

# Curriculum Vitæ

*(short version)*

**Ernesto Jorge Fernandes Costa**

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## 1. Personal information

**Name:** Ernesto Jorge Fernandes Costa

**Personal Address:** Rua Daniel Rodrigues, 70 - 1D, 3030-257 Coimbra  
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**Nationality:** Portuguese

**Date and place of birth:** 15 of June of 1953, Coimbra (Portugal)

**Gender:** Male

## 2. Education and work experience

### Academic degrees <sup>1</sup>

- Agregation, Informatics Engineering, University of Coimbra, 1996.
- PhD, Electronic Engineering, University of Coimbra, 1985.
- Thèse 3ème Cycle, Informatique, Université Pierre et Marie Curie, 1981.
- Diplôme D'Etudes Approfondies, Computer Science, University of Paris, 1979.
- B.Sc. (5 years), Electronic Engineering, 1976.

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<sup>1</sup>fields of study, awarding institutions, dates in reverse chronological order

## Present position <sup>2</sup>

- Full Professor, University of Coimbra, 2001.

## Academic Responsibilities

- Rector of Universidade Independente of Lisbon (1993- 1996).
- Head of the Department of Informatics Engineering of the University of Coimbra (1997-1999)
- Head of the Centre for Informatics and Systems of the University of Coimbra (CISUC) (1998-2000)
- Head of the Scientific Board of the Department of Informatics Engineering of the University of Coimbra (2006 - 2008)

## Previous positions <sup>3</sup>

- Associate Professor, University of Coimbra, 1988.
- Assistant Professor, University of Coimbra, 1985.
- Teaching Assistant, University of Coimbra, 1977.

## Teaching Activities

Taught about 50 different courses in all areas of computer science, at different levels (B.Sc., M.Sc., Ph.D.) in several academic or corporate institutions, national and international.

## 3. Scientific work

### Areas of Research

- Artificial Intelligence
- Machine Learning
- Evolutionary Computation
- Complex Systems

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<sup>2</sup>institution, starting date

<sup>3</sup>institutions, dates in reverse chronological order

## Recent organization of scientific international meetings

- EuroGP 2003, 6th European Conference on Genetic Programming (publication chair).
- ALEA2003, International Workshop on Artificial Life and Evolutionary Algorithms, Beja, Portugal, December, 2003 (co-chair).
- Advanced School and Workshop on Soft Computing and Complex Systems, Faculdade de Ciências e Tecnologia da Universidade de Coimbra, Portugal, 23-27 June, 2003 (co-chair).
- Workshop on Bird-of-a-feather GECCO-03 Workshop: Application of Hybrid Evolutionary Algorithms to NP-complete Problems - EvoHybridNP03, GECCO 2003, Chicago, USA, July 2003 (co-chair).
- Workshop on Bird-of-a-feather GECCO-04 Workshop: Application of Hybrid Evolutionary Algorithms to Complex optimization Problems - EvoHybrid04, GECCO 2004, Seattle, USA, June 2003 (co-chair).
- EuroGP 2004, 7th European Conference on Genetic Programming (local chair)
- ALEA 2005, Workshop on Artificial Life and Evolutionary Algorithms, Covilhã(Portugal), December 2005 (co-chair)
- EvoSTOC, Workshop on Evolutionary Algorithms in Stochastic and Uncertain Environments, Budapest ( Hungary), April, 2006. (co-chair)
- ECAL 2007, European Conference on Artificial Life, Lisbon (Portugal), September 2007 (co-chair).
- ICARIS 2007, International Conference on Artificial Immune Systems, São Paulo (Brazil), August 2007 (publicity chair).

## Prizes

### Scientific Awards

2009 EvoStar Award for Outstanding Contributions to the Field of Evolutionary Computation, April 2009.

### Best Paper Awards

- C. Bento, J. Exposto, V. Francisco and E. Costa, 'Empirical Study of an Evaluation Function for Cases Imperfectly Explained', Second European Workshop on Case-Based Reasoning (EWCBR-94), November 1994, Paris.

- P. Machado, F. B. Pereira, A. Cardoso, E. Costa, 'Busy Beaver: The Influence of Representation', Proceedings of the Second European Workshop on Genetic Programming (EuroGP 99), Goteborg, Sweden, 26-27 May, 1999.
- F. B. Pereira and E. Costa, The influence of learning in the evolution of Busy Beaver, Proceedings of the First European Conference on Evolutionary Learning (EvoLearn'2001), Como, Italy, 18-20 April, 2001.
- Simões, A. and Costa, E. , 'The Influence of Population and Memory Sizes on the Evolutionary Algorithm's Performance for Dynamic Environments', 6th European Workshop on Evolutionary Algorithms in Stochastic and Dynamic Environments (EVOSTOC 2009), Tübingen, Germany, April 2009.

## Recent Publications

### Books

- Ernesto Costa and Anabela Simões, Artificial Intelligence: principles and applications, 2nd Edition (*in portuguese*), FCA, Lisbon, 2008.

### Books Edition, Book Chapters

- E. Costa e A. Simões, 'Artificial Intelligence: foundations and applications', 2nd Edition (in Portuguese) FCA Editores , Lisboa, 2008.
- Gonçalves, Â. and Costa, E. , 'A model for an heterogeneous gene regulatory network', in Computational Methodologies for Gene Regulatory Networks, chapter 12, Handbook Research, Sanjoy Das, January 2008.
- Costa, F. and Rocha, L. and Costa, E. and Harvey, I. and Coutinho, A. , 'Advances in Artificial Life', Lecture Notes in Artificial Intelligence, # 4648, ISBN 9783540749127, September 2007.
- Brabazon, A. and Silva, A. F. and Sousa, T. F. and O'Neill, M. and Matthews, R. and Costa, E. , 'Simulating Product Invention using InventSim', in Handbook of Research on Nature Inspired Computing for Economy and Management, pp. 379-394, Jean-Philippe Rennard, September 2006.
- Brabazon, A. and Silva, A. F. and Costa, E. and Sousa, T. F. and O'Neill, M. , 'Simulating the strategic adaptation of organizations using OrgSwarm', in Handbook of bioinspired algorithms and applica-

tions, chapter 20, Computer and Information Science, pp. 305-319, Stephan Olariu and Albert Zomaya, January 2006.

- Sousa, T. F. and Silva, A. F. and Silva, A. P. and Costa, E. , 'Bioinspired data mining', in Handbook of bioinspired algorithms and applications, chapter 27, Computer and Information Science, pp. 469-489, Stephan Olariu and Albert Zomaya, January 2006.
- P. Machado, F. B. Pereira, J. Tavares, E. Costa, and A. Cardoso, Evolutionary Turing Machines: The Quest for Busy Beavers, in Recent Developments in Biologically Inspired Computing, L. N. de Castro, F. J. Von Zuben (eds.), Idea Group Inc., 2005.
- Maarten Keijzer, Una-May O'Reilly, Simon Lucas, Ernesto Costa, Terence Soule, 'Genetic Programming: 7th European Conference', Vol. 3003, Lecture Notes in Computer Science, ISBN 0302-9743, April-2004. Conor Ryan, Terence Soule, Maarten Keijzer, Edward Tsang, Riccardo Poli and Ernesto Costa (Eds.), Genetic Programming, Lecture notes in Computer Science, Volume 2610, Springer-Verlag, 2003.
- P.Quaresma, A. Dourado, E. Costa and J. Costa, Soft Computing and Complex Systems, Centro Internacional de Matemática (CIM), June, 2003.
- A. Cardoso, E. Costa, P. Machado, F. C. Pereira and P. Gomes - An Architecture for Hybrid Creative Reasoning. in Sankar K. Tall, Tharan S. Dillon, Daniel S. Yeung (eds.), Soft Computing in Case-Based Reasoning, Springer, 2000,pp. 147-177.

## **Journals**

- Lopes, R, and Costa, E., 'The regulatory network computational device', Genetic Programming and Evolvable Machines, Vol. 13, pp. 339-375, 2012.
- Silva, S. and Costa, E. , 'Dynamic Limits for Bloat Control in Genetic Programming - and a review of past and current bloat theories', Genetic Programming and Evolvable Machines, Vol. 10, # 2, pp. 141-179, June 2009.
- Tavares, J. and Pereira, F. B. and Costa, E. , 'Multidimensional Knapsack Problem: A Fitness Landscape Analysis', IEEE Transactions on Systems, Man and Cybernetics - Part B, Vol. 38, # 3, pp. 604-616, June 2008.

- Baptista, T. and Costa, E. , 'Evolution of a multi-agent system in a cyclical environment', Theory in Biosciences, Vol. 127, # 2, pp. 141-148, Springer Berlin / Heidelberg, June 2008.
- Menezes, T. and Costa, E. , 'Modeling Evolvable Brains - An Heterogeneous Network Approach', International Journal of Information Technology and Intelligent Computing, Vol. 2, # 2, January 2008.
- Brabazon, A. and Silva, A. F. and Sousa, T. F. and O'Neill, M. and Matthews, R. and Costa, E. , 'Organizational strategic adaptation in the presence of inertia', Advances in Complex Systems, Vol. 8, # 4, pp. 497-520, December 2005.
- Brabazon, A. and Silva, A. F. and Sousa, T. F. and O'Neill, M. and Matthews, R. and Costa, E. , 'Investigating Strategic Inertia Using OrgSwarm', Informatica, # 29, pp. 125-141, January 2005.
- Sousa, T. F. and Silva, A. P. and Silva, A. F. and Costa, E. , 'Particle Swarm Based Data Mining Algorithms for Classification Tasks', Parallel Computing, # 30, pp. 767-783, Elsevier B. V., January 2004.

#### **International conferences**

- Simões, A. and Costa, E. , "Virtual Loser Genetic Algorithm for Dynamic Environments", in In C. Di Chio et al. (Eds.): EvoApplications 2012, LNCS 7248, pp. 539–548, 2012. Springer-Verlag Berlin Heidelberg 2012, Malaga, Spain, 10-14 April 2012., 2012.
- Lourenço, N. and Pereira, F.B. and Costa, E. , "Evolving Evolutionary Algorithms", in Genetic and Evolutionary Computation Conference (GECCO-2012), 2012.
- Simões, A. and Costa, E. , "Enhancing the Virtual Loser Genetic Algorithm for Dynamic Environments", in Genetic and Evolutionary Computation Conference (GECCO 2012), 2012.
- Simões, A. and Costa, E. and Carvalho, R. and Campos, J. , "A Study on Population's Diversity for Dynamic Environments", in 2011 International Conference on Adaptive and Natural Computing Algorithms, ICANNGA'11, 2011.
- Simões, A. and Costa, E. , "CHC-based Algorithms for the Dynamic Traveling Salesman Problem", in EvoWorkshops 2011, Applications of Evolutionary Computing, 2011.

- Rui L. Lopes and Costa, E. ,”ReNCoDe: a regulatory network computational device”, in 14th European Conference on Genetic Programming (EuroGP 2011), 2011.[\[Best Paper Award Nomination\]](#).
- Simões, A. and Costa, E. ,”Memory-based CHC Algorithms for the Dynamic Traveling Salesman Problem”, in 2011 Genetic and Evolutionary Computation Conference (GECCO 2011), 2011.
- Rui L. Lopes and Costa, E. ,”Using Feedback Connections in ReN-CoDe”, in 2011 Genetic and Evolutionary Computation Conference (GECCO 2011), 2011.
- Rui L. Lopes and Costa, E. ,”The Squares Problem and a Neutrality Analysis with ReNCoDe”, in 15th Portuguese Conference on Artificial Intelligence, 2011.
- Tiago Baptista and Costa, E. ,”The Evolution of Foraging in an Open-Ended Simulation Environment”, in Progress in Artificial Intelligence: 15th Portuguese Conference on Artificial Intelligence, 2011.
- Melo, L. and Pereira, F.B. and Costa, E. ,”Multi-caste Ant Colony Optimization Algorithms”, in 15th Portuguese Conference on Artificial Intelligence, 2011.
- Sousa, J. and Costa, E. ,”EpiAL - an epigenetic approach for an Artificial Life Model”, in International Conference on Agents and Artificial Intelligence, 2010.
- Simões, A. and Costa, E. , ’Improving Prediction in Evolutionary Algorithms for Dynamic Environments’, in Proc. of the Genetic and Evolutionary Computation Conference, pp. 875-888, GECCO 2009, Montreal, Canada, July 2009
- Simões, A. and Costa, E. , ’Prediction in Evolutionary Algorithms for Dynamic Environments Using Markov Chains and Nonlinear Regression’, in Proc. of the 2009 Genetic and Evolutionary Computation Conference, pp. 883-890, GECCO 2009, Montreal, Canada, July 2009
- Simões, A. and Costa, E. , ’The Influence of Population and Memory Sizes on the Evolutionary Algorithm’s Performance for Dynamic Environments’, 6th European Workshop on Evolutionary Algorithms in Stochastic and Dynamic Environments (EVOSTOC 2009), Tübingen, Germany, April 2009. [\[Best Paper Award\]](#)



- Menezes, T. and Costa, E. , 'Coevolution of competing agents species in a game-like environment', in Proc. of the 1st European Workshop on Bio-inspired Algorithms in Games, EvoGAMES 2009, Tübingen, Germany, April 2009
- Tomé, P. and Costa, E. and Amaral, L. , 'The re-use of experience trough the use o CBR in information systems modeling', International Conference on Agents and Artificial Intelligence, January 2009.
- Tavares, J. and Pereira, F. and Costa, E. , 'Golomb Rulers: a Fitness Landscape Analysis', in Proc. of the 2008 IEEE Congress on Evolutionary Computation (IEEE CEC 2008), IEEE Congress on Evolutionary Computation, June 2008.
- Gonçalves, Â. and Costa, E. , 'A computational model of gene regulatory networks and its topological properties.', in Proceeding of the 11th International Conference on the Simulation and Synthesis of Living Systems (ALife XI), U.K., August 2008.
- Gonçalves, Â. and Costa, E. , 'HeRoN: a computational model of gene regulatory networks', 13th Portuguese Conference on Artificial Intelligence, Guimarães, Portugal, December 2007.
- Baptista, T. and Costa, E. , 'The Emergence of a Circadian Rhythm in a Multi-Agent Simulation', in Proc. of the European Conference on Complex Systems 2007, European Conference on Complex Systems 2007, Dresden, Germany, October 2007.
- Simões, A. and Costa, E. , 'Improving Memory's Usage in Evolutionary Algorithms for Changing Environments', in Proc. of the IEEE 2007 Congress on Evolutionary Computation, IEEE 2007 Congress on Evolutionary Computation, Singapore, September 2007.
- Menezes, T. and Costa, E. , 'Designing for Surprise', in Proc. of the 9th European Conference on Artificial Life, ECAL 2007, Lisbon, September 2007.
- Leitão, T. and Pereira, F. and Tavares, J. and Costa, E. , 'Niching Techniques: a Study on the Cluster Geometry Optimization Problem', in Proc. of the Genetic and Evolutionary Computation Conference (GECCO 2007), Genetic and Evolutionary Computation Conference (GECCO 2007), London, UK, July 2007.
- Simões, A. and Costa, E. , 'Variable-size Memory Evolutionary Al-

gorithm: Studies on Replacing Strategies and Diversity in Dynamic Environments', in Proc. of the Genetic and Evolutionary Computation Conference (GECCO-2007), Genetic and Evolutionary Computation Conference (GECCO-2007), London, UK, July 2007.

- Simões, A. and Costa, E. , 'Variable-size Memory Evolutionary Algorithm to Deal with Dynamic Environments', in Proc. of the Applications of Evolutionary Computing, pp. 617-626, Lecture Notes in Computer Science, Volume 4448, EvoWorkshops 2007, Valencia, Spain, April 2007.

- Menezes, T. and Costa, E. , 'The Gridbrain: an Heterogeneous Network for Open Evolution in 3D Environments', in Proc. of the The First IEEE Symposium on Artificial Life, The First IEEE Symposium on Artificial Life, Honolulu, USA, April 2007.

- Tomé, P. and Costa, E. and Amaral, L. , 'Improving data modelling through the use of case-based reasoning', CAISE'07, Trondheim, Noruega, January 2007.

- Tomé, P. and Costa, E. and Amaral, L. , 'A tool-neutral framework for systematic experience reuse in architecture description', 14th Enterprise Architecture Practitioners, Paris (France), January 2007.

- Menezes, T. and Costa, E. , 'A First Order Language to Coevolve Agents in Complex Social Simulations', in Proc. of the European Conference on Complex Systems 2006, European Conference on Complex Systems 2006, University of Oxford, September 2006.

- Baptista, T. and Menezes, T. and Costa, E. , 'BitBang: A Model and Framework for Complexity Research', in Proc. of the European Conference on Complex Systems 2006, European Conference on Complex Systems 2006, Oxford, United Kingdom, September 2006.

- Menezes, T. and Baptista, T. and Costa, E. , 'Bitbang—a Library for Modern Game AI', in Proc. of the International Digital Games Conference (iDiG 2006), International Digital Games Conference (iDiG 2006), Portalegre, Portugal, September 2006.

- Jorge Tavares, Francisco B. Pereira, Ernesto Costa, 'The Role of Representation on the Multidimensional Knapsack Problem by means of Fitness Landscape Analysis', in Proc. of the 2006 IEEE Congress on Evolutionary Computation (CEC'06), IEEE Congress on Evolutionary Computation, Vancouver, Canada, July-2006.

- Telmo Menezes, Tiago Baptista, Ernesto Costa, 'Towards the Generation of Complex Game Worlds', in Proc. of the IEEE Symposium on Computational Intelligence and Games (CIG'06), IEEE Symposium on Computational Intelligence and Games, Reno/Lake Tahoe, USA, May-2006.
- Sara Silva, Ernesto Costa, 'Comparing Tree Depth Limits and Resource-Limited GP', 2005 IEEE Congress on Evolutionary Computation, Edinburgh, UK, September-2005.
- Sara Silva, Ernesto Costa, 'Resource-Limited Genetic Programming: The Dynamic Approach', in Proc. of the GECCO-2005, Genetic and Evolutionary Computation Conference (GECCO-2005), Washington DC, June-2005.
- Jorge Tavares, Tiago Leitão, Francisco B. Pereira, Ernesto Costa, 'Evolving Segments Length in Golomb Rulers', 7th International Conference on Adaptive and Natural Computing Algorithms (ICANNGA05), Coimbra, March-2005.
- Jorge Tavares, Francisco B. Pereira, Ernesto Costa, 'Golomb Rulers: Experiments with Marks Representation', 7th International Conference on Adaptive and Natural Computing Algorithms (ICANNGA05), Coimbra, March-2005.
- Sara Silva, Pedro Silva, Ernesto Costa, 'Resource-Limited Genetic Programming: Replacing Tree Depth Limits', in Proc. of the ICANNGA-2005, pp. 243-246, Adaptive and Natural Computing Algorithms, 7th International Conference on Adaptive and Natural Computing Algorithms (ICANNGA05), Coimbra, Portugal, March-2005.
- Penousal Machado, Jorge Tavares, Amilcar Cardoso, Francisco B. Pereira, Ernesto Costa, 'Evolving Creativity', Computational Creativity Workshop, 7th European Conference in Case Based Reasoning, Madrid, August-2004.
- Sara Silva, Ernesto Costa, 'Dynamic Limits for Bloat Control - Variations on Size and Depth', Genetic and Evolutionary Computation Conference (GECCO-2004), Seattle, Washington USA, June-2004.
- Anthony Brabazon, Arlindo F. Silva, Tiago F. Sousa, Michael O'Neill, Robin Matthews, Ernesto Costa, 'A Particle Swarm Model of Organizational Adaptation', in Proc. of the Genetic and Evolutionary Computation Conference (GECCO-2004), pp. 12-23, Vol. 3102, Lecture Notes in Computer Science, Genetic and Evolutionary Computation Conference (GECCO-2004),

June-2004.

- Jorge Tavares, Francisco B. Pereira, Ernesto Costa, 'Evolving Golomb Rulers', Genetic and Evolutionary Computation Conference (GECCO-2004), Seattle, Washington USA, June-2004.

- Jorge Tavares, Francisco B. Pereira, Ernesto Costa, 'Understanding the Role of Insertion and Correction in the Evolution of Golomb Rulers', in Proc. of the Congress on Evolutionary Computation Conference (CEC2004), Congress on Evolutionary Computation, Portland, Oregon, June-2004.

- Jorge Tavares, Penousal Machado, Amilcar Cardoso, Francisco B. Pereira, Ernesto Costa, 'On the Evolution of Evolutionary Algorithms', in Proc. of the EuroGP 2004 Proceedings, 7th European Conference on Genetic Programming, Coimbra, Portugal, April-2004.

- Silva, A. F. and Silva, A. P. and Costa, E. , 'SAPPO: A Simple, Adaptive, Predator Prey Optimiser', in Proc. of the 11th Portuguese Conference on Artificial Intelligence, Workshop on Artificial Life and Evolutionary Algorithms (ALEA), EPIA'03, Beja, Portugal, December 2003

- Pereira, F. B. and Tavares, J. and Costa, E. , 'Golomb Rulers: The Advantage of Evolution', Workshop on Artificial Life and Evolutionary Algorithms (ALEA'03), Beja, Portugal, December 2003

- Barreiros, J. and Costa, E. , 'Global routing for lookup-table based FPGAs using genetic algorithms', 13th International Conference on Field Programmable Logic and Applications 2003, Lisbon, Portugal, September 2003

- Barreiros, J. and Costa, E. , 'An Hierarchic Genetic Algorithm for Computing (near) Optimal Euclidean Steiner Trees', Workshop on Application of Hybrid Evolutionary Algorithms to NP-Complete Problems (GECCO2003), Chicago, July 2003

- Tavares, J. and Pereira, F. B. and Machado, P. and Costa, E. , 'Crossover and Diversity: A Study about GVR', in Proc. of the Proceedings of the Analysis and Design of Representations and Operators (ADoRo'2003), pp. 27-33, a bird-of-a-feather workshop at the 2003 Genetic and Evolutionary Computation Conference (GECCO-2003), Chicago, Illinois USA, July 2003

- Simões, A. and Costa, E. , 'An Immune System-Based Genetic Algorithm to Deal with Dynamic Environments: Diversity and Memory', in

Proc. of the Sixth International Conference on Neural Networks and Genetic Algorithms (ICANNGA'03), pp. 168-174, Roanne, France, April 2003

- Simões, A. and Costa, E. , 'A Comparative Study Using Genetic Algorithms to Deal with Dynamic Environments', in Proc. of the Sixth International Conference on Neural Networks and Genetic Algorithms (ICANNGA'03), pp. 203-209, Roanne, France, April 2003

- Simões, A. and Costa, E. , 'Improving the Genetic Algorithm's Performance when Using Transformation', in Proc. of the Sixth International Conference on Neural Networks and Genetic Algorithms (ICANNGA'03), pp. 175-181, Roanne, France, April 2003

- Tavares, J. and Pereira, F. B. and Machado, P. and Costa, E. , 'On the Influence of GVR in Vehicle Routing', in Proc. of the 2003 ACM Symposium On Applied Computing (SAC 2003), pp. 753-758, Melbourne, Florida USA, March 2003

- Tavares, J. and Pereira, F. B. and Machado, P. and Costa, E. , 'GVR Delivers It On Time', in Proc. of the 4th Asia-Pacific Conference on Simulated Evolution And Learning (SEAL'02), pp. 745-749, Singapore, November 2002

- Silva, A. F. and Silva, A. P. and Costa, E. , 'An Empirical Comparison of Particle Swarm and Predator Prey Optimisation', in Proc. of the Artificial Intelligence and Cognitive Science : 13th Irish International Conference, Vol. 2464, Lecture Notes in Computer Science, AICS 2002, Limerick, Ireland, September 2002

- Pereira, F. B. and Tavares, J. and Machado, P. and Costa, E. , 'GVR: a New Genetic Representation for the Vehicle Routing Problem', in Proc. of the 13th Irish Conference on Artificial Intelligence and Cognitive Science (AICS 2002), pp. 95-102, Limerick, Ireland, September 2002

- Simões, A. and Costa, E. , 'Using Genetic Algorithms to Deal with Dynamic Environments: A Comparative Study of Several Approaches Based on Promoting Diversity', in Proc. of the Genetic and Evolutionary Computation Conference (GECCO' 2002), New York, July 2002

- Machado, P. and Tavares, J. and Pereira, F. B. and Costa, E. , 'Vehicle Routing Problem: Doing it the Evolutionary Way', Genetic and Evolutionary Computation Conference, GECCO-02, New York, USA, July 2002

- Simões, A. and Costa, E. , 'Parametric Study to Enhance the Ge-

netic Algorithm's Performance when Using Transformation', in Proc. of the Genetic and Evolutionary Computation Conference (GECCO' 2002), New York, July 2002

- Silva, A. F. and Silva, A. P. and Costa, E. , 'Chasing the Swarm: A Predator-Prey Approach to Function Optimisation', in Proc. of the Mendel 2002 – 8th International Conference on Soft Computing, pp. 103-110, Mendel 2002, Brno, Czech Republic, June 2002.

- Simões, A. and Costa, E. , 'On Biologically Inspired Genetic Operators: Transformation in the Standard Genetic Algorithm', in Proc. of the Genetic and Evolutionary Computation Conference, GECCO-2001, pp. 584-591, San Francisco, July 2001

- Pereira, F. B. and Costa, E. , 'Understanding the Role of Learning in the Evolution of Busy Beavers: a Comparison Between the Baldwin Effect and a Lamarckian Strategy', in Proc. of the Genetic and Evolutionary Computation Conference (GECCO-2001), pp. 884-891, July 2001

- Simões, A. and Costa, E. , 'Using Biological Inspiration to Deal with Dynamic Environments', in Proc. of the Seventh International Conference on Soft Computing (MENDEL'01), Brno, Czech Republic, June 2001

- Simões, A. and Costa, E. , 'An Evolutionary Approach to the Zero/One Knapsack Problem: Testing Ideas from Biology', in Proc. of the Fifth International Conference on Neural Networks and Genetic Algorithms (ICAN-NGA'01), pp. 236-239, Prague, Czech Republic, April 2001

- Pereira, F. B. and Costa, E. , 'The Influence of Learning in the Evolution of Busy Beavers', in Proc. of the EvoWorkshops 2001: Applications of Evolutionary Computing, pp. 421-430, Como, Italy, April 2001. **[Best Paper Award]**

- Pereira, F. B. and Costa, E. , 'How Learning Improves the Performance of Evolutionary Agents: a Case Study with an Information Retrieval System for a Distributed Environment', in Proc. of the Third International Symposium on Adaptive Systems: Evolutionary Computation and Probabilistic Graphical Models, pp. 48-55, Havana, Cuba, March 2001

- Coutinho, F. and Fonseca, J. and Barreiros, J. and Costa, E. , 'Using Genetic Algorithms to Reduce Jitter in Control Variables Transmitted over CAN', International CAN Conference, October 2000

- Silva, A. F. and Silva, A. P. and Costa, E. , 'Polymorphy and Hy-

bridization in Genetically Programmed Networks', in Proc. of the Sixth International Conference on Parallel Problem Solving from Nature, pp. 221-231, Paris, France, September 2000

- Coutinho, F. and Fonseca, J. and Barreiros, J. and Costa, E. , 'Jitter Minimization with Genetic Algorithms', IEEE International Workshop on Factory Communication Systems, September 2000

- Simões, A. and Costa, E. , 'Using Genetic Algorithms with Sexual or Asexual Transposition: A Comparative Study', in Proc. of the 2000 Congress on Evolutionary Computation (CEC' 2000), pp. 1196-1203, San Diego, USA, July 2000

- Barreiros, J. and Costa, E. and Fonseca, J. and Coutinho, F. , 'Jitter Reduction in a Real-time Message Transmission System Using Genetic Algorithms', Congress on Evolutionary Computation 2000, San Diego, USA, July 2000

- Simões, A. and Costa, E. , 'Using Genetic Algorithms with Asexual Transposition', in Proc. of the Genetic and Evolutionary Computation Conference (GECCO' 2000), pp. 323-330, Las Vegas, USA, July 2000

- Pereira, F. B. and Costa, E. , 'How Adaptive Agents Learn to Deal with Incomplete Queries in Distributed Environments', in Proc. of the Conference on Evolutionary Computation, Special Session on Evolutionary Intelligent Agents (CEC-2000), pp. 1329-1336, San Diego, USA, July 2000.

- Pereira, F. B. and Machado, P. and Costa, E. and Cardoso, A. and Ochoa-Rodriguez, A. and Santana, R. and Soto, M. , 'Too Busy to Learn', in Proc. of the Conference on Evolutionary Computation (CEC-2000), pp. 720-727, San Diego, USA, July 2000.

- Santana, R. and Ochoa-Rodriguez, A. and Soto, M. and Pereira, F. B. and Machado, P. and Costa, E. and Cardoso, A. , 'Probabilistic Evolution and the Busy Beaver Problem', in Proc. of the Late Breaking Papers of the Genetic and Evolutionary Computation Conference (GECCO-2000), pp. 261-268, Las Vegas, USA, July 2000.

- Pereira, F. B. and Costa, E. , 'The Influence of Learning in the Behavior of Information Retrieval Adaptive Agents', in Proc. of the ACM Symposium on Applied Computing (SAC 2000), pp. 452-457, Como, Italy, April 2000.

For more publications see: <https://www.cisuc.uc.pt/groups/show/ecos/>

[publications](#)

### Other scientific activities<sup>4</sup>

- Principal Researcher of 15 projects including 7 international ones.
- Supervisor of 12 Ph. D. thesis, including 2 international.
- Supervisor of several M.Sc. and Final Year projects.
- Member of the editorial board of international journals.
- Member of Program Committee of several international conferences.
- Professor at the Fourth Evolutionary Computation Summer School, Parma, Italy, August, 2003.
- Professor at the First Computational Intelligence Summer School, Limerick, Ireland, August, 2000.
- Former member of the European Network of Excellence on Machine Learning funded by the EU (MLNet).
- Former member of the European Network of Excellence on Evolutionary Computation funded by the EU (EvoNet).

## 4. Evaluation work

He participated in different evaluation work, both at national and international level. Some examples below.

- Scientific Projects evaluation on behalf of the European Commission (FP6, FP7).
- Scientific Projects evaluation on behalf of the Portuguese Ministry of Science and Technology and for the Luso-American Foundation (FLAD).
- European Young Investigator Award (EURYI 2006).
- IBM Scientific Award (Portugal).
- Ph. D. Examinations (national and international).
- Associate Professor and Full Professor candidatures (Portugal).

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<sup>4</sup>These elements refer to work already done.



- NATO referee for the Advanced Research Workshops Applications since 1990.

## 5. Personal skills and competences:

**Mother tongue:** Portuguese

**Other languages:**

Language	Understanding				Speaking				Writing	
	Listening		Reading		Spoken Interaction		Spoken Production			
English	C1	Prof. User	C2	Prof. User	C1	Prof. User	C1	Prof. User	C1	Prof. User
French	C2	Prof. User	C2	Prof. User	C2	Prof. User	C2	Prof. User	C1	Prof. User
Spanish	B2	Ind. User	B2	Ind. User	B1	Ind. User	B1	Ind. User	A2	Basic User
Italian	A1	Basic User	A1	Basic User	A1	Basic User	A1	Basic User	A1	Basic User

**Social skills and competences:**

During 35 years I have been a teacher and a researcher at different universities and countries. I was also involved in administrative tasks (in academic and business environments). Because of that I contacted with many different people and cultures and lead several groups in different contexts (both academic and industrial). Communication ability is central to fulfill the different aspects required by my past work. The capacity of active listening, resolving conflicts, sharing ideas, sense of humor are some of the skills that I do have and that were matured along time.

**Organizational skills and competences:**

I found and was the first Rector of a private University. I was the founder of two research groups that acquired international recognition (e.g. prizes) having supervised several graduate students. I was the Head of the Computer Science Department of the University of Coimbra and the Director of the research Centre for Informatics and Systems of the University of Coimbra (CISUC). I organized several international scientific conferences, summer schools and training actions. All these activities imply leadership and teamwork skills which I do have. Also, when several problems arise all at once, which occurred frequently in the different jobs I had, it is important to harness stress, clearly identify priorities and stay focused. I used these skills to end up with success stories in the different roles I assumed in the past.

**Other skills and competences:**

Being a researcher I have to be creative, always seeking for new and innovative solutions for hard problems. Being a teacher I'm always trying to motivate students and must be curious enough to learn and explore new ways of teaching. But this is only possible if you are a self motivated person. During 35 years the high marks given to my work as a researcher and

a teacher by external evaluators and the students themselves prove that I have been successful and thus have the necessary above mentioned skills.

## 6. Other relevant activities

- Member of the Scientific Advisory Board of PERADA <http://m.thispervasiveday.com/>, an European funded Network of Excellence on Pervasive Computation, since 2008.
- Member of the Scientific Advisory Board of SolveIT Software <http://www.solveitsoftware.com/Company/people>, Adelaide (Australia), since 2005.
- Organizer of a Computer Science Training Action in Cabo Verde, on behalf of UNESCO and the Portuguese Government in 1990.
- Organizer and Director of the Nato Advanced Research Workshop (ARW) 'New directions for Intelligent tutoring Systems', Sintra (Portugal), 1990.
- Organizer of a Computer Science Training Action in São Tomé e Príncipe, on behalf of UNESCO and the Portuguese Government in 1991.
- Organizer and Director of the First Advanced School on Artificial Intelligence, Mira (Portugal), October, 1988.
- Founder and Head of the Artificial Intelligent Group of the University of Coimbra, 1986.
- Founder and Head of the Evolutionary and Complex Systems Group, University of Coimbra, 2003.
- Co-founder of the Portuguese Association for Artificial Intelligence (APPIA), having taking part of its Board of Directors during several years. He was also one of the two Portuguese representatives to the board of the European Association for Artificial Intelligence (ECAI).
- Scientific Coordinator of the M.Sc. courses on Informatics Engineering (editions 90-92 and 96-98).
- Co-founder and first Rector of the Universidade Independente (Lisbon), June 1993 - June 1996.

- Co-founder (1994) and Head of the Informatics Engineering Department of the University of Coimbra (March 97 - March 99).
- Responsible for the Artificial Intelligence Group at *Caixa Geral de Depósitos* (the biggest Portuguese bank) that he helped to create (1990 - 1992)
- Co-founder (1991) and President of the Centre for Informatics and Systems of the University of Coimbra (CISUC) (May 98 - May 2000).
- Head of the Scientific Board of the Department of Informatics Engineering of the University of Coimbra (2006 - 2008)
- Member do IEEE Evolutionary Computation Technical Committee (Working Group on Evolutionary Computation in Dynamic and Uncertain Environments), since 2004.
- Member (or former member) of several scientific societies (e.g. ACM, AAAI, ISAL, SIGEVO, APPIA, ...).
- Member of Scientific Board of Directors of the Laboratoire de Recherche en Informatique, Université Montpellier (France), appointed by the Centre Nationale de Recherche Scientifique (CNRS) during 1986.