

WEBPAGE

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Metrics

ORCID Id (Scopus Author ID: 24586970200): h-index: 13

Google Scholar: **h-index**: 25

Short biography

BSc and a MSc in Physics, MSc in Applied Mathematics, PhD in Mathematics, and Aggregation (Habilitation) in Theoretical Computer Science.

Current research interests: Computability; Recursion-theoretical Learning Theory; Philosophy of Science.

Prizes

Honorable Mention in the Scientific Prize of IBM 1992, awarded by the Company IBM Portuguesa, SA, to the work “A Calculus of Activities and Transactions”.

Prize Descartes 1992, awarded by the Institute of Informatics of the Ministry of Finance to the work “Specification of Objects with Diagrams: OBLOG Approach” (in collaboration with Amílcar Sernadas and Cristina Sernadas).

Courses lectured and being lectured

Algebraic Elements of Programming, BSc (1991/93), IST.

Complexity, BSc and (PhD) (1998/99 and 2010/11), FCUL, IST.

Computability and Complexity, BSc, MSc, and (PhD) (2001/02, 2003/07, and 2009/23), IST.

Computability and Complexity of Learning, MSc and (PhD) (2013/15 and 2016/20), IST.

Concurrent Processes, BSc (2001/02), IST.

Data Structures and Algorithms, BSc (1988/90), IST.

Differential Geometry, BSc (1984/85), U. Açores.

Discrete Mathematics, BSc (2013/23), IST.

Formal Specifications, BSc (1991/92), IST.

Functional Programming, BSc and MSc (1994/95), FCUL, IST.

History of Mathematics, BSc (1985/86), U. Açores.

Imperative Programming, BSc (1987/90, 1992/93, and 1994/98), IST, FCUL.

Introduction to Physics and Chemistry, BSc (1984/87), U. Açores.

Currently Introduction to the Theory of Computation, BSc (2021/24), IST.

Currently Introduction to Machine Learning, MSc (2021/24), IST.

Languages and Paradigms of Programming, BSc (1993/94), FCUL.

Logical and Algebraic Elements of Programming, BSc (1989/90), IST.

Logical Foundations of Programming, BSc (1990/91), IST.

Mathematical-Physics, BSc (1983/85), U. Açores.

New Paradigms of Computation, BSc, MSc and (PhD) (2001/02, 2003/06, and 2009/11), IST.

Neurocomputation, MSc (1994/99), FCUL.

Neurodynamics, MSc (1994/96), FCUL.

Programming in Logic and Functional Programming, BSc (1990/91), IST.

Seismology, BSc (1985/87), U. Açores.

Syntax and Semantics of Languages, BSc (1999/01 and 2000/01), IST.

Theory of Computation, BSc (1989/90, 1994/98 and 1999/00 and 2009/12), IST, FCUL.

Curricula proposals

Proposal for a MSc in **Informatics and Education**, combined project of the Departments of Education and Informatics of the Faculty of Sciences, with the collaboration of the Department of General and Romanic Linguistics of the Faculty of Humanities (December 1993). Proponents were José Félix Costa, José Luiz Fiadeiro, José Pedro da Ponte, Maria Odete Valente, and Pedro Veiga.

Proposal for MSc in **Informatics**, a project of the Department of Informatics of the Faculty of Sciences (December 1993). Proponents were José Félix Costa, José Luiz Fiadeiro, and Pedro Veiga.

Proposal for the BSc in **Language and Knowledge Engineering**, combined project of the Departments of Informatics and Mathematics of the Faculty of Sciences and of the Department of General and Romanic Linguistics of the Faculty of Humanities (December 1993). Proponents were Fernando Ferreira, Inês Duarte, Isabel Hub Faria, José Félix Costa, José Luiz Fiadeiro, and Margarita Ramalho. He organised the inaugural colloquium of the degree in “Language and Knowledge Engineering”, carried out in Arquivos Nacionais/Torre do Tombo, on 6–7 June 1994.

Editorial board

Member of the editorial board of the [International Journal of Unconventional Computing](#) since March 2017.

Member of the Advisory Board of the [World Scientific Series in Unconventional Computing](#) since January 2021.

Selection of papers published in journals

- JA-50 [**Q2 Scimago**]Eduardo Skapinakis and José Félix Costa. “Timed Measurement Theory”, *International Journal of Unconventional Computing*, 2024, in print.
- JA-49 [**Q1, Q2 Scimago**]Eduardo Skapinakis and José Félix Costa. “[Machines that Perform Measurements](#)”, *Theoretical Computer Science*, 924(30 July 2022):68-93, 2022.
- JA-48 [**Q1, Scimago**]Vasco Boavida de Brito, José Félix Costa, and Diogo Poças. “[The power of machines that control experiments](#)”, *International Journal of Foundations of Computer Science*, 33(2): 91-118, 2022.
- JA-47 [**Q2, Scimago**]José Félix Costa. “[On discovering scientific laws](#)”, *International Journal of Unconventional Computing*, 14(3-4): 285-318, Old City Publishing, Inc., 2019.
- JA-46 [**Q2, Scimago**]Edwin Beggs, Pedro Cortez, José Félix Costa, and John V. Tucker. “[Classifying the computational power of stochastic physical oracles](#)”, *International Journal of Unconventional Computing* 14(1): 59-90, Old City Publishing, Inc., 2018.
- JA-45 [**Q1, Journal of Citation Reports: Philosophy 2017-8**]José Félix Costa and Diogo Poças. “[Solving Smullyan puzzles with formal systems](#)”, *Axiomathes* 28(2):181-199, Springer, 2018.
- JA-44 [**Q1, Scimago**]Andrew Adamatzky, Selim Akl, Mark Burgin, Cristian S. Calude, José Félix Costa, Mohammad Mahdi Dehshibi, Yukio-Pegio Gunji, Zoran Konkoli, Bruce MacLennan, Bruno Marchal,

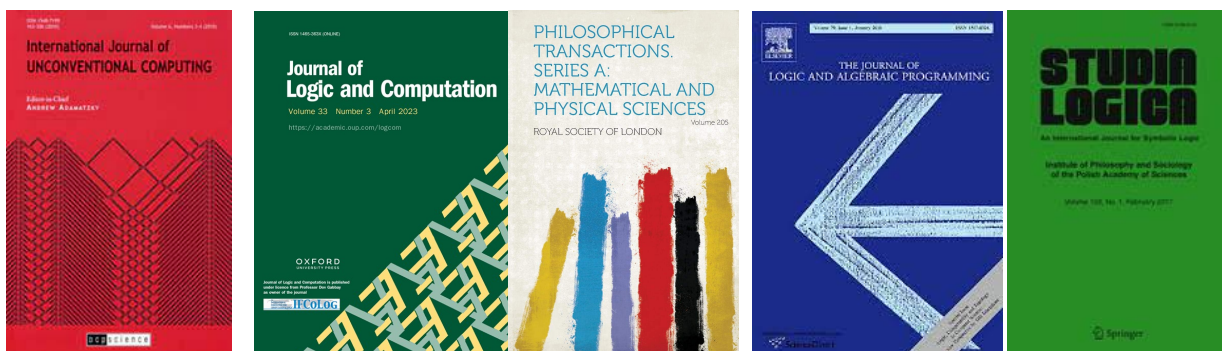
Maurice Margenstern, Genaro J. Martínez, Richard Mayne, Kenichi Morita, Andrew Schumann, Yaroslav D. Sergeyev, Georgios Ch. Sirakoulis, Susan Stepney, Karl Svozil, Hector Zenil. “East-West Paths to Unconventional Computing”, Progress in Biophysics & Molecular Biology, 131(1): 469-493, 2017.

- JA-43 [Q2, Scimago] José Félix Costa. “The unity of science as seen through the universal computer”, International Journal of Unconventional Computing, 13(1): 59-81, Old City Publishing, Inc., 2017.
- JA-42 [Q1, Scimago] Edwin Beggs, José Félix Costa, Diogo Poças, and John V. Tucker. “Computations with oracles that measure vanishing quantities”, Mathematical Structures in Computer Science, Cambridge University Press, 27(8): 1315-1363, 2017. .
- JA-41 José Félix Costa. “A física da terminação”, Kairos, Journal of Philosophy & Science, 16(1): 14-60, De Gruyter, 2016.
- JA-39 [Q3, Q4 Scimago] José Félix Costa. “Uncertainty in time”, Parallel Processing Letters. 25(1), March 2015.
- JA-38 [Q1, Scimago] Edwin Beggs, José Félix Costa, and John V. Tucker. “Three forms of physical measurement and their computability”, The Review of Symbolic Logic, 7(4): 618-646, 2014.



- JA-37 [Q1, Scimago: Computer Science 2013] Edwin Beggs, José Félix Costa, Diogo Poças, and John V. Tucker. “An Analogue-digital Church-Turing Thesis”, International Journal of Foundations of Computer Science 25(4): 373-389, June 2014.
- JA-36 [Q2, Scimago] Edwin Beggs, José Félix Costa, and John V. Tucker. “A natural computation model of positive relativization”, International Journal of Unconventional Computing, 10(1-2): 111-141, Old City Publishing, Inc., 2014.
- JA-35 [Q1, Q2 Scimago] José Félix Costa. “Incomputability at the Foundations of Physics (A Study in the Philosophy of Science)”, Journal of Logic and Computation, 23(6): 1225-1248, 2013.
- JA-34 [Q1, Scimago] Edwin Beggs, José Félix Costa, Diogo Poças, and John V. Tucker. “Oracles that measure thresholds: The Turing machine and the broken balance”, Journal of Logic and Computation, 23(6): 1155-1181, 2013.
- JA-33 [Q1, Q2 Scimago] José Félix Costa and Raimundo Leong. “The ARNN model relativizes $P=NP$ and $P \neq NP$ ”, Theoretical Computer Science, 499(1): 2-22, Elsevier, 2013.
- JA-31 [Q2, Scimago] Hélia Guerra and José Félix Costa. “Processes with infinite liveness requirements”, Journal of Logic and Algebraic Programming, 82(3-4): 137-161, Elsevier, 2013.

- JA-30 [Q2, Scimago: Computer Science 1999, 2005-8] Edwin Beggs, José Félix Costa, and John V. Tucker. “[The impact of limits of computation on a physical experiment](#)”, *Mathematical Structures in Computer Science* 22(05): 853-879, Cambridge University Press, 2012.
- JA-29 [Q1, Scimago: Mathematics 2011-12] Edwin Beggs, José Félix Costa, and John Tucker. “[Axiomatising physical experiments as oracles to algorithms](#)”, *Philosophical Transactions of the Royal Society, Series A (Mathematical, Physical and Engineering Sciences)*, 370(171): 3359-3384, July 28, 2012.
- JA-28 [Q2, Scimago: Computer Science 1999, 2005-8] Edwin Beggs, José Félix Costa, and John V. Tucker. “[Limits to measurements in experiments governed by algorithms](#)”, *Mathematical Structures in Computer Science* 20(06):1019-1050, Cambridge University Press, 2010.
- JA-27 [Q1, Scimago: Logic 2020, History and Philosophy of Science 1999-2020] Edwin Beggs, José Félix Costa, and John V. Tucker. “[Physical oracles: the Turing machine and the Wheatstone bridge](#)”, in Diederik Aerts, Sonja Smets, and Jean Paul Van Bendegeme (editors): *The Contributions of Logic to the Foundations of Physics*, *Studia Logica* 95(1-2):279-300, 2010.



- JA-26 [Q1, Scimago] José Félix Costa, Bruno Loff, and Jerzy Mycka. “[A foundation for real recursive function theory](#)”, in Samuel R. Buss, S. Barry Cooper, Benedikt Löwe, and Andrea Sorbi, *Computation and Logic in the Real World: CiE 2007*, *Annals of Pure and Applied Logic* 160(3):255-288, 2009.
- JA-25 [Q1, Scimago] Edwin Beggs, José Félix Costa, Bruno Loff, and John V. Tucker. “[Computational complexity with experiments as oracles. II. Upper bounds](#)”, *Proceedings of the Royal Society, Series A (Mathematical, Physical and Engineering Sciences)* 465(2105): 1453-1465, 2009.
- JA-24 [Q2, Scimago] Hélia Guerra and José Félix Costa. “[Processes with local and global liveness requirements](#)”, *Journal of Logic and Algebraic Programming* 78(3):117-137, 2009.
- JA-23 [Q2, Scimago] Bruno Loff and José Félix Costa. “[Five views of hypercomputation](#)”, in Mike Stannett (editor): *Future Trends in Hypercomputation*, *International Journal of Unconventional Computing* 5(3-4):193-207, Old City Publishing, Inc., 2009.
- JA-22 [Q1, Scimago] Edwin Beggs, José Félix Costa, Bruno Loff, and John Tucker. “[Computational complexity with experiments as oracles](#)”, *Proceedings of the Royal Society, Series A (Mathematical, Physical and Engineering Sciences)* 464(2098):2777-2801, October 8, 2008.
- JA-21 [Q1, Scimago] Bruno Loff, José Félix Costa, and Jerzy Mycka. “[Computability on reals, infinite limits and differential equations](#)”, *Applied Mathematics and Computation* 191(2):353-371, Elsevier, 2007.

- JA-20 [Q2, Scimago] Jerzy Mycka, José Félix Costa, and Francisco Coelho. “The Euclid abstract machine”, *International Journal of Unconventional Computing* 4(3):223-248, Old City Publishing, 2007.
- JA-19 [Q1, Q2 Scimago] Jerzy Mycka and José Félix Costa. “A new conceptual framework for analog computation”, *Theoretical Computer Science* 374(1-3):277-290, Elsevier, 2007.
- JA-18 [Q1, Scimago] Jerzy Mycka and José Félix Costa. “The $P \neq NP$ conjecture in the context of real and complex analysis”, *Journal of Complexity* 22(2):287-303, Elsevier, 2006.
- JA-17 [Q1, Scimago] Jerzy Mycka and José Félix Costa. “Undecidability over continuous-time”, *Logic Journal of the IGPL* 14(5): 649-658, Oxford University Press, 2006.



- JA-16 [Q1, Scimago] Jerzy Mycka and José Félix Costa. “Real recursive functions and their hierarchy”, *Journal of Complexity* 20(6):835-857, 2004.
- JA-15 [Q1, Scimago] Daniel Graça and José Félix Costa. “Analog computers and recursive functions over the reals”, *Journal of Complexity* 19(5):644-664, 2003.
- JA-13 [Q1, Scimago] Manuel Lameiras Campagnolo, Cristopher Moore, and José Félix Costa. “An analog characterization of the Grzegorzcz hierarchy”, *Journal of Complexity* 18(3):977-1000, 2002.
- JA-12 [Q1, Scimago] Manuel Campagnolo, Cris Moore, and José Félix Costa. “Iteration, inequalities, and differentiability in analog computers”, *Journal of Complexity* 16(4):642-660, 2000.
- JA-11 [Q2, Scimago] Paulo Blauth Menezes, Amílcar Sernadas, and José Félix Costa. “Nonsequential automata semantics for a concurrent object-based language”, *Electronic Notes in Theoretical Computer Science* 14(1), 1998.
- JA-10 [Q2, Scimago] José Luiz Fiadeiro and José Félix Costa. “Mirror, mirror in my hand... a duality between specifications and models of process behaviour”, *Mathematical Structures in Computer Science* 6:353-373, Cambridge University Press, 1996.
- JA-09 Paulo Blauth Menezes and José Félix Costa. “Synchronization in Petri nets”, *Fundamenta Informaticæ* 26:11-22, *Annales Societatis Mathematicæ Polonæ*, IOS Press, 1996.
- JA-08 Amílcar Sernadas, Cristina Sernadas, and José Félix Costa. “Object specification logic”, *Journal of Logic and Computation* 5(5):603-630, Oxford University Press, 1995.
- JA-07 José Félix Costa and Amílcar Sernadas. “Progress assumption in concurrent systems”, *Formal Aspects of Computing* 7[1]:18-36, Springer-Verlag, 1995.

JA-06 Paulo Blauth Menezes and José Félix Costa. “Compositional reification of concurrent systems”, Journal of the Brazilian Computer Society 2: 50-67, Special Issue on Parallel Computation, 1995.



JA-05 José Félix Costa, Amílcar Sernadas, and Cristina Sernadas. “Object inheritance beyond subtyping”, Acta Informatica, 31(1):5-26, Springer-Verlag, 1994.

JA-04 José Luiz Fiadeiro and José Félix Costa. “Espelho, espelho meu...”, in Proceedings of the 3rd Meeting of Portuguese Algebraists, 71-86, Universidade de Coimbra, 1993.

JA-03 José Félix Costa and Amílcar Sernadas. “A categorial framework of process interconnection”, The INESC Journal of Research and Development 4(1): 81-93, 1993.

JA-02 Amílcar Sernadas, Hans-Dieter Ehrich, and José Félix Costa. “From processes to objects”, The INESC Journal of Research and Development 1(1):7-27, 1990.

REVIEW Edwin Beggs, José Félix Costa, and John V. Tucker. “Physical experiments as oracles”, Bulletin of the European Association for Theoretical Computer Science, 97:137-151, February 2009.



Selection of papers published in LNCS

LNCS-19 [Q2, Q3 Scimago] José Félix Costa, “The Power of Analogue-digital Machines”. Unconventional Computation and Natural Computation 2017, Lecture Notes in Computer Science, Springer-Verlag, 2017.

LNCS-18 [Q2, Q3 Scimago] Edwin Beggs, José Félix Costa, Diogo Poças, and John V. Tucker, “On the power of threshold measurements as oracles”, in Giancarlo Mauri, Alberto Dennunzio, Luca Manzoni, and Antonio E. Porreca (Editors), Unconventional Computation and Natural Computation 2013, Lecture Notes in Computer Science 7956:6-18, Springer-Verlag, 2013.

- LNCS-15 [Q2, Q3 Scimago] Edwin Beggs, José Félix Costa, Bruno Loff, and John Tucker. “On the complexity of measurement in classical physics”, in M. Agrawal, D. Du, Z. Duan, and A. Li (editors), Theory and Applications of Models of Computation, TAMC 2008, Xi’an, China, April 25-29, 2008, Lecture Notes in Computer Science 4978:20-30, Springer, 2008.
- LNCS-14 [Q2, Q3 Scimago] Daniel Pacheco and José Félix Costa. “The abstract immune system algorithm”, in S. G. Akl, C. S. Calude, M. J. Dinneen, G. Rozenberg, H. T. Wareham (editors), Proceedings of the 6th Intl. Unconventional Computation 2007, UC 2007, Lecture Notes in Computer Science 4618:137-149, Springer, 2007.
- LNCS-12 [Q2, Q3 Scimago] Jerzy Mycka, Francisco Coelho, and José Félix Costa. “Euclid abstract machine: the trisection of the angle and the halting problem”, in G. Rozenberg (editors), Proceedings of the 5th Intl. Unconventional Computation 2006, UC 2006, Lecture Notes in Computer Science 4135:195-206, Springer, 2006.



- LNCS-11 [Q2, Q3 Scimago] Jerzy Mycka and José Félix Costa. “The computational power of continuous dynamic systems”, Machines, Computations, and Universality, MCU 2004, Lecture Notes in Computer Science 3354:163-174., Springer, 2005.
- LNCS-10 [Q2, Q3 Scimago] José Félix Costa and Hugo Lourenço, “Canonical institutions of behavior”, in Maura Cerioli and Gianna Reggιο (editores), Recent Trends in Algebraic Development Techniques, Lecture Notes in Computer Science 2267:71-84, Springer-Verlag, 2001.
- LNCS-09 [Q2, Q3 Scimago] Pedro Rodrigues, José Félix Costa, and Hava T. Siegelmann. “Verifying Properties of Neural Nets”, in José Mira and Alberto Prieto (editors), Connectionist Models of Neurons, Learning Processes, and Artificial Intelligence, Lecture Notes in Computer Science 2084: 158-165, Springer-Verlag, 2001.
- LNCS-06 [Q2, Q3 Scimago] Paulo Blauth Menezes, José Félix Costa, and Amílcar Sernadas. “Refinement mapping for general (discrete event) systems theory”, in F. Pichler, R. Moreno Diaz, and R. Albrecht (editors), Computer Aided Systems Technology, EUROCAST’95, Lecture Notes in Computer Science, 1030: 103-116, Springer-Verlag, 1995.
- LNCS-05 [Q2, Q3 Scimago] José Luiz Fiadeiro and José Félix Costa. “Institutions for behaviour specification”, in E. Astesiano, G. Reggιο, and A. Tarlecki (editors), Recent Trends in Data Type Specification, Lecture Notes in Computer Science 906:273-289, Springer-Verlag, 1995.



- LNCS-04 [Q2, Q3 Scimago] Amílcar Sernadas, José Félix Costa, and Cristina Sernadas. “An institution of object behaviour”, in H. Ehrig and F. Orejas (editors), Recent Trends in Data Type Specification, Lecture Notes in Computer Science 785:337-350, Springer-Verlag, 1994.
- LNCS-03 [Q2, Q3 Scimago] José Félix Costa, Amílcar Sernadas, and Cristina Sernadas. “Data encapsulation and modularity: three views of inheritance”, in A. Borzyszkowski and S. Sokolowski (editors), Mathematical Foundations of Computer Science '93, Lecture Notes in Computer Science, 711: 382-391, Springer-Verlag, 1993.
- LNCS-02 [Q2, Q3 Scimago] José Luiz Fiadeiro, José Félix Costa, Amílcar Sernadas, and Tom Maibaum. “Process semantics of temporal logic specifications”, in M. Bidoit and C. Chopy (editors), Recent Trends in Data Type Specification: 8th Workshop on Specification of Abstract Data Types - Selected Papers, Lecture Notes in Computer Science 655:236-253, Springer-Verlag, 1993.
- LNCS-01 [Q2, Q3 Scimago] José Félix Costa, Amílcar Sernadas, Cristina Sernadas, and H.-D. Ehrich. “Object interaction”, in I. Havel and V. Koubek (editors), Mathematical Foundations of Computer Science '92, Lecture Notes in Computer Science 629:200-208, Springer, 1992.

Edition of journal issues and proceedings

- ED-AMC-03 Cristian S. Calude, José Félix Costa, and Hélia Guerra (Guest Editors). Special Issue “Towards a computational interpretation of physical theories”, *Applied Mathematics and Computation*, Volume 219, Issue 1, Elsevier, September 15, 2012.
- ED-NC-03 José Félix Costa and Nachum Dershowitz (Guest Editors). Special Issue on Unconventional Computation, *Natural Computing*, Volume 10, Issue 4, Springer, December, 2011.
- ED-IJUC-01 Cristian S. Calude and José Félix Costa (Guest Editors). Special Issue on Physics and Computation, *International Journal of Unconventional Computing*, Volume 7, Issue 5, Old City Publishing Science Journals, September/October 2011.
- ED-NC-02 Cristian S. Calude and José Félix Costa (Guest Editors). Special Issue on Unconventional Computing, *Natural Computing*, Volume 9, Issue 4, Springer, December, 2009.
- ED-AMC-02 Cristian S. Calude and José Félix Costa (Guest Editors). Special Issue on Physics and Computation, *Applied Mathematics and Computation*, Volume 215, Issue 4, Elsevier, October 15, 2009.
- ED-NC-01 Cristian S. Calude and José Félix Costa (Guest Editors). Special Issue on Physics and Computation, *Natural Computing*, Volume 8, Issue 3, Springer, September 2009.

ED-AMC-01 Francisco António Dória and José Félix Costa (Guest Editors). Special Issue on Hypercomputation, *Applied Mathematics and Computation*, Volume 178, Issue 1, Elsevier, July 1, 2006.



LNCS-ED-02 Cristian S. Calude, José Félix Costa, Nachum Dershowitz, Elisabete Freire, and Grzegorz Rozenberg, editors of *Lecture Notes in Computer Science*, Volume 5715, Unconventional Computation, 8th International Conference, UC 2009, Ponta Delgada, Azores, Portugal, September 7-11, Springer, 2009.



LNCS-ED-01 Cristian S. Calude, José Félix Costa, Rudolf Freund, Marion Oswald, and Grzegorz Rozenberg, editors of *Lecture Notes in Computer Science*, Volume 5204, Unconventional Computation, 7th International Conference, UC 2008, Vienna, Austria, August 25-28, Springer, 2008.

Books and book chapter published

B-03 “*Matemática Discreta*” by José Félix Costa and Paula Gouveia, ISTPress, January 2019, 710 pp.



- B-02 “[Génese da Revolução Astronómica](#)” by José Félix Costa, Escolar Editora, 2000.
- B-01 “[FÍSICA](#)”, Addison-Wesley, 1999, 936 pp, coordinator of the Portuguese version of PHYSICS by Marcelo Alonso and Edward J. Finn, PHYSICS, Addison-Wesley, 1998.
- BOOK-10 José Félix Costa and Paula Gouveia. “The Clock of the Apocalypse – The Rhythms of Life and the Ending of Time”, in Andrew Adamatzky (editor): Unconventional Computing, Arts, Philosophy, World Scientific, 2024, to be published.
- BOOK-09 José Félix Costa and Paula Gouveia. “[Labyrinth: From Literature to Algorithms](#)”, in Andrew Adamatzky (editor): Unconventional Computing, Arts, Philosophy, World Scientific, 2022.
- BOOK-08 João Alves Alírio, José Félix Costa, and Luís Filipe Fonseca. “[Space Bounded Scatter Machines](#)”, in Andrew Adamatzky (editor): Handbook of Unconventional Computing, volume 1, chapter 3, pp. 59-97, World Scientific, 2021.
- BOOK-07 Edwin Beggs, Pedro Cortez, José Félix Costa, and John V. Tucker. “[A hierarchy for BPP//log \$\star\$ based on counting calls to an oracle](#)”, in Andrew Adamatzky (editor): Emergent Computation (Festschrift for Selim Akl), Chapter III: 39-56. Book series: Emergence, Complexity and Computation, Vol. 21, Springer, 2016.
- BOOK-06 Tânia Ambaram, Edwin Beggs, José Félix Costa, Diogo Poças, and John V. Tucker. “[An Analogue-digital Model of Computation: Turing Machines with Physical Oracles](#)”, in Andrew Adamatzky (editor): Advances in Unconventional Computing, chapter IV: 73-115. Book series: Emergence, Complexity and Computation, Vol. 22, Springer, 2016.
- BOOK-05 Edwin Beggs, José Félix Costa, and John V. Tucker. “[Unifying science through computation: Reflections on computability and physics](#)”, in Olga Pombo, Juan Manuel Torres, John Symons, and S. Rahman (editors): Special Sciences and the Unity of Science, Book series: Logic, Epistemology, and the Unity of Science, Vol. 24, Springer, 2012, 53-80.



- BOOK-04 Edwin Beggs, José Félix Costa, and John V. Tucker. “[Computational Models of Measurement and Hempel’s Axiomatization](#)”, in Arturo Carsetti (editor): Causality, Meaningful Complexity and Embodied Cognition, Book Series: Theory and Decision Library A, Vol. 46, Springer, 2010, 155-184.
- BOOK-03 José Félix Costa, Bruno Loff, and Jerzy Mycka. “[Differential Equations, Infinite Limits and Real Recursive Functions](#)”, in M. Demiralp, W. B. Mikhael, A. A. Caballero, et al. (editors): Computational Methods and Applied Computing, Book Series: Mathematics and Computers in Science and Engineering, World Scientific and Engineering Academy and Society, 2008, 294-299.

- BOOK-02 João Pedro Neto, José Félix Costa, Paulo Carreira, and Miguel Rosa. “[A compiler and simulator for partial recursive functions over neural networks](#)”, in Ahmad Lotfi and Jonathan M. Garibaldi (editors), Applications and Science in Soft Computing, Springer-Verlag, 2004, 39-46.
- BOOK-01 Carlos Paredes, José Luiz Fiadeiro, and José Félix Costa. “[Architectural specifications: modeling and structuring behavior through rules](#)”, in H. Kilov and W. Harvey (editors), Object-Oriented Behavioral Specifications, Kluwer Academic Publishers, 1996, 221-240.



Advisor of post-doc researchers

Danilo Montesi. Project: “Foundations and Applications of Object-oriented Rule Languages for Database Systems”, Programme of Research of INESC/FCUL, from October 1993 to April 1994.

Advisor of (PhD) students

Luís Miguel Pacheco Mendes Gomes. Dissertation: “Applications of Real Recursive Infinite Limits”, (PhD) in Informatics (branch Theory of Computation), University of the Azores, 2007.

Hélia Marília Ferreira Guerra. Dissertation: “Teoria Algébrica de Processos Sequenciais com Requisitos de Animação”, (PhD) in Informatics (branch “Theory of Computation”), University of the Azores, 2004.

João Pedro Guerreiro Neto. Dissertation: “Construção Modular de Redes Neurais Recorrentes Analógicas”, (PhD) in Informatics, Faculty of Sciences, University of Lisbon, 2002. (Co-advisor Helder Coelho.)

Manuel Lameiras de Figueiredo Campagnolo. Dissertation: “Computational Complexity of Real Valued Recursive Functions and Analog Circuits”, (PhD) in Mathematics, IST Instituto Superior Técnico, University of Lisbon, 2002. (Co-advisor Cristopher Moore.)

Paulo Fernando Blauth Menezes. Dissertation: “Reificação de Objectos Concorrentes”, (PhD) in Mathematics, Instituto Superior Técnico, University of Lisbon, 1997. (This researcher worked with José Félix Costa, although he was formally enrolled and advised in another University.)

Advisor of MSc students

Anthony Guilherme. Dissertation: “A Study of Simpleminded Scientists”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, September 2023.

Henrique Miguel De Andrade Campos Navas. Dissertation: “Weekly non-computable processes described by evolving recursive functions”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, June 2023.

Eduardo Skapinakis. Dissertation: “Measuring quantities with analogue-digital systems”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, March 2022.

Luís Filipe Barreiros Fonseca. Dissertation: “The computational power of infinite precision measurements”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, 2020.

Bruno Miguel Carrajola Patrício. Dissertation: “Automated Search of Functions and Synthesis of Programs”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, 2019.

Vasco Boavida de Brito. Dissertation: “The Power of Unreliability in Analogue-Digital Computation”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, 2017.

João Alves Alírio. Dissertation: “Scatter machines in bounded space”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, 2017.

Martim Cortez de Lobão. Dissertation: “Identifying Empirical Laws”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, 2016.

Pedro Cortez Rodrigues. Dissertation: “BPP//log \star (Random Walks as Oracles)”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, 2015.

Tânia Filipa Nascimento Ambaram. Dissertation: “Theory of two-sided experiments (A new insight on measurable numbers)”, MSc in Applied Mathematics, IST Instituto Superior Técnico, Universidade de Lisboa, 2014.

Diogo Miguel Ferreira Poças. Dissertation: “Complexity with costing and stochastic oracles”, MSc in Applied Mathematics, IST Instituto Superior Técnico, University of Lisbon, 2013.

Raimundo Coelho Leong. Dissertation: “Positive relativizations of $P=NP$ and $P\neq NP$ in the ARNN model”, MSc in Applied Mathematics, IST Instituto Superior Técnico, University of Lisbon, 2010.

Bruno Serra Loff Barreto. Dissertation: “Physics, Computation, and Definability”, MSc in Informatics, IST Instituto Superior Técnico, University of Lisbon, 2007.

José Daniel Dias Pacheco. Dissertation: “Computational Power of Killers and Helpers in the Immune System”, MSc in Informatics, Faculty of Sciences, University of Lisbon, 2004.

Daniel da Silva Graça. Dissertation: “The Analog Purpose Analog Computer and Recursive Functions over the Reals”, MSc in Mathematics, IST Instituto Superior Técnico, University of Lisbon, 2002.

Francisco Cipriano da Cunha Martins. Dissertation: “Computação em Redes Idiotópicas, MSc in Informatics”, University of Azores, 2000.

Pedro Miguel de Andrade Rodrigues. Dissertation: “Verificação de Propriedades em Redes Neurais”, MSc in Informatics, Faculty of Sciences, University of Lisbon, 2000.

Sara Guilherme Oliveira da Silva. Dissertation: “Previsão da Estrutura Secundária de Proteínas Utilizando Redes Neurais”, MSc in Informatics, Faculty of Sciences, University of Lisbon, 1999. (Co-advisor: Pedro Silva.)

Sérgio Moura Santana. Dissertation: “Computação Analógica em NetWay”, MSc in Informatics, Faculty of Sciences, University of Lisbon, 1997.

João António de Oliveira Maçãs. Dissertation: “Computação no Limiar do Eu - Um Novo Algoritmo Evolutivo”, MSc in Informatics, Faculty of Sciences, University of Lisbon, 1997.

Hélia Marília Goulart Ferreira de Oliveira Guerra. Dissertation: “Poder Computacional das Redes Neurais”, MSc in Informatics, Faculty of Sciences, University of Lisbon, 1997.

Maria Antónia Bacelar da Costa Lopes. Dissertation: “Herança na Especificação OBLOG: Um Sistema Correcto e Adequado de Reescrita do Comportamento”, MSc in Applied Mathematics, Instituto Superior Técnico, University of Lisbon, 1993. (This researcher worked with José Félix Costa, although she was formally enrolled and advised in another University.)

Advisor of diploma thesis (ended with Bolonha treaty)

Alexandre Paulo Lourenço Francisco. Dissertation: “Finite Automata over Continuous-time”, Graduation in Applied Mathematics and Computation, Instituto Superior Técnico, University of Lisbon, June 2002.

Ricardo Joel Marques dos Santos Silva. Dissertation: “On the Computational Power of Sigmoidal Neural Networks”, Graduation in Applied Mathematics and Computation, Instituto Superior Técnico, University of Lisbon, June 2002.

Luís Calhorda Cruz-Filipe. Dissertation: “ λ -calculus and Beyond”, Graduation in Applied Mathematics and Computation, Instituto Superior Técnico, University of Lisbon, June 2001.

Sara Guilherme Oliveira da Silva. Dissertation: “Arquitecturas de Ressonância Aplicadas na Classificação de Imagens de Satélite”, Graduation in Informatics, Faculdade de Ciências, University of Lisbon, September 1995.

Rui Jorge Soares da Silva Bastos. Dissertation: “Computação Associativa Aplicada à Emergência de Conceitos”, Graduation in Informatics, Faculdade de Ciências, University of Lisbon, September 1995.

Jaime Alexandre dos Santos Rodrigues. Dissertation: “Experimentação em Algorítmica Genética”, Graduation in Applied Mathematics, Instituto Superior de Línguas e Administração, June 1995.

Carla Alexandra Félix Silva. Dissertation: “Verificação de Propriedades Temporais”, Graduation in Applied Mathematics, Instituto Superior de Línguas e Administração, July 1994.

João António de Oliveira Maçãs. Dissertation: “Máquinas Abstractas e Programação”, Graduation in Applied Mathematics, Instituto Superior de Línguas e Administração, July 1994.

Luís Miguel Pacheco Mendes Gomes. Dissertation: “Through the Looking Glass”, Graduation in Applied Mathematics, Instituto Superior de Línguas e Administração, July 1994.

Nuno Gonçalo Gaspar dos Santos Guarda. Dissertation: “a-Life: Vida Artificial”, Graduation in Applied Mathematics, Instituto Superior de Línguas e Administração, July 1994.

Pedro Manuel Valério Vília. Dissertation: “Sistemas Auto-replicadores”, Graduation in Applied Mathematics, Instituto Superior de Línguas e Administração, July 1994.

Mário Jorge Alexandre Arrais. Dissertation: “Cálculo- λ ”, Graduation in Applied Mathematics and Computation, Instituto Superior Técnico, University of Lisbon, July 1993.

Rosa Maria Mimoso. Dissertation: “Model-Checking: Composicionalidade”, Graduation in Applied Mathematics and Computation, Instituto Superior Técnico, University of Lisbon, July 1993.

Sofia Maria Figueiredo Cardoso. Dissertation: “Model Checking: Verificação de Propriedades Temporais de Diagramas de Comportamento”, Graduation in Applied Mathematics and Computation, Instituto Superior Técnico, University of Lisbon, July 1993.

Tutor

André Cheng, project on Machine Learning “Identification of Regular Languages with Computable Scientists”, 2023.

João Melo, project “On Universal Turing Machines”, 2022.

Gabriel Matos, project on Machine Learning “An Exhaustive Algorithm for Minimum State Automaton Identification”, 2017.

Gilberto Silva, project “Collider machine experiment simulator”, 2017.

Sérgio Daniel Gonçalves Melo Pequito, project “The Perceptron”, 2007.

Teresa Alves de Matos, project “Mathematics in Ancient Egypt”, 2007.

António Reis, scholarship holder of the programme “Novos Talentos da Matemática” of the Fundação Calouste Gulbenkian, 2006.

Ricardo Gonçalves Rodrigues, scholarship holder of the programme “Novos Talentos da Matemática” of the Fundação Calouste Gulbenkian, 2000.

Workshops and conferences

Steering committee

Member of the Steering Committee of the Workshop on Physics and Computation, together with Caslav Brukner, Cristian S. Calude, Gregory Chaitin, and István Németi (for the events of 2008, 2009, 2010, and 2012).

Chair

General chair of the conference UC 2009, 8th [International Conference on Unconventional Computation](#), Ponta Delgada, September 7-11, 2009.

Co-chair of the Programme Committee of the conference UC 2008, Seventh [International Conference on Unconventional Computation](#), TU Vienna, Vienna, Austria, August 25-28, 2008.

Workshop organizer

Co-organizer (together with Valentina Harizanov) the Special Session “COMPUTABILITY” of the Logic Colloquium 2013, University of Évora, Portugal, July 22-27, 2013.

Co-organizer (together with Cristian Calude, Walid Gomaa, Hélia Guerra, and Karl Svozil) the Third International Workshop on Physics and Computation, Egypt, August 30 – September 4, 2010.

Co-organizer (together with Cristian S. Calude) of the [Workshop on Physics and Computation \(Physics and Computation 2008\)](#), satellite event of the Conference UC 2008, August 25-28, 2008.

Invited speaker

16th International Conference, UCNC 2017, Fayetteville, AR, USA, June 5-9. Title: “[The Power of Analogue-digital Machines](#)”.

[Workshop on Physics and Computation](#), LARSIM and QuPa joint workshop, Institut Henri Poincaré, June 28-29, 2012. Title: “The Computational Power of Experiments in Physics”.

Workshop “The Incomputable”, Kavli Royal Society International Centre, Chicheley Hall, June 12-15, 2012. Title: “Classifying the Theories of Physics”.

9th International Conference on Unconventional Computation, UC 2010, Tokyo, June 21-25, 2010. Title: “Computable Scientists, Uncomputable World”.

[Workshop Complexity Resources in Physical Computation](#), Oxford University Computing Laboratory, Oxford, UK, August 24-26, 2009. Title: “Computable scientists, Uncomputable Nature”.

Conference Science and Philosophy of Unconventional Computing (SPUC09, organized by Mark Hogarth), Cambridge, UK, March 23-25, 2009. Title: “Physical Oracles”.

International Colloquium on Causality, Meaningful Complexity and Knowledge Construction, University of Rome “Tor Vergata” (organized by Arturo Carsetti), Rome, June 5-7, 2008. Title: “The Laplace Daemon Revisited”.

The 24th British Colloquium for Theoretical Computer Science, Grey College (organized by Hajo Broersma, Tom Friedetzky, and Daniël Paulusma), Durham University, UK, April 7-10, 2008. Title: “Physics and Computation: An Essay on the Unity of Science Through Computability”.

[CiE 2007, Special Session of the Conference Computability in Europe 2007: Computation and Logic in the Real World](#), University of Siena, Siena, June 18-23, 2007. Title: “The New Promise of Analog Computation”.

[Workshop on Hypercomputation](#) (organized by Mike Stannett), Sheffield, September 11-13, 2006. Title: “Five Views over Hypercomputation”.

[International Logic and Computer Science Semester at Tel-Aviv](#) (Tel Aviv University), Models of Computation, March 10-12, 2004. Title: “Analog computation and beyond”.

Foundations of information systems Specification and Design, Dagstuhl Seminar, Schloss Dagstuhl, March 1992. Title: “Algebraic Theory of Transition Systems Implementation”.

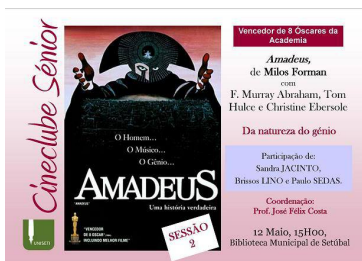


Special session on the Turing centennial, organized by Academia das Ciências de Lisboa, November 8, 2012. Title: “O cientista como algoritmo”.

Colóquio do Centro de Matemática da Universidade do Minho, Anfiteatro da Escola de Ciências, Campus de Gualtar, May 23, 2012. Title: “O cientista como algoritmo”.

Talks to the general public (selection)

Besides teaching and research, José Félix Costa kept long term interest in popularizing science, by means of writing chapters of books, by editing and revising translations of popular science books, or by delivering courses on the History and Philosophy of Science. He was also responsible for film clubs, first in the University of Azores (in the beginning of his career) and, more recently, in a Senior University in Setúbal (until 2012).



Cosmology

Seminário de Matemática: “O Universo no verso de um sobrescrito”, DMIST, October 2020.

Escola de Verão de Geometria: “100 anos de Relatividade Geral”, 13-17 de julho, 2015. Title: “Porque é o céu escuro à noite?”

Conference, Cinema Charlot Setúbal, June 20, 2012. Title: “O Universo de Hamlet”.

Observatório Astronómico de Lisboa, May 25, 2007. Title: “Newtonian Cosmology”.

Club Setubalense, April 12, 2007. Title: “As Concepções Clássicas do Universo e os Primeiros Passos da Revolução Científica”.

Planetário Calouste Gulbenkian (sponsored by Sociedade Portuguesa de Física), together with Máximo Ferreira, May 1982. Title: “Paradoxos Cosmológicos”.

History and philosophy of science

“Mistérios do Calendário: O Calendário da República Romana Tardia (I a.C.)”, terceira edição do colóquio “Introdução à Cultura e às Línguas Clássicas” – Associação CLENARDVS, November 2022.

“Controvérsia Interdisciplinar na Génese da Computação Digital”, [IV workshop of the thematic line “Unity of Science and Interdisciplinarity – Illustrative ID cases”](#), Faculty of Sciences, 2017.

Book presentation: “Entre o Conceito e a Imagem. O lugar da Psicanálise na obra de Gaston Bachelard” by Ana Gaspar, organized by Centro de Filosofia das Ciências da Universidade de Lisboa, Livraria Escolar Editora, Faculty of Sciences, May 14, 2010.

“Bachelard’s Implicit Measurement Theory of Physical and Chemical Quantities”, [Workshop “Bachelard: Conceitos & Imagens”](#), organized by Centro de Filosofia das Ciências da Universidade de Lisboa, May 14, 2010.

“Obsessão pela Ciência: O Caso de Maria Sklodowska”, Dia Internacional da Mulher, Organização de Palmira Santana, Auditório da Biblioteca Municipal de Setúbal, March 8, 2010.

“O Lugar da Imaginação em Ciência”, [Workshop “Os lugares da Epistemologia e da Poética de Gaston Bachelard”](#), Centro da Filosofia das Ciências da Universidade de Lisboa, December 10, 2007

“Physics and Computation: An essay on the unity of science through computation”, First Lisbon Colloquium for the Philosophy of Science, “The Unity of Science: Non-Traditional Approaches”, October 25-28, 2006.

“A História e Filosofia da Ciência”, Workshop “Ciência e Filosofia entre Rómulo de Carvalho e António Gedeão”, Centro de Filosofia das Ciências da Universidade de Lisboa, November 24, 2006.

“The Computing Universe”, Centro da Filosofia das Ciências da Universidade de Lisboa, March 8, 2006.

“A Matemática no Antigo Egipto”, Escola Secundária Antero de Quental, Ponta Delgada, May 1986.

Mathematics and computer science

José Félix Costa, “[A vida e a ciência de Turing \(Jogo da Imitação\)](#)”, in Óscares 2015, Jornal Expresso.

“Os Labirintos”, Escola Secundária de Sebastião e Silva, May 25, 2022.

“[Os Labirintos](#)”, Escola Secundária de Pombal, May 20, 2022. [SLIDES](#).

“Os Labirintos”, Colégio de S. Tomás, May 11, 2022.

“Os Labirintos”, Escola Secundária de Raul Proença, February 5, 2018.

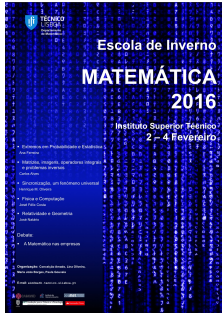
“Os Labirintos”, Escola Secundária de D. Pedro V, November 10, 2017.

“Códigos e Mensagens Secretas”, [Matemática no Técnico 2021: Vem conhecer as melhores profissões do mundo...](#), June 21, 2021. [SLIDES](#).

“Usos do Grego Clássico na Terminologia Científica”, Escola Secundária de Sebastião e Silva, June 8, 2021.

“O Calendário”, CFCUL - Centro de Filosofia das Ciências da Universidade de Lisboa, November 2019.

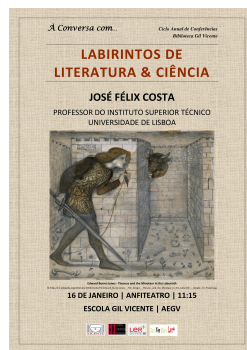
“On discovering scientific laws”, Seminário Permanente de Filosofia das Ciências, CFCUL - Centro de Filosofia das Ciências da Universidade de Lisboa, January 2020.



“Física e Computação”, Seminário de Matemática, DMIST, October 2019.

“Complexidade da Computação Híbrida (Analogico-Digital)”, EIM 2019 – Escola de Inverno de Matemática 2019, DMIST, February 6-8, 2019, Anfiteatro Abreu Faro.

“Sessão 1: O Calendário: O Sol na Igreja” and “Sessão 2: O Calendário: A Heresia da Páscoa”, Universidade Sénior de Setúbal, VI Universidade de Verão, Auditório Maestro Rui Serôdio, June 26-27, 2019.



“Segredos, sonhos e problemas do calendário: A matemática aplicada ao estudo do tempo”, Semana Raul Proença, Escola Secundária Raul Proença, April 2, 2019.

“Labirintos de Literatura & Ciência”, Biblioteca Gil Vicente, “À Conversa Com...” Ciclo Anual de Conferências, Escola Secundária de Gil Vicente, January 18, 2019.

“Os Labirintos”, PNL - Plano Nacional de Leitura, Teatro Thalia, November 25, 2018.

“Descoberta Automática de Leis Científicas”, Seminário de Matemática, IST, October 2018.

“Segredos do Calendário Gregoriano”, Seminário de Matemática, IST, October 2017.

“O Labirinto”, [Seminário de Doutoramento em Filosofia da Ciência, Tecnologia, Arte e Sociedade](#), February 2017.

“Os Labirintos”, Seminário de Matemática, IST, October 2016.

“Física e Computação”, [EIM – Escola de Inverno de Matemática 2016](#), DMIST, February 2016.

“Limites da Ciência e Ciência dos limites”, Seminário de Matemática, DMIST, September 2015.

“Teoria Matemática do Conhecimento”, [EIM – Escola de Inverno de Matemática 2015](#), DMIST, February of 2015.

“Sensorium Dei – As regularidades e irregularidades dos céus”, Seminário de Matemática, DMIST, novembro de 2014.

“Bioinformática, Ir Mais Além... Benefícios e Malefícios da Manipulação do Genoma Humano”, Semana da Ciência e da Tecnologia, Câmara Municipal de Portalegre, November 2001.

“Aplicações da Matemática: A Biocomputação”, Sociedade Portuguesa de Matemática – Ano Mundial da Matemática (palestras do ano 2000), Escola Secundária Leal da Câmara, May 12, 2000.

“Bioinformática”, Opening Lesson of the School Year 1996/97, Department of Informatics, Faculty of Sciences, University of Lisbon, October 1996.

“Geração dos Biocomputadores”, Virtual Week “95, Students” Union of the Faculty of Sciences, University of Lisbon, December 1995.

“Engenharia da Linguagem e do Conhecimento”, Open Day in Faculty of Sciences, University of Lisbon, October 1994.

“Engenharia da Linguagem e do Conhecimento”, Debate on “Learning Mathematics Today” (carried out by the Instituto da Inovação Educacional do Ministério da Educação), Institut Franco-Portugais, May 1994.

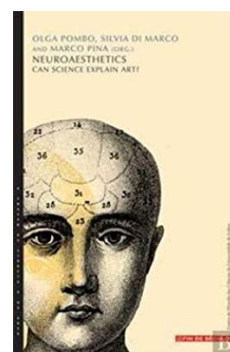
Science and art

“Neuroestética, Pode a ciência explicar a arte?”, Tertúlia CAIS DE CULTURAS, June 28, 2023. [SLIDES](#).

“Neuroestética, Pode a ciência explicar a arte?”, Jornadas Pedagógicas da Escola Secundária D. Pedro V e Instituto dos Pupilos do Exército, Instituto dos Pupilos do Exército, February 22, 2019.

“Neuroaesthetics”, Associação “Casa Veva de Lima”, Regular Seminar Series 2012, January 25, 2012.

Book presentation: “Neuroaesthetics – Can Science Explain Art?”, edited by Olga Pombo, Silvia di Marco, and Marco Pina, organized by Centro de Filosofia das Ciências da Universidade de Lisboa, Fábrica Braço de Prata, December 16, 2010.



“A Neurobiologia da Arte”, Seminar “Aproximações ao Conceito de Imagem XX”, organized by Centro de Filosofia das Ciências da Universidade de Lisboa, June 14, 2010.

“A Neurobiologia da Arte”, Sessão Inaugural AIA: “Artes, Ciências, Tecnologias”, September 21, 2009.

“A Quarta Dimensão na Arte”, Workshop “Caminhos da Complexidade: Ciência e Arte”, Arrábida, July 4-6 , 2005.