

Curriculum vitae

**Miguel Francisco
de Almeida Pereira da Rocha**

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PERSONAL DATA

Name	MIGUEL Francisco de Almeida Pereira da ROCHA
Date and Place of Birth	April 15 th 1973, Lisbon
Nationality	Portuguese
Address	Rua Amália Costa Lima, 55, 4 ^o esq Gualtar, 4710-488 Braga, Portugal
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SUMMARY

Miguel Rocha is currently an Auxiliar Professor at the Informatics Department (<http://www.di.uminho.pt>) in the School of Engineering, University of Minho, Portugal.

He is a researcher within the CCTC research centre (<http://cctc.uminho.pt>), being currently the Director of its board (since October 2010). He co-leads a research group in Bioinformatics and Systems Biology (<http://sysbio.di.uminho.pt/bisbii>), in collaboration with researchers from the Centre for Biological Engineering that currently involves over 30 researchers. He is the author of over 100 publications in international journals and in peer-reviewed conferences, from which over 60 are indexed in *ISI Web of Science*. Also, over the last few years he has been the PI and has collaborated in several funded research projects by the Portuguese FCT, European Commission and private companies.

He currently teaches courses at the undergraduate, master and doctoral levels in the areas of Bioinformatics, Machine Learning/ Data Mining, Natural Computing and basic Computer Science. He is in the board of the master course in Bioinformatics, a degree that he co-founded in 2007 and from which he was the first Director (2007 to 2010).

Furthermore, he is one of the founders and the Chief Technological Officer of the spin-off company Silico Life (<http://www.silicolife.com>), created in 2010, that offers Bioinformatics and Computational Biology solutions for industry. The company has recently won a national prize in entrepreneurship (Atreve-te 2010 contest).

Miguel Rocha graduated in Systems and Informatics Engineering (1995) from the University of Minho, the institution where he also did the Master in Informatics (1998) and the PhD in Informatics (2004).

ACADEMIC EDUCATION

April 2004

PhD in Informatics - University of Minho (Portugal)

Thesis: "*Optimization of Neural Network Learning Models Through Genetic and Evolutionary Computation*"

Original title: "*Optimização de Modelos Conexionistas de Aprendizagem via Computação Genética e Evolucionária*"

Oral defence in April 16th 2004; approved unanimously by the committee

Supervisor: Professor José Maia Neves

March 1998

MSc in Informatics, specialization in *Distributed Systems, Computer Communications and Computer Architectures* – University of Minho (Portugal)

Thesis: "*An approach to the Travelling Salesman Problem using Evolutionary Algorithms*"

Original title: "*Uma Aproximação à Resolução do Problema do Caixeiro Viajante via Programação Genética*"

Final grade: *Very Good* (highest possible grade)

September 1995

Degree in Systems and Informatics Engineering ("*Licenciatura*", 5 year degree) – University of Minho (Portugal)

Final mark: 17 (scale 0-20)

Included a 6 months industry internship in a company in 1995: *Integral Vision Ltd, Bedford, UK*

PROFESSIONAL ACTIVITIES

CURRENT POSITION

April 2004 – present

Auxiliar Professor in the Informatics Department, School of Engineering, University of Minho, Portugal

Tenure track ("contrato por tempo indeterminado") since 2009

Researcher in the CCTC - Computer Science and Technology Center unit, University of Minho; Director of the CCTC since October 2010

Sabbatical leave between March and August 2010

PREVIOUS POSITIONS

April 1998 – April 2004

Assistant Professor in the Informatics Department, University of Minho

Leave from teaching duties from September 2001 to April 2004 to finish the PhD

December 1997 – March 1998

PhD bursar at the Informatics Department, University of Minho

PhD grant from FCT (ref. BD/13445/97)

October 1995 – September 1997

MSc bursar at the Informatics Department, University of Minho

Master grant from FCT (ref. BM/6662/95)

April 1995 – September 1995

Final degree **internship** at *Integral Vision Ltd, Bedford, United Kingdom*

Role: Software Engineer; development of computer vision applications

October 1994 – February 1995 and October 1996 – July 1997

Teaching Assistant (“Monitor”), Department of Production and Systems, University of Minho

Tasks: taught practical classes of Numerical Methods curricular units

POSITIONS IN PRIVATE COMPANIES

April 2010-Present

Promoter and member of the Board of the spin-off company SilicoLife, Ltd, being also the Chief Technological Officer (CTO)

PART A: RESEARCH ACTIVITIES

Summary / research interests

Miguel Rocha's main research interests are within the fields of Evolutionary Computation and Neural Networks, core themes of his PhD. Without disregarding these subjects, since 2004 he strongly committed most of his research efforts to the emergent area of Bioinformatics, a field where there were no research groups at the University of Minho. He has focused on methods for modelling and optimizing biological processes, mainly metabolic and regulatory systems. The main application of these efforts has been in the design of phenotype simulation and strain optimization methods for *in silico* Metabolic Engineering. Also, he has been involved in other research efforts in Bioinformatics, related to Biomedical Text Mining, database integration, gene expression data analysis and biological network topological analysis.

He currently co-leads a research group in Bioinformatics and Systems Biology at the University of Minho, an interdisciplinary collaboration from researchers of the CCTC and the Centre of Biological Engineering at the same institution (<http://sysbio.di.uminho.pt/bisbii>). The multidisciplinary nature of the research performed is guaranteed by the diversity in the backgrounds of the group members (more than 30 coming from fields such as Computer Science, Biology/ Biotechnology, Mathematics).

Unrelated to Bioinformatics, his research has also dealt with the development of Data Mining algorithms for several problems, such as time series forecasting and spam email detection. Also, he has been involved in the development of evolutionary approaches for computer network optimization (e.g. routing).

He has been able to publish in reference journals within his research fields, such as *Briefings in Bioinformatics*, *BMC Bioinformatics*, *BMC Systems Biology*, *Journal of Computational Biology*, *Applied Soft Computing* or *Expert Systems with Applications*, as well as high quality international conferences (e.g. IEEE CEC, GECCO, IJCNN, EvoStar). International and national recognition is also illustrated by the numerous invited talks to the scientific community, the vast majority in the past few years and the invitations for paper reviewing in journals and international conferences.

Regarding funding, Miguel has successfully written two grant proposals for the Portuguese FCT (as the principal investigator), being currently the PI of one project. He has also been involved in several other projects as the principal researcher from the CCTC, establishing collaborations with several groups both in the University of Minho (Algoritmi, CEB, ICVS) and other groups in Portugal.

Also, he has established several strong international collaborations with some well-known groups in his research fields (such as University College London, UC Berkeley, UC Irvine, EMBL-EBI, Argonne Labs) both involving co-supervision of students (6 different groups worldwide) and joint research projects (European Commission projects, FLAD Portugal-USA networks, Portugal-Spain coordination actions). Also quite relevant is the collaboration with the multinational company Dupont through joint research projects.

A1. SCIENTIFIC PRODUCTION

SUMMARY OF THE SCIENTIFIC PRODUCTION

Total number of publications ¹

- In peer-reviewed international journals: 18
- In peer-reviewed conference proceedings: 79
- Books: editor: 4; book chapters: 4

- Publications in journals indexed by *ISI JCR*: 15 (9 Q1; 4 Q2; 2 Q3)
- Publications indexed by *ISI Web of Science*: 62
- Publications indexed by *DBLP*: 64
- Publications indexed by *Scopus*: 61
- Publications in journals/ conference proceedings indexed by *Scimago*: 54

Citation numbers ¹

Total number of citations/ h-index (a value of n means the author has n publications with more than n citations)

- Google Scholar: 498 / 12
- ISI WoS: 140 / 7
- Scopus: 204 / 6

Lists of publications and citations

URLs allowing access to the list of publications and citations by the indexing services

- List of publications (and citations) indexed in ISI Web of Science: <http://www.researcherid.com/rid/B-9404-2011>
- List of publications indexed in DBLP: <http://www.informatik.uni-trier.de/~ley/db/indices/a-tree/r/Rocha:Miguel.html>
- List of publications (and citations) indexed in Google Scholar: <http://scholar.google.com/citations?user=pT-rwEIAAAAJ&hl=en>

Indexing services used in the analysis:

- *ISI Web of Knowledge* (*ISI WoS*) and *ISI Journal Citation Reports* (*ISI JCR*) – <http://www.isiknowledge.com>
- *Scimago* Journal & Country rankings – <http://scimagojr.com>
- *Scopus* – <http://www.scopus.com>
- *DBLP* (computer science bibliography)– <http://www.informatik.uni-trier.de/~ley/db/>
- *Google Scholar* – <http://scholar.google.com>

Acronyms and definitions

- IF – impact factor from *ISI JCR 2010* edition (most recent available)

¹ Data collected on the 1st of December 2011

- Q_i – stands for the i^{th} quartile obtained by the journal in the indexing service; if more than one is available the lowest is taken.

BOOK EDITOR

4. M. Rocha, J.M. Corchado, F. Fdez Riverola; A. Valencia. *5th International Conference on Practical Applications of Computational Biology & Bioinformatics*. Series: Advances in Intelligent and Soft Computing, Vol. 93, Springer-Verlag, Salamanca, April 2011.

Indexed: DBLP; ISI WoS; Scimago (Q4)

3. M. Rocha, F. Fernandez-Riverola, J.M. Corchado, H. Shatkay (Eds). *Advances in Bioinformatics, Proceedings 4th International Workshop on Practical Applications of Computational Biology and Bioinformatics (IWPACBB'2010)*, Series: Advances on Soft Computing, Springer Verlag, Guimarães, June 2010.

Indexed: DBLP; ISI WoS; Scimago (Q4)

2. S. Omatu, M. Rocha, J. Bravo, F. Fernandez Riverola, E. Corchado, A. Bustillo, J.M. Corchado (Eds) *Distributed Computing, Artificial Intelligence, Bioinformatics, Soft Computing, and Ambient Assisted Living, 10th International Work-Conference on Artificial Neural Networks, IWANN 2009 Workshops, Part II, Lecture Notes in Computer Science*, vol. 5518, Springer, Salamanca, Spain, June 2009.

Indexed: DBLP; ISI WoS; Scimago (Q2); Scopus

1. J. M. Corchado, J. F. Paz, M. Rocha, F. F. Riverola (Eds), *Proceedings 2nd International Workshop on Practical Applications of Computational Biology and Bioinformatics (IWPACBB'08)*, Series: Advances on Soft Computing, Springer Verlag, Salamanca, Spain, October 2008.

Indexed: DBLP; ISI WoS; Scimago (Q4)

ARTICLES IN JOURNALS

18. R. Carreira, S. Carneiro, R. Pereira, M. Rocha, I. Rocha, E.C. Ferreira, A. Lourenço. Semantic Annotation of Entities Interplaying Microbial Cellular Responses. *BMC Bioinformatics*. Accepted for publication.

Available online: <http://www.biomedcentral.com/1471-2105/12/460/abstract>

Indexed: ISI JCR 2010 IF 3.029 (Q1); Scimago (Q1)

17. E. Gonçalves, I. Rocha, M. Rocha. Optimization approaches for the in silico discovery of optimal targets for gene over/underexpression. *Journal of Computational Biology*. Accepted for publication.

Indexed: ISI JCR 2010 IF 1.694 (Q1); Scimago (Q2)

16. D. Machado, R.S. Costa, M. Rocha, E.C. Ferreira, B. Tidor, I. Rocha. Modeling formalisms in Systems Biology. *AMB Express* 1:45, SpringerOpen, 2011.

Available online: <http://www.amb-express.com/content/1/1/45>

15. P. Cortez, M. Rio, M. Rocha, P. Sousa. Multiscale Internet traffic forecasting using neural networks and time series methods. *Expert Systems*, In press.

Online version: <http://dx.doi.org/10.1111/j.1468-0394.2010.00568.x>

Indexed: ISI JCR 2010 IF 0.733 (Q3); Scimago (Q3)

Repository: <http://hdl.handle.net/1822/14482>

14. A. Lourenço, S. Carneiro, J.P. Pinto, M. Rocha, E.C. Ferreira, I. Rocha. A Study on the Short and Long-Term Regulation of E. coli Metabolic Pathways. *Journal of Integrative Bioinformatics*. 8(3), 2011.

Indexed: Scimago (Q1); DBLP

Repository: <http://hdl.handle.net/1822/14327>

13. C. Lopes, P. Cortez, P. Sousa, M. Rocha, M. Rio. Symbiotic filtering for spam email detection. *Expert Systems with Applications*, 38(8), Aug. 2011, 9365-9372.

Indexed: ISI JCR 2010 IF 1.926 (Q1); Scimago (Q1); DBLP; Scopus

Repository: <http://hdl.handle.net/1822/12042>

12. A. Lourenço, S. Carneiro, M. Rocha, E.C. Ferreira, I. Rocha. Challenges in Integrating E. coli Molecular Biology Data. *Briefings in Bioinformatics*, 12(2): 91-103, 2011.

Indexed: ISI JCR 2010 IF 9.283 (Q1); Scimago (Q1); DBLP; Scopus

Repository; <http://hdl.handle.net/1822/14330>

11. P. Vilaça, I. Rocha, M. Rocha. A computational tool for the simulation and optimization of microbial strains accounting integrated metabolic/ regulatory information. *BioSystems*, 103(3): 435-441, 2011.

Indexed: ISI JCR 2010 IF 1.478 (Q2); Scimago (Q1); DBLP; Scopus

Repository: <http://hdl.handle.net/1822/14326>

10. M. Rocha, P. Sousa, P. Cortez, M. Rio. Quality of Service Constrained Routing Optimization using Evolutionary Computation. *Applied Soft Computing*, 11(1): 356-364, Jan 2011.

Indexed: ISI JCR 2010 IF 2.097 (Q1); Scimago (Q1); DBLP; Scopus

Repository: <http://hdl.handle.net/1822/11983>

9. I. Rocha, P. Maia, P. Evangelista, P. Vilaça, S. Soares, José P. Pinto, J. Nielsen, K.R. Patil, E.C. Ferreira, M. Rocha. OptFlux: an open-source software platform for *in silico* metabolic engineering. *BMC Systems Biology*, 4(45), 2010 (IF 3.71)

Highly accessed paper: <http://www.biomedcentral.com/1752-0509/4/45>

Indexed: ISI JCR 2010 IF 3.565 (Q1); Scimago (Q1); Scopus

Repository: <http://hdl.handle.net/1822/10699>

8. D. Glez-Peña, M. Reboiro-Jato, P. Maia, M. Rocha, F. Diaz, F. Fdez-Riverola. AlBench: a rapid application development framework for translational research in biomedicine. *Computer Methods and Programs in Biomedicine*, 98(2): 191-203, May 2010

Indexed: ISI JCR 2010 IF 1.238 (Q2); Scimago (Q1); Scopus; DBLP

7. A. Lourenço, R. Carreira, D. Glez-Peña, J.R. Mendez, S. Carneiro, L.M. Rocha, F. Diaz, E.C. Ferreira, I. Rocha, F. Fdez-Riverola, M. Rocha. BioDR: Semantic Indexing Networks for Biomedical Document Retrieval. *Expert Systems with Applications*, 37(4): 3444-3453, 2010.

Indexed: ISI JCR 2010 IF 1.926 (Q1); Scimago (Q1); Scopus; DBLP

Repositorium: <http://hdl.handle.net/1822/10213>

6. A. Lourenço, R. Carreira, S. Carneiro, P. Maia, D. Glez-Peña, F. Fdez-Riverola, E. C. Ferreira, I. Rocha, M. Rocha. @Note: A Workbench for Biomedical Text Mining. *Journal of Biomedical Informatics*, 42(4):710-720, 2009.

Indexed: ISI JCR 2010 IF 1.724 (Q2); Scimago (Q1); Scopus; DBLP

Repositorium: <http://hdl.handle.net/1822/9416>

5. M. Rocha, P. Maia, R. Mendes, J.P. Pinto, E.C. Ferreira, J. Nielsen, K.R. Patil, I. Rocha. Natural computation meta-heuristics for the in silico optimization of microbial strains. *BMC Bioinformatics*, 9(499), BioMed Central, November 2008.

Indexed: ISI JCR 2010 IF 3.029 (Q1); Scimago (Q1); Scopus; DBLP

Repositorium: <http://hdl.handle.net/1822/8742>

4. M. Rocha, P. Cortez, J. Neves. Evolution of Neural Networks for Classification and Regression. *Neurocomputing*, 70(16-18): 2809-2816, Elsevier, October 2007

Indexed: ISI JCR 2010 IF: 1.442 (Q2); Scimago (Q1); Scopus; DBLP

Repositorium: <http://hdl.handle.net/1822/8028>

3. P. Sousa, M. Rocha, M. Rio, P. Cortez. Automatic Provisioning of QoS Aware OSPF Configurations. *Journal of Networks*, 2(2), pp. 1-10, April 2007.

Indexed: DBLP

Repositorium: <http://hdl.handle.net/1822/6619>

2. P. Cortez, M. Rocha, J. Neves. Evolving Time Series Forecasting ARMA Models. *Journal of Heuristics*, Kluwer, 10(4): 415-429, July 2004

Indexed: ISI JCR 2010 IF: 1.623 (Q1); Scimago (Q1); Scopus; DBLP

Repositorium: <http://hdl.handle.net/1822/2221>

1. P. Cortez, M. Rocha, J. Neves. A Lamarckian Approach for Neural Network Training. *Neural Processing Letters*, Kluwer, 15(2):105-116, April 2002

Indexed: ISI JCR 2010 IF: 1.088 (Q3); Scimago (Q2); Scopus; DBLP

Repositorium: <http://hdl.handle.net/1822/353>

EDITOR OF JOURNAL SPECIAL ISSUES

1. *Journal of Integrative Bioinformatics*. Special issue "Selected extended papers of the 5th International Conference on Practical Applications of Computational Biology and Bioinformatics", Guest editors: Juan M. Corchado, Miguel Rocha, Florentino Fdez-Riverola and Alfonso Valencia, vol. 8, no. 3, 2011.

Indexed: ISI WoS; Scimago (Q1)

BOOK CHAPTERS

4. E. Valente, M. Rocha, E.C. Ferreira, I. Rocha. Modelling of Biotechnological Processes - An approach based on Artificial Neural Networks. In M.C. Nicoletti, L.C. Jain (eds), *Computational Intelligence Techniques for Bioprocess Modelling, Supervision and Control*. Series: *Studies in Computational Intelligence*, vol. 218, pp. 311-332, Springer, 2009.

Indexed: Scopus; Scimago (Q4)

3. R. Mendes, I. Rocha, J.P. Pinto, E.C. Ferreira, M. Rocha. Differential Evolution for the Offline and Online Optimization of Fed-Batch Fermentation Processes. In U.K. Chakraborty (ed.), *Advances in Differential Evolution*. Series: *Studies in Computational Intelligence*, vol. 143. chap. 13, pp. 299-318, Springer, 2008.

Indexed: Scopus; Scimago (Q4)

Repositorium: <http://hdl.handle.net/1822/9221>

2. D. Machado, M. Rocha. getALife - An Artificial Life Environment for the Evaluation of Agent-based Systems and Evolutionary Algorithms for Reinforcement Learning. In N. Nguyen and R. Katarzyniak (eds), *New Challenges in Applied Intelligence Technologies*. Series: *Studies in Computational Intelligence*, vol. 134, pp. 35-44, Springer, 2008.

<http://www.springerlink.com/content/57m73m656ww24826/>

Indexed: Scopus; DBLP; Scimago (Q4)

1. P. Cortez, M. Rocha, J. Neves. Time Series Forecasting by Evolutionary Neural Networks. In J. Rabunal, J. Dorado (Eds.), *Artificial Neural Networks in Real-Life Applications*, pp. 47-70, Idea Group Publishing, 2006.

Repositorium: <http://hdl.handle.net/1822/5929>

PAPERS IN INTERNATIONAL CONFERENCE PROCEEDINGS

All papers are full texts, peer-reviewed and published in proceedings with ISBN

Papers indexed in ISI Web of Science, Scopus and DBLP

61. J.P. Pinto, I. Rocha, M. Rocha. Highlighting Metabolic Strategies Using Network Analysis over Strain Optimization Results. Proc. Pattern Recognition in Bioinformatics (PRIB 2011), Lecture Notes in Computer Science, vol. 7036, pp. 109-120, Springer, Delft, Nov. 2011.

Indexed: ISI WoS²; Scopus; DBLP; Scimago (Q2)

Repositorium: <http://hdl.handle.net/1822/14438>

60. P. Evangelista, J. Pinho, E. Gonçalves, P. Maia, J.L. Sobral, M. Rocha. A Software Platform for Evolutionary Computation with Pluggable Parallelism and Quality

² Recent papers still not indexed in ISI Web of Science (previous papers on the same series / conference are listed)

Assurance. Proceedings of the EANN/AIAI conferences, vol. 2, pp. 45-50, IFIP publications, Springer, Corfu, Greece, September 2011.
Indexed: ISI WoS², Scopus; DBLP

59. P. Sousa, P. Cortez, M. Rio, M. Rocha. Traffic Engineering Approaches Using Multicriteria Optimization Techniques. *Proceedings of the Wired/Wireless Internet Communications Conference (WWIC 2011), Lecture Notes in Computer Science*, vol. 6649, pp. 104-115, Vilanova i la Geltrú, Spain, June 2011.
Indexed: ISI WoS²; Scopus; DBLP; Scimago (Q2)
Repositorium: <http://hdl.handle.net/1822/14987>

58. M. Rocha, T. Sá, P. Sousa, P. Cortez, M. Rio. Multiobjective Evolutionary Algorithms for intradomain routing optimization. *Proceedings IEEE Congress on Evolutionary Computation (IEEE CEC 2011)*, IEEE Press, New Orleans, pp. 2272-2279, June 2011.²
Indexed: ISI WoS²; Scopus; DBLP
Repositorium: <http://hdl.handle.net/1822/14336>

57. P. Vilaça, P. Maia, M. Rocha. A Study on the Robustness of Strain Optimization Algorithms. *Proceedings of Conference on Practical Applications of Bioinformatics and Computational Biology (PACBB 2011), Advances on Intelligent and Soft Computing*, vol. 93, pp. 329-336, Springer, April 2011.
Indexed: ISI WoS; Scopus; DBLP; Scimago (Q4)
Repositorium: <http://hdl.handle.net/1822/14344>

56. A. Lourenço, S. Carneiro, J.P. Pinto, M. Rocha, E.C. Ferreira, I. Rocha. Interpreting the Regulatory Interplay in E. coli Metabolic Pathways. *Proceedings of Conference on Practical Applications of Bioinformatics and Computational Biology (PACBB 2011), Advances on Intelligent and Soft Computing*, vol. 93, pp. 303-312, Springer, April 2011.
Indexed: ISI WoS; Scopus; DBLP; Scimago (Q4)
Repositorium: <http://hdl.handle.net/1822/14343>

55. J.P. Pinto, I. Rocha, M. Rocha. A software tool for network topology analysis under a metabolic engineering perspective. *Proceedings of the ACM Conference on Bioinformatics and Computational Biology (ACM BCB 2010)*, pp. 569- 578, ACM Press, August 2010.
Indexed: Scopus; DBLP

54. O. Dias, M. Rocha, E. C. Ferreira, I. Rocha. Merlin: Metabolic Models Reconstruction using Genome-Scale Information. *Proceedings 11th IFAC Conference Computer Applications on Biotechnology (CAB 2010)*, Leuven (Belgium), pp. 120-125, July 2010.
Indexed: Scopus

53. P. Cortez, A. Correia, P. Sousa, M. Rocha, M. Rio. Spam Email Filtering Using Network-Level Properties. *Proceedings of the Industrial Conference Data Mining (ICDM 2010), Lecture Notes in Artificial Intelligence*, vol. 6171, Springer, Berlin, pp. 476-489, July 2010.
Indexed: ISI WoS; Scopus; DBLP; Scimago (Q2)
Repositorium: <http://hdl.handle.net/1822/10829>

52. J. P. Faria, M. Rocha, R. L. Stevens, C. S. Henry. Analysis of the Effect of Reversibility Constraints on the Predictions of Genome-scale Metabolic Models. *Advances in Bioinformatics, Proceedings of IWAPCBB'2010, Advances on Soft Computing vol. 74*, Springer, pp. 217-224, June 2010.

Indexed: ISI WoS; DBLP; Scimago (Q4)

51. P. Maia, M. Pont, J.-F. Tomb, I. Rocha, M. Rocha. Enhancing Elementary Flux Modes Analysis using Filtering Techniques in an Integrated Environment. *Advances in Bioinformatics, Proceedings of IWAPCBB'2010, Advances on Soft Computing vol. 74*, Springer, pp. 209-216, June 2010.

Indexed: ISI WoS; DBLP; Scimago (Q4)

50. P. Vilaça, P. Maia, I. Rocha, M. Rocha. Metaheuristics for strain optimization using transcriptional information enriched metabolic models. *Proceedings EvoBio'2010, Lecture Notes in Computer Science*, vol. 6023, pp. 205-216, Springer Verlag, Istanbul, April 2010.

Indexed: ISI WoS; Scopus; DBLP; Scimago (Q2)

49. P. Sousa, A. Machado, M. Rocha, P. Cortez, M. Rio, A Collaborative Approach for Spam Detection, *Proceedings 2nd International Conference on Evolving Internet - INTERNET 2010*, pp. 92-97, Valencia, Spain, 2010

Indexed: Scopus

48. J. Pinho, M. Rocha, J.L. Sobral. Plugabble Parallelization of Evolutionary Algorithms Applied to the Optimization of Biological Processes. *Proceedings 18th Euromicro International Conference on Parallel, Distributed and Network-based Computing (PDP 2010)*, pp. 395-402, Pisa, February 2010.

Indexed: Scopus; DBLP

47. J. Pinho, M. Almeida, M. Rocha, J. L. Sobral. Parallelisation Service in the AspectGrid Framework. *Proceedings 4th Iberian Grid Infrastructure Conference (Ibergrid'2010)*, pp. 429-439, 2010

Indexed: ISI WoS

46. P. Evangelista, P. Maia, M. Rocha. Implementing Metaheuristic Optimization Algorithms with JEColi. *Proceedings 9th International Conference on Intelligent Systems Design and Applications (ISDA 2009)*, pp. 505-510, Pisa, Italy, Nov./Dec. 2009.

Indexed: ISI WoS; Scopus; DBLP

45. O. Rocha, P. Maia, I. Rocha, M. Rocha. OptFerm - A Computational Platform for the Optimization of Fermentation Processes. *Proceedings European Simulation and Modelling Conference (ESM 2009)*, Leicester, October 2009.

Indexed: ISI WoS

44. P. Cortez, C. Lopes, P. Sousa, M. Rocha, M. Rio. Symbiotic Data Mining for Personalized Spam Filtering. *Proceedings IEEE/WIC/ACM International Joint Conferences*

on *Web Intelligence and Intelligent Agent Technologies*, pp. 149-156, IEEE Press, Milan, September 2009.

Indexed: ISI WoS; DBLP

43. D. Machado, R. Costa, M. Rocha, I. Rocha, B. Tidor, E.C. Ferreira. A critical review on modelling formalisms and simulation tools in Computational Biosystems. *Proceedings IWPACBB 2009, Lecture Notes in Computer Science*, vol. 5518, pp. 1063-1070, Springer, Salamanca, Spain, June 2009.

Indexed: ISI WoS; Scopus; DBLP Scimago (Q2)

42. P. Evangelista, I. Rocha, E.C. Ferreira, M. Rocha. A software tool for the simulation and optimization of dynamic metabolic models. *Proceedings IWPACBB 2009, Lecture Notes Computer Science*, vol. 5518, pp. 1071-1078, Springer, Salamanca, Spain, June 2009.

Indexed: ISI WoS; Scopus; DBLP Scimago (Q2)

41. A. Lourenço, S. Carneiro, E.C. Ferreira, R. Carreira, L.M. Rocha, D. Glez-Peña, J.R. Mendez, F. Fdez-Riverola, F. Diaz, I. Rocha, M. Rocha. Biomedical Text Mining Applied To Document Retrieval and Semantic Indexing. *Proceedings IWPACBB 2009, Lecture Notes in Computer Science*, vol. 5518, pp. 954-963, Springer, Salamanca, Spain, June 2009.

Indexed: ISI WoS; Scopus; DBLP; Scimago (Q2)

40. P. Evangelista, I. Rocha, E.C. Ferreira, M. Rocha. Evolutionary Approaches for Strain Optimization using Dynamic Models under a Metabolic Engineering Perspective. *Proceedings EvoBio'2009, Lecture Notes Computer Science*, vol. 5483, pp.140-151, Springer, Tubingen, Germany, April 2009.

Indexed: ISI WoS; Scopus; DBLP; Scimago (Q2)

Repositorium: <http://hdl.handle.net/1822/11327>

39. J.P. Pinto, O. Dias, A. Lourenço, S. Carneiro, E.C. Ferreira, I. Rocha, M. Rocha. Data Integration Issues in the Reconstruction of the Genome-scale Metabolic Model of *Zymomonas mobilis*. *Proceedings IWPACBB'08*, pp. 92-101, Series: *Advances on Soft Computing*, Springer Verlag, Salamanca, October 2008.

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SOFTWARE DEVELOPMENT PROJECTS

OptFlux- computational platform for metabolic engineering (<http://www.optflux.org>), coordinator and developer (published in *BMC Systems Biology 2010*); includes a number of plug-ins:

- Support to regulatory models (published in *BioSystems 2011*);
- Topological network analysis (published in *ACM BCB 2010*);
- Elementary Modes Analysis (published in *IWPACBB 2010*);
- Support to dynamic models (published in *IWPACBB 2009*);
- Simulation and optimization with gene over/ under expression (paper submitted);
- Support to addition of reactions from external databases (paper submitted).

@Note, biomedical text mining platform (<http://sysbio.di.uminho.pt/anote/wiki>), coordinator (published in *Journal of Biomedical Informatics 2009*)

JEColi, the Java Evolutionary Computation library (<http://darwin.di.uminho.pt/jecoli>), coordinator and developer (published in *ISDA 2009*); now includes support for parallel architectures (published in *AIAI 2011*)

AI Bench (<http://www.aibench.org>) - joint project with the University of Vigo (published in *Computer Methods and Programs for Biomedicine 2010*, see above); this framework has supported the development of several applications for biomedical research

OptFerm, software platform for the optimization of fed-batch fermentation processes (<http://darwin.di.uminho.pt/optferm>), coordinator (published in *ESM 2009*)

Merlin, software for model reconstruction (<http://darwin.di.uminho.pt/merlin>), collaborator (published in *CAB 2010*)

NetOpt (<http://darwin.di.uminho.pt/netopt>), application for intra-domain network routing optimization using OSPF protocol, coordinator (published in *CRC 2010*)

A2. RECOGNITION BY THE COMMUNITY

INVITED LECTURES

September 2011 – *Computational tools for metabolic engineering*
III Galician Bioinformatics Meeting, Vigo, Spain

June 2011 - *Optimization Methods in Metabolic Engineering Applications*
Workshop in Bio-Optimization: Optimization techniques applied to Biology
Coimbra, Portugal

May 2011 – *Introduction to Systems Biology and Metabolic Engineering; Computational Methods for Gene Expression Analysis* (two lectures)
Course: *Master in Advanced Informatics Technologies, Univ, Huelva, Spain.*

April 2011 – *Transcriptome Analysis*
Course: *Methods in DNA Analysis, School of Health Sciences, University of Minho*

May/ July 2010 - *In silico Metabolic Engineering*
European Bioinformatics Institute, informal lectures to the Luscombe and Steinbeck groups

April 2010 and April 2011 - *In silico Metabolic Engineering and Transcriptome analysis* (two lectures)
Doctoral course in Informatics Engineering, Univ, Vigo, Spain.

March 2010 - *In silico Metabolic Engineering*
Instituto Gulbenkian de Ciências and INESC-ID, Lisboa

August 2009 - *In silico Metabolic Engineering*
Univ. California Berkeley, USA, lecture to the Arkin lab

June 2009 - *Tutorial on Metabolic Engineering - Methods for in silico strain optimization and elementary modes analysis*
ISMB/ECCB conference, Stockholm

July 2008 - *Nature Inspired Meta-heuristics for the Optimization of Microbial Strains*
1st Portuguese Forum on Computational Biology, Lisbon.

May 2008 - *Applications of Evolutionary Algorithms in Systems Biology*
Workshop on Systems Biology, CSIC IIM, Vigo, Spain.

May 2007 - *OptGene: a computational tool for metabolic engineering*
Dupont Experimental Station, Wilmington, USA

June 2006 - *Microarray Data Analysis with Data Mining and Machine Learning*
Short course organized by the *FLAD Computational Biology Collaboratorium* hosted by the Instituto Gulbenkian da Ciências and the Instituto de Sistemas e Robótica at the Instituto Superior Tecnico (ISR-Lisbon).

May 2006 - *Bioinformatics: Past and Future*
Polytechnic Institute of Bragança, Portugal

July 2005 - *Optimization of Neural Network based Models through Evolutionary Computation*
Universidad Vigo, Ourense, Spain

ORAL PRESENTATIONS IN INTERNATIONAL CONFERENCES

Presentation of papers/ abstracts listed above in A1

7th Annual RECOMB Satellite on Systems Biology 2011, Barcelona, Spain, October 2011

EvoStar Conference 2010, EvoBio'2010 track, Istanbul, Turkey, April 2010.

9th International Conference on Intelligent Systems Design and Applications (ISDA 2009), Pisa, Italy, Nov./Dec. 2009.

European Simulation and Modelling Conference (ESM 2009), Leicester, UK, Oct. 2009.

17th Intl. Conference on Intelligent Systems for Molecular biology (ISMB) and 8th European Conference Computational Biology, Stockholm, Sweden, June/July 2009.

EvoStar Conferences 2009, EvoBio'2009, Tubingen, Germany, April 2009.

8th IEEE International Conference on Bioinformatics and Bioengineering (BIBE 2008), Athens, October 2008.

11th IFIP/IEEE International Conference on Management of Multimedia and Mobile Networks and Services (MMNS 2008), Samos (Greece), September 2008.

21st International Conference on Industrial, Engineering & Other Applications of Applied Intelligent Systems (IEA-AIE 2008), Wroclaw, June 2008.

ICINCO 2008 - International Conference on Informatics in Control, Automation and Robotics, Funchal, May 2008.

13th Portuguese Conference on Artificial Intelligence, Guimarães, December 2007

Genetic and Evolutionary Computation Conference (GECCO 2007), London, July 2007.

EvoWorkshops and EvoBio'2007, Valencia, Espanha, April 2007 (2 presentations)

IEEE Symposium Series on Computational Intelligence, Honolulu, EUA, April 2007.

IEEE World Congress on Computational Intelligence (WCCI 2006), July 2006 (2 presentations)

IEEE Conference on Evolutionary Computation (CEC2005), Edinburgh, Sept. 2005.

ICANNGA 2005, Coimbra, March 2005 (2 presentations)

EvoStar conference 2004, EvoBio track, Coimbra, April 2004.

ICSC Symposium on Engineering of Intelligent Systems (EIS 2004), Funchal, Feb. 2004.

Portuguese Conference Artificial Intelligence (EPIA'2003), Beja (Portugal), Dec. 2003.

European Symposium Artificial Neural Networks (ESANN-2003)}, Brugge, April 2003.

Fourteenth International Conference on Industrial & Engineering Applications of Artificial Intelligence & Expert Systems (IEA-AIE'2001), Budapest, Hungary, June 2001 (2 presentations)

ICSC Symposium on Engineering of Intelligent Systems (EIS'2000), Paisley, July 2000.

Genetic and Evolutionary Computation Conference (GECCO'99), Orlando, July 1999.

Optimization-98, Coimbra, July 1998

REVIEWING FOR INTERNATIONAL JOURNALS

- *Bioinformatics* (2011)
- *DNA Research* (2011)
- *BioSystems* (2011)
- *BMC Systems Biology* (2010 - 2011)
- *BMC Bioinformatics* (2010)
- *Neurocomputing* (2009, 2010)
- *Information Sciences* (2009)
- *IEEE Transactions on Systems, Man and Cybernetics - part C: Applications and reviews* (2009)
- *IET Communications* (2008-2011)
- *IEEE Transactions on Neural Networks* (2008)
- *Applied Microbiology and Biotechnology* (2008)
- *Fuzzy Sets and Systems* (2007)
- *Chemical Engineering Communications* (2007)

PROGRAM COMITEES OF INTERNATIONAL CONFERENCES

2012

- *IEEE Congress on Evolutionary Computation (CEC 2012)* (Technical PC), Brisbane, Australia, June 2012

- BIOINFORMATICS 2012 - International Conference on Bioinformatics Models, Methods and Algorithms
- ICAART 2012

2011

- Technical Program Committee, IEEE Symposium Computational Intelligence Bioinformatics and Computational Biology (CIBCB), Symposium Series on Computational Intelligence, Paris, April 2011
- Technical Program Committee, IEEE Conference on Evolutionary Computation (CEC 2011), New Orleans, June 2011.
- European Conference on Artificial Life (ECAL 2011) , Paris, August 2011.
- Pattern Recognition in Bioinformatics, PRIB 2011, Delft

2010

- World Congress on Computational Intelligence, 2010 (Barcelona) (Technical PC).
- AAAI Conference on Artificial Intelligence, Special track: Artificial Intelligence and Bioinformatics (AAAI AIB 2010)
- Pattern Recognition in Bioinformatics, PRIB 2010
- ISC - Industrial Simulation Conference 2010, Budapest
- IEEE Symposium Computational Intelligence Bioinformatics and Computational Biology (CIBCB 2010) (Technical PC)

2009

- IEEE Conference on Evolutionary Computation (Trondheim) (Technical PC).
- ISC - Industrial Simulation Conference, UK
- IEEE Symposium Computational Intelligence Bioinformatics and Computational Biology (CIBCB 2009) (Technical PC)

2008

- ISC - Industrial Simulation Conference, Lyon
- World Congress on Computational Intelligence (WCCI), Hong-Kong (technical PC)

2007

- ISC - Industrial Simulation Conference, Delft
- European Conference on Artificial Life (ECAL), Lisboa

2006

- ESM - European Simulation and Modelling (Toulouse)
- ISC - Industrial Simulation Conference, Palermo

2005

- ESM - European Simulation and Modelling (Porto)

REVIEWING FOR INTERNATIONAL CONFERENCES

In addition to the conferences mentioned in the Program Committee item, there are the following:

- IFAC Symposium on Computer Applications of Biotechnology (CAB) -2010;
- Petri Nets 2009, Paris;
- International Conference on Artificial Neural Networks (ICANN) - 2006, 2007, 2008;
- World Congress on Computational Intelligence (WCCI) - 2008 (Hong-Kong);
- International Conference on Adaptive and Natural Computing Algorithms (ICANNGA) - 2007 (Warsaw);

PROJECT EVALUATIONS

Evaluation of project proposals for the City University of Hong Kong, 2011

EVALUATION OF ACADEMIC ACTIVITIES

See section C4 below

PRIZES

Atreve-te 2010 Entrepreneurship Prize, **1st place**, December 2010 - most innovative start-up project - SilicoLife, Ltd. Sponsored by the Presidency of the Portuguese Republic, sponsored by Caixa Geral de Depósitos (30.000 €).

Rocha, I. Maia, P., Evangelista, P., Vilaça, P., Soares, S., Pinto, J. P., Nielsen, J., Patil, J. N., Ferreira, E. C. and Rocha, M. OptFlux: an open-source software platform for *in silico* metabolic engineering. *BMC Systems Biology* 2010, 4:45 - **Highly accessed article** and **most viewed** in April 2010.

Best Poster - Dias, O.; Rocha, M.; Rocha, I.; Ferreira, E.C. Metabolic reconstruction of less characterized microorganisms: a new methodology for reaction identification from genome sequencing data. *Jornadas de Bioinformática JB'2009 - Challenges in Bioinformatics*, Lisboa, Portugal, November 3, 57, 2009.

A. Lourenço, R. Carreira, S. Carneiro, P. Maia, D. Glez-Peña, F. Fdez-Riverola, E. C. Ferreira, I. Rocha, M. Rocha. @Note: A Workbench for Biomedical Text Mining. *Journal of Biomedical Informatics*, 42(4):710-720, 2009.

Top25 **Hottest Articles** in *Journal of Biomedical Informatics* (July-September 2009), number 4

URL: <http://top25.sciencedirect.com/subject/computer-science/7/journal/journal-of-biomedical-informatics/15320464/archive/23>

2nd Best Poster - Carneiro, S., Maia, P. Rocha, M., Ferreira, E.C., Rocha, I. Constraint-based approach for *in silico Escherichia coli* combined regulatory/metabolic modeling.

Micro '07 - Biotec '07 - XXIII JPG, "Functional Genomics, Bioinformatics and Systems Biology" area, Lisbon November 30 to December 22007.

AWARDS, GRANTS AND SCOLLARSHIPS

2010 – EMBO, European Science Foundation and FCT awards for short-term fellowship (3 months) in the European Bioinformatics Institute (May-July 2010)

2007 - Dupont Science & Engineering Award for the work "Development of a user-friendly software platform for the rational design of improved microbial strains". Sponsored and Funded by Dupont Europe (25.000 €); team member.

2005, 2001, 1999 – Awards from Gulbenkian Foundation and Luso-American Foundation for attending international conferences and performing oral presentations

1998 – PhD grant from Portuguese FCT (ref. BD/13445/97)

1995-1997 – MSc grant from Portuguese FCT (ref. BM/6662/95)

1995 – Scholarship from Galileo program for the internship in the company Integral Vision Ltd.- Bedford – UK.

1992/93 and 1993/94 – Scholar merit award from the University of Minho

A3. FUNDED RESEARCH PROJECTS

PRINCIPAL INVESTIGATOR

Title: *ToMEGIM - Computational Tools for Metabolic Engineering using Genome-scale Integrated Models*

Starting date: March 2011; duration: 3 years

Funding agency: Portuguese FCT; ref. PTDC/EIA-EIA/115176/2009

Budget: 111900 €

Title: *Strategic Project - unit UI 752 - 2011-2012*³

Funding agency: Portuguese FCT; ref. PEst-OE/EEI/UI0752/2011

Starting date: January 2011; duration: 2 years

Budget: 168 000 €

Title: *MOBioPro - Nature-Based Computation in the Modeling and optimization of Biological Processes*

Funding agency: Portuguese FCT; ref. POSC/ EIA/59899/2004

Starting date: July 2005; duration: 3 years

Budget: 73000 €

³ PI of this project as a Director of the unit

Title: *Machine Learning Applications in Systems Biology Research*
Collaboration with Univ. California Irvine
Funding agency: Luso-American Foundation (FLAD)
Budget: 14000 €

PARTICIPATION IN RESEARCH TEAMS

Title: *The Transcriptome of the Oncogenic HOXA9 Homeoprotein in Human Glioblastoma: Characterization and Functional Significance*
Funding agency: Portuguese FCT; ref. PTDC/SAU-GMG/113795/2009
Starting date: April 2011; duration: 3 years
Budget: 160000 €
PI: Bruno Costa, ICVS, School of Health Science, University of Minho

Title: *In silico reconstruction of Streptococcus pneumoniae cellular networks and their impact on virulence*
Funding agency: Portuguese FCT; ref. PTDC/EBB-EBI/113824/2009
Starting date: January 2011; duration: 3 years
Budget: 126500 €
PI: Francisco Pinto, Faculty of Sciences, Lisbon University

Title: *HeliSysBio- Molecular Systems Biology Helicobacter pylori*,
Funding agency: Portuguese FCT; ref. PTDC/EBB-EBI/104235/2008, 200000 €.
Starting date: April 2010; duration: 3 years
Budget: 159000 €
PI: Isabel Rocha, CEB/IBB, Univ. Minho

Title: *GAsPar: General-purpose Aspect-Oriented framework for heterogeneous multicore parallel systems*,
Funding agency: Portuguese FCT; ref. PTDC/EIA-EIA/108937/2008
Starting date: June 2010; duration: 3 years
Budget: 100000 €.
PI: João Luis Sobral, CCTC, Univ. Minho

Title: *The Transcriptome of the Oncogenic HOXA9 Homeoprotein in Human Glioblastoma and Precursor Cells*
Funding agency: Gulbenkian Foundation
Starting date: 2010; duration: 2 years
Budget: 50000 €
PI: Bruno Costa, ICVS, School of Health Sciences, University of Minho

Title: *Bridging Systems and Synthetic Biology for the development of Improved Microbial Cell Factories*,
Funding agency: Portuguese FCT, Program MIT-Portugal, ref. MIT-Pt/BS-BB/0082/2008
Starting date: April 2009; duration: 3 years

Budget: 200000 €

PI: Eugénio C. Ferreira, CEB/IBB, Univ. Minho

Title: *SYSINBIO- Systems Biology as a Driver for Industrial Biotechnology*

Funding: FP7 European Coordination and support action (call FP7-KBBE-2007-1)

UM budget: 33000 euros

PI: Jens Nielsen, Chalmers, Sweden

Title: *SPAM Telescope Miner: worldwide unsolicited email detection using data mining techniques*

Funding agency: Portuguese FCT, ref. PTDC/EIA/64541/2006

Starting date: July 2007; duration: 3 years

Budget: 70000 €

PI: Paulo Cortez, Algoritmi unit, Univ. Minho

Title: *AspectGrid: Pluggable Grid Aspects for Scientific Applications*, funded by FCT, ref. GRID/GRI/81880/2006

Starting date: April 2007; duration: 3 years

Budget: 152000 €

PI: João Luis Sobral, CCTC, Univ. Minho

Title: *Development of a user-friendly software platform for the rational design of improved microbial strains*

Funding: Dupont Science and Engineering Program.

Starting date: 2007; duration: 2 years

Budget: 20000 USD

PI: Isabel Rocha, CEB/IBB, Univ. Minho

Title: *Development of a case-based reasoning tool for cancer diagnosis using microarray datasets*

Funding: Portuguese/ Spanish integrated actions,

Collaboration with University of Vigo, Spain

Starting date: 2007; duration: 2 years

Budget (Portuguese team): 3000 €

PI of the Portuguese team: Rui Mendes, CCTC, Univ. Minho

Title: *Neural Network based techniques for Internet Congestion Control*

Funding: Portuguese/UK integrated actions (CRUP/ British Council),

Collaboration with the University College London.

Starting date: 2005; duration: 2 years

Budget (Portuguese team): 3000 €

PI of the Portuguese team: Paulo Cortez, Algoritmi, Univ. Minho

Title: *Intelligent Agents Simulation for the RoboCup*

Funding agency: Portuguese FCT, ref. POSI/ROBO/ 43904/2002.

Starting date: 2003; duration: 3 years

PI: José Neves, CCTC, Univ. Minho

A4. COORDINATION AND DINAMIZATION OF RESEARCH ACTIVITIES

COORDINATION OF RESEARCH ACTIVITIES

Since 2004, Miguel Rocha has been coordinating a research team in Bioinformatics within the CCTC unit. Together with the BioPSEG group at the CEB/IBB centre, a collaboration effort has been established to create an informal group: the Bioinformatics and Systems Biology interdisciplinary initiative – BiSBII (<http://sysbio.di.uminho.pt/bisbii>), that he co-leads. This group involves more than 30 researchers including faculty, post-docs, PhD students and grantees in research projects.

Also, together with colleagues from the University of Minho and from University College London (United Kingdom), he created the Intelligent Systems for Network Optimization (ISNO) informal group (since 2005), aiming to address computer network modelling and optimization problems with methods from the Artificial Intelligence/ Data Mining/ Natural Computation fields.

He also maintains important collaborations with other groups both at the University of Minho and other national and international institutions, listed below.

ACTIVE COLLABORATIONS

includes co-supervisions, co-authorship, shared projects

International academic collaborations

- **Miguel Rio**, University College London, United Kingdom (<http://www.ee.ucl.ac.uk/~mrio>) - joint projects and publications
- **Florentino Riverola**, Universidad de Vigo, SING group, Spain - <http://sing.ei.uvigo.es/~riverola>; <http://sing.ei.uvigo.es> - joint projects and publications
- **Christopher Henry**, Argonne National Labs, USA (http://www.mcs.anl.gov/about/people_detail.php?id=605) - joint publications; co-supervision of MSc and PhD students)
- **Julio Saez-Rodriguez**, European Bioinformatics Institute, United Kingdom (<http://www.ebi.ac.uk/saezrodriguez>) - co-supervision of MSc students
- **Nicholas Luscombe**, European Bioinformatics Institute, United Kingdom (<http://www.ebi.ac.uk/luscombe>) - sabbatical leave
- **Luis Rocha**, Indiana University (USA) and Instituto Gulbenkian de Ciência (<http://informatics.indiana.edu/rocha>) - joint publications
- **Adam Arkin**, Univ. California Berkeley, USA (<http://bioeng.berkeley.edu/cv/aarkin.php>) - co-supervision of PhD student
- **Kiran Patil**, European Molecular Biology Laboratory (EMBL), Germany (<http://www.embl.de/research/units/scb/patil>) - joint projects and publications

- **Jens Nielsen**, Chalmers Institute of Technology, Sweden (http://www.sysbio.se/_people/people_jens.html) - joint projects and publications
- **Bruce Tidor**, CSAIL – Massachusetts Institute of Technology (MIT), USA, co-supervision of students, joint projects publications
- **Silas Villas-Bôas**, University of Auckland, New Zealand, co-supervision of PhD student
- **Pierre Baldi**, Univ. California Irvine, USA (<http://www.igb.uci.edu/~pfbaldi>) - joint project

Collaborations with international companies

- **Dupont, USA – Jean François Tomb and Marcellinus Pont.** Joint research projects and publications.

Collaborations within the University of Minho

- **Isabel Rocha** and **Eugénio C. Ferreira**, Centre for Biological Engineering (part of IBB Associated Lab) – joint research in BiSBII involving co-supervision of students, joint publications and research projects
- **Paulo Cortez** and **Pedro Sousa**, Algoritmi centre – joint research in ISNO (together with Miguel Rio) involving joint publications and research projects
- **Rui Manuel Reis** and **Bruno Costa** – ICVS, School of Health Sciences – joint research projects

Other national collaborations

- **Francisco Pinto**, University of Lisbon - joint projects

Other collaborations

- Since 2006 - Member of the FLAD Computational Biology Collaboratorium (<http://bc.igc.gulbenkian.pt/collaboratorium>)
- Since February 2007 – part of the faculty involved in the **MIT-Portugal program**

RESEARCH VISITS

May-July 2010: European Bioinformatics Institute, Cambridge, UK –Luscombe group (3 month stay in the context of a sabbatical leave)

March 2010, July 2008, July 2006: Instituto Gulbenkian de Ciência, Lisbon

April 2010, April 2009, June 2008, September 2007, June 2007, July 2006: Universidad de Vigo, Florentino Riverola/ SING group

August 2009, August 2008, August 2007: Univ. California Irvine, USA – Pierre Baldi

August 2009: Univ. California Berkeley, USA – Adam Arkin group

September 2008, July 2007, June 2006, February 2006, May 2005: University College London, UK – Miguel Rio's group

May 2007: visit to MIT (Cambridge, MA, USA) and to Dupont headquarters (Wilmington, DE, USA)

June 2003 and June 2004: Universidade Católica de Luanda, Angola

ORGANIZATION OF SCIENTIFIC MEETINGS

See C.2 below

PART B: PEDAGOGICAL ACTIVITIES/ STUDENT SUPERVISION

Summary

The teaching activities over the last few years have been devoted mostly to Bioinformatics, an emergent field where there were no pedagogical offers before 2004 in the University of Minho. Within this context, the main achievements are the following:

- responsible docent for the first curricular unit in Bioinformatics at the University of Minho, taught to the Biomedical Engineering degree since 2004 (until the present); this curricular units were also offered as optional in Informatics Engineering since 2004 until the reformulation of the degree in 2007;
- co-founder and Director of the Master in Bioinformatics, since its creation in 2007 until February 2010, being still on the directive board;
- responsible docent of one of the curricular units (30 ECTS) in the 1st year of the Bioinformatics master course (“UC Bioinformática”), that is also offered as optional in the Informatics Engineering master;
- part of the faculty of the MIT-Portugal program since 2007, lecturing at the Bioengineering PhD doctoral program in the curricular unit related to Computational Biology.

Apart from the previous activities, he has also been teaching several other courses in the areas of Data Mining and basic Computer Science / Informatics. Altogether, the mean number of teaching hours per week in the last years has been around 9-10 (nearly 150 hours per semester), spanning 2-3 curricular units per semester. The teaching performance evaluated by the students is above average.

Regarding the supervision of students, he is currently (co-)supervising 8 PhD students (with 2 more starting in early 2012), from which he is the main supervisor of 5. He has also concluded the supervision of 13 master theses.

B1. TEACHING ACTIVITIES IN UNIVERSITY COURSES

Notes:

- All teaching activities were conducted at the University of Minho, while Miguel was an Assistant Professor (before 2004) and an Auxiliar Professor (from 2004)
- contact hours will be given as total values in the semester/ year
- type of classes: T – theoretical classes; TP – theoretical/ practical classes; P – practical classes (laboratory)

DOCTORAL PROGRAMS

Curricular unit: ***Computational Biosystems Science and Engineering***

Doctoral program: *PhD in Bioengineering* (MIT/ Portugal program)

Dates: 2007 to 2011; 1st semester

Role: lecturer

Curricular unit: ***Bioinformatics Algorithms and Technologies*** (optional unit in the context of the *Scientific and Technological Computing Option*)

Doctoral program: *PhD in Informatics* (<http://pdinf.di.uminho.pt>)

Dates: 2011/2012, 1st semester

Roles: responsible docent; theoretical and practical classes; 60 h. (30 T + 30 TP)

Note: taught together with Master in Bioinformatics

MASTER COURSES

Curricular unit: ***UCE Bioinformatics*** (two variants: *Biological Sciences – CB*; *Information Technologies – TI*)

Course/ year: *Master in Bioinformatics* (variants CB and TI); *Master in Informatics Engineering/ Informatics* (optional); 1st year

Credits: 30 ECTS

Dates: 2007/2008 to 2011/2012

Roles: **responsible docent** of the whole curricular unit; involved in teaching the following internal modules:

- *Bioinformatics Algorithms and Technologies* (theoretical and practical classes); 60 hours (30 T + 30 TP); 1st semester; TI and CB variants; 2007/2008 to 2010/2011
- *Knowledge Extraction from Biological Databases* (theoretical and practical classes); 60 hours (30 T + 30 TP); 2nd semester; TI and CB variants; 2007/2008, 2008/2009, 2010/2011
- *Bioinformatics Laboratories* (practical classes); 24 h.; 2010-2011 and 2011-2012
- *Integrated project in Bioinformatics* (practical classes); 30 hours (P); 2nd semester; TI and CB variants; 2007/2008, 2008/2009, 2010/2011

Curricular unit: ***UCE Advanced Bioinformatics and Systems Biology***

Course/ year: *Master in Bioinformatics* (variants CB and TI); 1st year

Credits: 30 ECTS

Dates: 2007/2008; 2008/2009; 2011/2012

Roles: involved in teaching of the internal module: *Advanced Algorithms in Bioinformatics* (theoretical and practical classes); 60 hours (30 T + 30 TP); 2nd semester

Curricular unit: ***Research Methods in Bioinformatics***

Course/ year: *Master in Bioinformatics* (variants CB and TI); 2nd year

Credits: 5 ECTS

Dates: 2008/2009 to 2011/2012; 1st semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 22.5 h. (15 T + 7.5 TP)

Curricular unit: ***Intelligent Systems for Bioinformatics***

Course/ year: *Master in Bioinformatics* (variants CB and TI);

Dates: 2008/2009; 1st semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 45 h. (30 T + 15 TP)

Curricular unit: ***Bioinformatics***

Course: Master in Molecular Genetics

Dates: 2005/2006 and 2006/2007

Collaboration with the Dept. Biology

INTEGRATED MASTER COURSES

Curricular Unit: ***Bioinformatics***

Degree/ year: *Integrated Master in Biomedical Engineering*, 3rd year

Credits: 5 ECTS

Dates: 2007/2008 to 2011/2012; 1st semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 45 h. (30 T + 15 TP); 2 groups in practical classes

Curricular Unit: ***Computing and programming***

Degree/ year: *Integrated Master in Biological Engineering*, 1st year

Credits: 5 ECTS

Dates: 2007/2008 to 2011/2012; 1st semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 45 h. (15 T + 30 TP); taught one of the 2 groups in practical classes

UNDERGRADUATE DEGREES

Curricular Unit: **Bioinformatics**

Degree/ year: *Biomedical Engineering*, 3rd year

Credits: 5 ECTS

Dates: 2004/2005 to 2006/2007; 1st semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 60 h. (30 T + 30 TP) ; 2 groups in practical classes.

Curricular Unit: **Informatics Laboratories II**

Degree/ year: *Informatics Engineering*; 1st year

Credits: 5 ECTS

Dates: 2006/2007 and 2007/2008; 2nd semester

Roles: practical classes (2 groups each semester); 30 h. (30 P)

Curricular Unit: **Bioinformatics**

Degree/ year: *Systems and Informatics Engineering / Mathematics and Computer Science* (5 year degrees; pre-Bologna; "licenciaturas"), 4th / 5th years; optional subject

Dates: 2004/2005 to 2006/2007; 1st semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 60 h. (30 T + 30 TP)

Curricular Unit: **Informatics**

Degree/ year: *Optometry and vision sciences*; 1st year

Dates: 1999/2000; 2004/2005 to 2006/2007; 1st semester

Roles: theoretical and practical classes; 60 h. (30 T + 30 P)

Curricular Unit: **Natural Computing**

Degree/ year: *Systems and Informatics Engineering / Mathematics and Computer Science* (5 year degrees; pre-Bologna; "licenciaturas"), 4th / 5th years; optional subject

Dates: 2004/2005 to 2006/2007; 2nd semester

Roles: theoretical and practical classes; 30 h. (15 T + 15 TP)

Curricular Unit: **Data Exploration Systems**

Degree/ year: *Biomedical Engineering* – specialization in *Medical Informatics*; 4th year

Dates: 2005/2006; 1st semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 60 h. (30 T + 30 TP)

Curricular Unit: **Introduction to Informatics**

Degree/ year: *Biological Engineering (5 yr degree pre-Bologna)*; 1st year

Dates: 2004/2005 and 2005/2006; 2nd semester

Roles: practical classes; 30 h. (2 groups)

Curricular Unit: **Introduction to Informatics**

Degree/ year: *Sociology (4 yr degree pre-Bologna)*; 1st year

Dates: 1997/1998 and 2004/2005

Roles: practical classes; 30 h. (2 groups)

Curricular Unit: **Artificial Life**

Degree/ year: *Systems and Informatics Engineering / Mathematics and Computer Science* (5 year degrees; pre-Bologna; "licenciaturas"), 4th / 5th years; optional subject

Dates: 2000/2001; 2nd semester

Roles: **responsible docent** of the curricular unit; theoretical and practical classes; 60 h. (30 T + 30 TP)

Curricular Unit: **Introduction to Informatics**

Degree/ year: *International Relationships – Economical and Political (4 yr degree pre-Bologna)*; 2nd year

Dates: 2000/ 2001; 1st semester

Roles: theoretical classes; 30 h

Curricular Unit: **Intelligent Systems**

Degree/ year: *Systems and Informatics Engineering* (5 year degrees; pre-Bologna; "licenciatura"), 4th year

Dates: 1998/1999 to 2000/2001; 2nd semester

Roles: practical classes; 30 h. (4 groups)

Curricular Unit: **Multiagent Systems**

Degree/ year: *Systems and Informatics Engineering / Mathematics and Computer Science* (5 year degrees; pre-Bologna; "licenciaturas"), 5th year; optional subject

Dates: 1998/1999 to 2000/2001; 1st semester

Roles: practical classes (30 h.)

Curricular Unit: **Knowledge Representation**

Degree/ year: *Systems and Informatics Engineering* (5 year degrees; pre-Bologna; "licenciatura"), 4th year

Dates: 1998/1999 and 1999/2000; 1st semester

Roles: practical classes; 30 h. (2 groups)

Curricular Unit: **Informatics**

Degree/ year: *The Law*; 1st year

Dates: 1998/ 1999; 2nd semester

Roles: practical classes; 30 h. (2 groups)

Curricular Unit: **Introduction to Informatics**

Degree/ year: *Materials Engineering*; 1st year

Dates: 1997/1998; 2nd semester

Roles: practical classes; 30 h.

B2. TEACHING PERFORMANCE

STUDENT'S EVALUATION

Table 1 shows the main results of the student's evaluations from the teaching activities conducted since 2005. The students answered the question: "Globally, I do a positive appreciation of the docent's work in the curricular unit". The scale of possible answers is the following: 1 – disagree completely; 2 – disagree substantially; 3 – disagree; 4 – agree; 5 – agree substantially; 6 – agree completely. In the table, the first column states the year, the second states the curricular unit, the third gives the mean of the answers provided by the students for the docent's evaluation in the unit, the fourth provides a normalization of this value to a 0-100% scale and, finally, the fifth provides the percentage of positive evaluations (4, 5 or 6). In the last row the mean values are provided.

In summary, the mean of the evaluations is around 4.5, representing a value of 70% in a normalized scale. The mean of positive answers is around 88%. It is also clear that in all units the docent's evaluation has been always positive.

Table 1. Results of the student's evaluation of the teaching activities (2005 to 2011)

Year	UC	Evaluation	Evaluation (%)	% positive
2010/2011	UCE Bioinformatics - TI (MB)	4.5	70%	100%
2010/2011	UCE Bioinformatics - CB (MB)	4.7	74%	100%
2010/2011	Computing and Programming (Biol. Eng.)	3.8	56%	60%
2010/2011	Bioinformatics (Biomedical Eng.)	4.3	66%	83%
2009/2010	Computing and Programming (Biol. Eng.)	4.3	66%	100%
2009/2010	Bioinformatics (Biomedical Eng.)	4.0	60%	82%
2009/2010	UCE Bioinformatics	4.6	72%	88%
2008/2009	UCE Bioinformatics	5.2	84%	100%
2008/2009	UCE Advanced Bioinformatics and Syst. Biol.	5.1	82%	100%
2008/2009	Computing and Programming (Biol. Eng.)	4.3	66%	85%
2007/2008	Informatics Laboratories II (Inf. Eng.)	4.7	74%	83%
2007/2008	Computing and Programming (Biol. Eng.)	3.7	54%	58%
2007/2008	Bioinformatics (Biomedical Eng.)	3.5	50%	60%
2006/2007	Natural Computing (Math. Comp Sci)	4.7	74%	100%
2006/2007	Informatics Laboratories II (Inf. Eng.)	4.1	62%	83%
2006/2007	Natural Computing (Syst Inf Eng)	5.0	80%	100%
2006/2007	Bioinformatics (Math Comp Sci)	5.0	80%	100%
2006/2007	Informatics (Optometry)	3.9	58%	68%
2006/2007	Bioinformatics (Biomedical Eng.)	4.9	78%	100%
2006/2007	Bioinformatics (Syst Inf Eng)	5.1	82%	100%
2005/2006	Data Exploring Systems (Biomedical Eng)	5.3	86%	100%
2005/2006	Natural Computing (Math. Comp Sci)	4.7	74%	100%
2005/2006	Introduction to Informatics (Biological Eng)	4.1	62%	77%
2005/2006	Informatics (Optometry)	4.1	62%	82%
2005/2006	Bioinformatics (Biomedical Eng.)	4.3	66%	88%
2005/2006	Bioinformatics (Syst Inf Eng)	4.8	76%	80%
Mean values		4.5	70%	88%

B3. PEDAGOGICAL INNOVATION AND VALORIZATION

PUBLICATIONS REGARDING PEDAGOGICAL INNOVATION

3. C. Ribeiro, C. Coutinho, M.F.M. Costa, M. Rocha. A Study of Educational Robotics in Elementary Schools. *Proceedings International Conference on Hands on Science*, pp. 76-85, Ponta Delgada, Portugal, July 2007.

2. C. Tavares Ribeiro, C. Ribeiro, P. Dias, M. Rocha, J. Neves. An Interdisciplinary E-learning System for the K-6, *Proceedings IASTED Conference on Computers and Advanced Technology in Education (CATE-2003)*, pp. 67-72, ACTA press, Rhodes, June 2003.

Indexed: Scopus

1. M. Rocha, J. Neves, A. Sousa, J. Mira, S. Almeida, J. Barreto, A. Sousa, C. Ribeiro. Intelligent Tutoring Systems at work in the Teaching of Mathematics. *Proceedings International Conference New Technologies in Science Education (CINTEC'2001)*, vol. 1, pp. 171-180, Aveiro, Portugal, July 2001.

PEDAGOGICAL COURSES ATTENDED

Workshop *Effective Learning*, coordinated by Richard Felder and Rebecca Brent University of Minho, July 2006 (12 h.; action 04/2006 - GAQE - Univ. Minho).

Course on Microarrays, Faculty of Sciences, University of Lisbon, January 2006 (30 h), lecturer: Nathalie Thorne, University of Cambridge.

Course on the Development of Contents for E-learning, TecMinho, 2004.

E-LEARNING SITES

Sites to support curricular units taught by the docent

Dates: 2006/2007 to 2009/2010

URL: <http://darwin.di.uminho.pt/moodle>

Date: 2005/2006

<http://omega.di.uminho.pt/moodle>

Since 2010/2011, the docent has been using for all its curricular units the institutional e-learning site (<http://elearning.uminho.pt>)

B4. PRODUCTION OF TEACHING MATERIAL

All materials in this section are written in Portuguese.

PUBLISHED BOOKS

1. Authors: M. Rocha, P. Cortez and J. Neves.

Title: ***Intelligent Data Analysis – Algorithms and Implementation in Java***

Original title: *Análise Inteligente de Dados - Algoritmos e Implementação em Java*)

Series: Tecnologias de Informação

Publisher / date: FCA Editora de Informática, Lda, 2009

ISBN: 978-972-722-278-0.

PEDAGOGICAL TEXTS

Notes written to support classes; not formally published but distributed for the students of the curricular units

9. Authors: M. Rocha, R. Mendes, P. Vilaça

Title: ***Practical exercises of MS Excel***

Original title: Folhas de cálculo – MS Excel: exercícios práticos

Date: October 2010

Description: Exercises and solutions for practical classes of introductory courses in informatics using spreadsheets

8. Authors: M. Rocha, R. Mendes

Title: ***Introduction to the R system***

Original title: *Introdução ao sistema R*

Date: December 2006; extended and reformulated in 2008 and 2011

Description: Support text for several introductory units in programming and computing

7. Authors: M. Rocha and R. Mendes

Title: ***Perl for Bioinformatics***

Original title: *Perl para Bioinformática*

Date: December 2004; extended and reformulated in 2006.

Description: Support text for several units in the field of Bioinformatics

6. Author: M. Rocha

Title: ***Relational databases: basic concepts and application examples***

Original title: *Bases de Dados Relacionais: Conceitos básicos e exemplos de aplicação*

Date: April 2005.

Description: Support text for part of the classes in the Computing and Programming unit.

5. Authors: M. Rocha, J. Neves

Title: ***Genetic and Evolutionary Computation***

Original title: *Computação Genética e Evolucionária.*

Date: May 2001; reformulated in November 2004.

Description: Text to support units of Natural Computing, Artificial Life and parts of the program in Bioinformatics

4. Authors: C. Vilela, M. Rocha

Title: ***Relational databases – a case study: the video-club***

Bases de Dados Relacionais - Um caso de estudo: O Clube de Vídeo

Date: 1998; reformulated in December 2000

Description: contains an extensive case study on relational database modelling used in several introductory units on the subject

3. Author: M. Rocha

Title: ***Introduction to Informatics: personal computers, networks and the Internet***

Original title: Introdução à Informática: computadores pessoais, redes e Internet

Date: November 2000

Description: text used to support some introductory units in Informatics

2. Authors: M. Rocha, R. Mendes, V. Alves, J. Neves

Title: ***Knowledge representation paradigms: a practical approach***

Original title: Paradigmas da Representação do Conhecimento: Uma Abordagem Prática

Date: December 1998, reformulated in January 2000.

Description: text to support practical classes of the Knowledge Representation unit

1. Author: M. Rocha

Title: ***Algorithms and Programming: solved practical cases***

Original title: Algoritmos e Programação, Casos Práticos Resolvidos

Date: May 1998

Description: text to support practical classes in introductory programming curricular

OTHER PEDAGOGICAL RESOURCES

Other resources developed to support classes including slides, practical exercises, etc.

All written in Portuguese and organized within pedagogical toolkits

Bioinformatics pedagogical toolkit

Includes:

- Slides for lectures
- Sheets for practical exercises
- Lists of algorithms
- Java software
- Perl textbook (see above) and software
- R examples and software

Description: supports part of the contents of several units in Bioinformatics

Dates: used since 2006; revised and extended continuously until the present

Data Mining pedagogical toolkit

Includes:

- Text book (published in FCA); see above
- Slides for lectures
- Java software

Description: supports curricular units in Data Mining

Dates: used since 2006; revised and extended continuously until the present

Introductory programming pedagogical toolkit

Includes:

- Slides for lectures
- Textbook in R (see above)
- Practical exercises

Description: supports part of the unit *Computing and Programming* where basic programming concepts are taught, using a scientific computing systems as the supporting platform

Dates: used since 2008; revised and extended continuously until the present

B5. COORDINATION AND PARTICIPATION IN PEDAGOGICAL PROJECTS

FUNDED PEDAGOGICAL PROJECTS

Role: Principal Investigator

Title: *Robotics at work in Elementary Schools*

Funding: Program "Ciência Viva", from the Portuguese FCT

Budget: 10000 €

Dates: 2006 to 2008

Collaboration with several basic schools from the city of Braga and Póvoa do Lanhoso and with the Institute of Education from the University of Minho to foster the area of Educational Robotics

B6. SUPERVISION OF STUDENTS

SUMMARY

Supervised PhD students: 8 on-going (+1 starting in 2012)

Supervised Master dissertations: 13 finished (+3 on-going)

Curricular internships in companies: 11

Coordination of post-docs: 1 approved

POST-DOCS

Researcher: Marcelo Maraschin

Institution: Universidade Federal Santa Catarina, Brasil

Title: *Bioinformatics and metabolomics applied to the typification of the catarinensis propolis*

Starting date: January 2012; duration: 7 months

Funding: CAPES, Brasil

PHD THESES

On-going

1. Student: João Pedro Pinto

Doctoral program: *PhD in Informatics*

Thesis: *Computational Tools for Data Integration and Regulatory Network Inference in Systems Biology*

Starting date: March 2008; expected finishing data: March 2012

Role: main supervisor

Co-supervisor: Isabel Rocha, CEB-IBB, Univ. Minho

Funding: Portuguese FCT; PhD grant

2. Student: João Guimarães

Doctoral program: *PhD in Informatics*

Thesis: *Development of tools for Synthetic Biology: towards a computational transcript engineering toolbox*

Starting date: February 2009

Role: main supervisor

Co-supervisor: Adam Arkin, Univ. California Berkeley

Funding: Portuguese FCT; PhD grant

3. Student: Rafael Carreira

Doctoral program: *PhD in Biomedical Engineering*

Thesis: *Developing Computational Tools to Explore the Synergies between Systems Biology and Metabolome Analysis*

Starting date: October 2009

Role: main supervisor

Co-supervisor: Isabel Rocha, CEB/IBB, Univ. Minho

Co-supervisor: Silas Vilas Boas, Univ. Auckland, New Zealand

Funding: Portuguese FCT; PhD grant

4. Student: Eduardo Valente

Doctoral program: *PhD in Informatics (MAPi program)*

Thesis: *Development of Computational Tools for the Integrated Analysis of DNA Microarray Data with Applications in Cancer Research*

Starting date: October 2009

Role: main supervisor
Co-supervisor: Rui Manuel Reis, ICVS; School of Health Sciences, Univ. Minho
Funding: PROTEC program

5. Student: Paulo Maia Silva
Doctoral program: *PhD in Bioengineering*
Thesis: *Metabolic Control Analysis as a Framework for Strain Optimization*
Starting data: October 2009
Role: co-supervisor
Main supervisor: Isabel Rocha, CEB/IBB, Univ. Minho
Funding: Portuguese FCT; PhD grant

6. Student: Pedro Tiago Evangelista
Doctoral program: *PhD in Bioengineering*
Thesis: *Development of Dynamic Multi-Layered Cell Models based on Cellular Automata*
Starting date: October 2009
Role: co-supervisor
Main supervisor: Isabel Rocha, CEB/IBB, Univ. Minho
Co-supervisor: Bruce Tidor, CSAIL, MIT, USA
Funding: Portuguese FCT; PhD grant (MIT Portugal program)

7. Student: Paulo Ricardo Vilaça
Doctoral program: *PhD in Informatics* (MAPi program)
Thesis: *Computer Aided Design of Metabolic Pathways*
Starting date: October 2010
Role: main supervisor
Funding: School of Engineering, Univ. Minho (from 2012)

8. Student: José Pedro Faria
Doctoral program: *PhD in Bioengineering*
Thesis: *Understanding the evolution and conservation of regulatory mechanisms through reconstruction and comparison of metabolic regulatory networks*
Starting date: October 2010
Role: co-supervisor
Main supervisor: Isabel Rocha, CEB/IBB, Univ. Minho
Co-supervisor: Christopher Henry, Argonne National Lab, USA
Funding: Portuguese FCT; PhD grant

Approved (starting in 2012)

9. Student: Sara Correia
Doctoral program: *PhD in Informatics*
Thesis: *A framework for the reconstruction and analysis of tissue specific genome-scale metabolic models*
Starting date: February 2012
Funding: Portuguese FCT; PhD grant (approved)
Role: main supervisor

Co-supervisor: Bruno Costa, ICVS, School of Health Sciences, Univ. Minho

MASTER DISSERTATIONS

Concluded

13. Student: David Saque Henriques

Master Course: Bioinformatics

Thesis: *Calibration of Logic Based Ordinary Differential Equation Models*

Role: main supervisor

Co-supervisor: Julio Saez-Rodriguez (European Bioinformatics Institute)

Date: December 2011

12. Student: Sara Correia

Master Course: Bioinformatics

Thesis: *Development of computational tools for strain optimization by adding reactions to the metabolic models (Desenvolvimento de ferramentas computacionais para optimização de estirpes por adição de reações ao modelo metabólico)*

Role: main supervisor

Co-supervisor: Isabel Rocha, CEB/ IBB, Univ. Minho

Date: December 2011

11. Student: José Pedro Faria

Master Course: Bioinformatics

Thesis: *Studying the effect of regulatory and thermodynamic constraints on genome-scale model predictions*

Role: main supervisor

Co-supervisor: Christopher Henry, Argonne National Labs, USA

Date: September 2010

10. Student: Paulo Vilaça

Master Course: *Bioinformatics*

Thesis: *Development of computational tools for the simulation and analysis of transcriptional regulation based on Boolean models (Desenvolvimento de ferramentas computacionais para a simulação e análise de redes de regulação genética com base em modelos booleanos)*

Role: main supervisor

Co-supervisor: Anália Lourenço, CEB/ IBB, Univ. Minho

Date: December 2009

9. Student: Danilo Santos

Master Course: *Bioinformatics*

Thesis: *Implementation of an integrated environment based on components for the analysis of gene expression data (Implementação de um ambiente integrado baseado em componentes para a análise de dados de expressão genética)*

Role: main supervisor

Co-supervisor: Rui Reis, ICVS, School of Health Sciences, Univ. Minho

Date: December 2009

8. Student: Jorge Pinho

Master Course: *Bioinformatics*

Thesis: *Development of Evolutionary Algorithms for Grid environments with applications in the optimization of biological systems (Desenvolvimento de algoritmos evolucionários para ambientes Grid com aplicações à optimização de sistemas biológicos)*

Role: main supervisor

Co-supervisor: João Luis Sobral, CCTC/ Dep. Informatics, Univ. Minho

Date: December 2009

7. Student: Orlando Rocha

Master Course: *Informatics*

Thesis: *Development of computational tools for the optimization of fermentation processes (Desenvolvimento de ferramentas computacionais para a optimização de processos de fermentação em Biotecnologia)*

Role: main supervisor

Co-supervisor: Isabel Rocha, CEB/IBB, Univ. Minho

Date: December 2009

6. Student: Paulo Maia Silva

Master Course: *Bioinformatics*

Thesis: *Multi-objective Evolutionary Algorithms for in the silico Optimization of Mutant Strains*

Role: main supervisor

Co-supervisor: Isabel Rocha, CEB/IBB, Univ. Minho

Date: December 2009

5. Student: Pedro Tiago Evangelista

Master Course: *Bioinformatics*

Thesis: *Computational Tools for the Simulation and Optimization of Biological Processes with Dynamical Models*

Role: co-supervisor

Main supervisor: Isabel Rocha, CEB/IBB, Univ. Minho

Date: December 2009

4. Student: Carlos Manuel Silva

Master Course: *Informatics*

Thesis: *A study on the emergence of languages for the communication of agents in artificial life environments (Um Estudo sobre a Emergência de Linguagens para a Comunicação de Agentes em Ambientes de Vida Artificial)*

Role: main supervisor

Date: April 2009

3. Student: Óscar Dias

Master Course: *Informatics*

Thesis: *Computational Tools for the Reconstruction of Genome-scale Metabolic Models*

Role: main supervisor
Co-supervisor: Isabel Rocha, CEB/IBB, Univ. Minho
Date: December 2008

2. Student: Eduardo Valente
Master Course: *Informatics*
Thesis: *Computational tools for Modelling and control of Biotechnological processes (Ferramentas computacionais para a Modelação e controlo de processos biotecnológicos)*
Role: main supervisor
Co-supervisor: Isabel Rocha, CEB/IBB, Univ. Minho
Date: December 2007

1. Student: Joana Castro
Master course: Biological Engineering (integrated master)
Thesis: *Using Bioinformatics techniques for the optimization of a process in industrial Biotechnology (Utilização de técnicas de Bioinformática para a Optimização de um processo de Biotecnologia Industrial)*
Role: co-supervisor
Date: December 2007

On-going (started October 2011)

Student: Emanuel Gonçalves
Master course: *Bioinformatics*
Role: main supervisor
Co-supervisor: Julio Saez-Rodriguez (European Bioinformatics Institute)

Student: José Miguel Dias
Master course: *Informatics Engineering*
Role: main supervisor

Student: João Cardoso
Master course: *Bioinformatics*
Role: main supervisor

INTERNSHIPS IN COMPANIES

Internships in companies integrated within the curricula of pre-Bologna degrees; written in Portuguese

11. *Desenvolvimento de aplicações para segmentação de clientes*, Novabase Business Intelligence, Paulo Sérgio Santos, Novembro 2008.

10. *Implementação de ferramentas de EM no âmbito da migração para o Accipiens*, Vantyx- Sistemas de Informação S.A., Joel Rocha, Novembro 2008.

9. *Desenvolvimento de ferramentas computacionais para mineração de literatura biomédica*, Dep. Informática - Univ. Minho, Rafael Carreira, Outubro 2008.
8. *Especificação, desenvolvimento e integração de aplicações user-friendly de apoio à exploração metro-ferroviária, com ênfase sobre a vídeo-vigilância*, EFACEC- Sistemas de Electrónica SA, Pedro Miguel Silva, Abril 2008.
7. *Data Warehousing em Tempo Real*, MNI - Médicos na Internet, Bruno Miguel Lopes, Outubro 2006.
6. *Desenvolvimento de ferramentas computacionais para a modelação e optimização de processos biológicos*, Dep. Informática - Univ. Minho, João Pedro Pinto, Setembro 2006
5. *Administração de Sistemas SAP*, SAP Portugal, Pedro Henrique Rodrigues, Nov^o 2005.
4. *Algoritmos Genéticos – Geração Automática de Horários*, Tecminho, João Miguel Soares, Outubro 2002.
3. *Portal E-Commerce & Intranet Site*, CPC-TA, Rogério Cristiano Martins, Setembro 2002.
2. *Portal de Grande Dimensão MyPage*, EB-Focus, António Pedro Quintas, Dezembro 2001.
1. *Sistema de Controlo de Análises de Águas e Vinhos*, DIGIDOC, Jean Bastos, Junho 2000.

OTHER

Scientific supervision of 9 research scholarships from research projects (FCT grants of type BI)

Supervision of 3 research scholarships for the initiation to research (FCT grants of type BII)

Supervision of 12 integrated projects – 1st year of the Master in Bioinformatics

Supervision of several projects within the framework of the curricular unit Option III in the degree of Systems and Informatics Engineering (between 1998 and 2006)

Supervision of projects for the curricular unit: Informatics Laboratories IV, Informatics Engineering degree

PART C: MANAGEMENT ACTIVITIES AND INTERACTION WITH SOCIETY

C1. SERVICES TO THE COMMUNITY, SOCIETY AND COMPANIES

RESEARCH CONTRACTS

Description: Definition of the functional requirements for the new Braga Hospital

Contractor: Consortium led by the Santa Casa da Misericórdia do Porto

Date: 2005

Budget: 24000 euros

Description: Sponsored research agreement for the development of Metabolic Engineering computational tools

Company: Dupont (USA)

Dates: 2008 – 2009.

Budget: 20000 USD

COLLABORATION WITH COMPANIES

Collaboration with the company IDV – Investigação e serviços especializados, Lda and Tecminho in a proposal for the QREN Vales program; approved in September 2011

Role: development of software for veterinary services

Budget 33000 euros; part for software development: 13000 euros

Collaboration with the company Biotempo, Lda in a proposal for the program IDEIA, Agência de Inovação (AdI), 2006; not approved.

Collaboration with the company SilicoLife Ltd in a proposal for the QREN research and development program - projects in co-promotion with entities from the scientific system; September 2011; under evaluation

C2. DISSEMINATION ACTIONS AND PUBLICATIONS

ORGANIZATION OF INTERNATIONAL CONFERENCES

6th International Conference on Practical Applications of Computational Biology and Bioinformatics (PACBB 2012), Salamanca, co-chairman of the Scientific Committee, March 2012

5th International Conference on Practical Applications of Computational Biology and Bioinformatics (PACBB 2011), Salamanca, co-chairman of the Organizing Committee, April 2011

4th International Workshop on Practical Applications of Computational Biology and Bioinformatics (IWPACBB 2010), Guimarães, co-chairman of the Organizing Committee, June 2010

Co-organizer of the Special Session on Multiagent Systems for Health Care and Bioinformatics, *8th International Conference on Practical Applications of Agents and Multi-Agent Systems*, Salamanca, April 2010

2nd Workshop on Computational Methods in Bioinformatics and Systems Biology, 14th Portuguese Conference on Artificial Intelligence}, co-chair, Aveiro, October 2009.

3rd International Workshop Practical Applications Computational Biology and Bioinformatics (IWPACBB 2009), co-chairman of the Scientific Committee, Salamanca, June 2009.

2nd International Workshop Practical Applications of Computational Biology and Bioinformatics (IWPACBB 2008), co-chairman of the Scientific Committee, Salamanca. Oct. 2008.

Workshop on Computational Methods in Bioinformatics and Systems Biology, 13th Portuguese Conference on Artificial Intelligence, co-chair, Guimarães. October 2007.

Special session ECNN - Evolutionary Computation and Neural Networks, *ICSC Symposium on Engineering of Intelligent Systems*, Funchal, February 2004.

ORGANIZATION OF NATIONAL/ LOCAL CONFERENCES

Co-chair of the Bioinformatics Open Days 2012, Universidade do Minho, March 2012.

Co-organizer of the Bioinformatics track in the *Inforum 2011* conference, Coimbra, September 2011.

Member of the organizing committee of the Doctoral Symposium of the Informatics Department, Universidade do Minho (SDDI), 2005 and 2006.

Member of the organizing committee of the “Jornadas de Informática” (JOIN), Universidade do Minho, 2005 and 2006.

Workshop on Bioinformatics, Dep. Informatics, Universidade do Minho, 2006.

Workshop on Educational Robotics, Agrupamento de Escolas André Soares, Braga, July 2006.

C3. VALORIZATION AND TRANSFER OF KNOWLEDGE

SPINOFF COMPANIES

Promoter and Chief Technological Officer (CTO) of **SilicoLife, Ltd**, a spinoff company dedicated to provide Bioinformatics and Systems Biology solutions to the Industrial Biotechnology field. Company created in April 2010.

PRIZES

Atreve-te 2010 Prize, 1st place, December 2010 for the most innovative start-up project to **SilicoLife, Ltd**. Sponsored by the Presidency of the Republic, sponsored by Caixa Geral de Depósitos. (30.000 €).

Co-promoter of the project "**Computational Biology Services for Industry**", finalist of the **SpinUM contest**, organized by TecMinho, March 2009.

Co-promoter of the project "**Com.bio**", semi-finalist of the contest **START 2009** (national entrepreneurship contest).

C4. EVALUATION ACTIVITIES

MEMBER OF JURY IN PHD THESES COMMITTEES

5. *PhD in Bioengineering*

Candidate: Rafael Costa

Dissertation: *Systems analysis and metabolic network modelling in Escherichia coli*

Role: internal examiner

Date: December 2011

4. *PhD in Informatics and Automation*, Universidad de Salamanca, Spain

Candidate: Juan Francisco de Paz Santana

Dissertation: *Model for dynamic planning for knowledge extraction in genetic expression data*

Role: external examiner

Date: April 2010

3. *PhD in Informatics Engineering*, Universidade de Aveiro, Portugal

Candidate: Joel Arrais

Dissertation: *Information Systems for DNA microarrays (Sistemas de informação para DNA microarrays)*

Role: external examiner

Date: March 2010

2. *PhD in Informatics Engineering*, Universidad de Vigo, Spain

Candidate: Daniel Gonzalez-Peña

Dissertation: *Model for the integration of explicit biological knowledge in classification techniques applied to DNA microarray data*

Role: external examiner

Date: July 2009

1. *PhD in Informatics*, University of Minho

Candidate: Pedro Gabriel Dias Ferreira

Dissertation: *Sequence Pattern Mining in Biochemical Data*

Role: internal examiner

Date: November 2007

MEMBER OF EVALUATION BOARD IN PHD THESES (on-going)

2. *PhD in Informatics*, Faculdade de Ciências, Universidade de Lisboa

Candidate: Tiago Pereira Grego

Dissertation: *Automatic Detection of Incorrect Annotations*

Date: First meeting in March 2010

1. *PhD in Informatics Engineering*, Faculdade de Engenharia, Universidade do Porto

Candidate: Célia Talma Gonçalves

Dissertation: *A Tool for Text Mining in Molecular Biology Domains*

Date: First meeting in September 2009.

MEMBER OF JURY IN MASTER DISSERTATION COMMITTEES

11. *Master in Bioinformatics*, Universidade do Minho

Candidate: André Charrua de Sousa

Date: December 2011

Role: president of the jury

10. *Master in Bioinformatics*, Universidade do Minho

Candidate: Diogo José Monteiro Morgado Abrantes

Date: December 2011

Role: president of the jury

9. *Master in Bioinformatics*, Universidade do Minho

Candidate: Antónia Regina Sales Machado Gonçalves

Date: December 2011

Role: president of the jury

8. *Master in Informatics Engineering*, FEUP, Universidade do Porto

Candidate: Paulo Tiago Seabra

Thesis: *Graph Mining for the Conception of new drugs (Graph mining para concepção racional de novos fármacos)*

Date: June 2011

Role: external examiner

7. *Master in Informatics Engineering*, FEUP, Universidade do Porto

Candidate: Marco Alexandre Alves

Thesis: *Library of programs for the analysis of populational genetics (Biblioteca de programas para análise de genética populacional)*

Date: June 2011

Role: external examiner

6. *Master in Bioinformatics*, Universidade do Minho

Candidate: Marisa Rocha Cunha

Thesis: *Uncovering metabolic and regulatory signatures in H. pylori infection by integration of "omics" data and metabolic models*

Date: November 2010

Role: President of the jury

5. *Master in Mathematics and Applications*, Universidade de Aveiro

Candidate: André Alexandre Marques

Thesis: *Métodos de biclustering no problema de selecção de genes*

Date: December 2009

Role: external examiner

4. *Master in Bioinformatics*, Universidade do Minho

Candidate: Simão Pedro Soares

Thesis: *Identifying metabolic and regulatory signatures of type 2 diabetes by integration of gene expression data and genome-scale metabolic networks*

Date: December 2009

Role: president of the jury

3. *Master in Informatics Engineering*, FEUP, Universidade do Porto

Candidate: João Norberto Fernandes da Costa

Thesis: *Towards Gathering and Mining Last.fm User-Generated Data*

Date: Julho de 2009.

Role: external examiner

2. *Master in Informatics Engineering*, FEUP, Universidade do Porto

Candidate: Vera Sofia Moreira Francisco

Thesis: *Business Intelligence- a practical case*

Date: July 2009.

Role: external examiner

1. Master in Informatics Engineering, FEUP, Universidade do Porto,
Candidate: Jorge Manuel Esparteiro Garcia
Date: June 2007
Role: external examiner

MANUSCRIPT PEER REVIEWING

See section A2 above

C5. MANAGEMENT ACTIVITIES

October 2010- present

Director of the Computer Science and Technology Centre (CCTC), research unit from the University of Minho (<http://cctc.uminho.pt>) recognized by Portuguese FCT;
2011 team: 35 integrated members (PhD); elected by his peers

October 2010 – present

Member of the **Scientific Council (“Conselho Científico”) of the School of Engineering**, University of Minho

October 2010 – present

Member of the **Management Council (“Conselho de Gestão”) of the School of Engineering**, University of Minho

October 2010- present

Member of the **Directive Commission of the Department of Informatics**, University of Minho

March 2010 - present

Member of the **Directive board** of the Master in Bioinformatics

September 2007 – February 2010

Director of the Master in Bioinformatics (University of Minho, Portugal)

2005-2009

Vice-director of the Computer Science and Technology Center (CCTC) research centre from the University of Minho

Date and signature

I declare that all data and facts contained in this application are true.

Braga, December 9th 2011

(Miguel Francisco de Almeida Pereira da Rocha)