Sofia José Figueiredo Almeida, Synchronisation d'oscillateurs biologiques: modélisation, analyse et couplage du cycle cellulaire et de l'horloge circadienne, Université Côte D'Azur, INRIA, Sophia Antipolis, France, 17 December 2018.

-Luis Carlos Gomes Pereira, Modeling cell response heterogeneity to pro-apoptotic ligands, Université Côte D'Azur, INRIA, Sophia Antipolis, France, 26 November 2019.

Member of the Jury of Master Thesis (no supervision):

-Paulino Miguel Silva, Study of bone remodelling through mathematical modelling (in Portuguese: Interpretação do comportamento e funcionamento da remodelação óssea através de modelos matemáticos). Universidade Católica Portuguesa, Faculdade de Engenharia, 12 October 2011.

-Miguel Tavares Aleluia, Teacher demand model for basic education, IST, 14 November 2014.

- Sérgio David Vitorino Ramos, Study and development of an autonomous computational system for intraday trading (In Portuguese: Estudo e desenvolvimento de um sistemas computacional de intraday trading autónomo), IST, April 2016.

- Marta Sofia Galrito Pinto, Passive Exoskeletons to Support Human Locomotion - a computational study), IST, Novembro 2017.

- João Maria Branco Carapuço, "Reinforcement Learning Applied to Forex Trading, IST, Novembro 2017.