Curriculum Vitae

Rui Carlos Vaqueiro de Castro Alves

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CURRICULUM VITAE

Rui Carlos Vaqueiro de Castro Alves

(R. Alves)

Present address:

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Education

University of Lisbon:

B. S. & Honor's Degree (Licenciatura: grade 15/20; 1994) Biochemistry

Ph. D. *Suma cum Laude* 24/07/2000 Theoretical Biochemistry

Computer Skills:

Programming Skills:

C, C++ and Visual C

PERL

Mathematica

SQL

Has database building and management knowledge.

Operating systems:

Extensive use of UNIX, WINDOWS and MacOS and a large assortment of mathematical, graphical and text edition programs under each of these operating systems.

Scientific Training and Professional Experience:

1993-94	Research stage, University of Lisbon (Laboratory of Dr. Ruy E. Pinto). 1-year research project. The research resulted in the small thesis with the title "Mathematical Model of Mitochondrial Phosphorylative Oxidation: Construction and analysis". This thesis was graded with 19 (out of 20).
April/June 1995	Worked on specific enzymatic markers for different species of partridge under the orientation of Assistant Professor Deodália Dias of Faculdade de Ciências, Universidade de Lisboa.
1995-2000	In July 1995 was selected as one of the 16 students to enter the "Programa Gulbenkian de Doutoramentos em Biologia e Medicina". This program has 4 year duration.
April/May 1996	Worked on Controlled Mathematical Comparisons of Signal Transduction Pathways during a short stay of a month at Lleida University, Spain, under Prof. Albert Sorribas.
October 1996-December 1999	Worked with Prof. Michael Savageau at the Microbiology and Immunology Department, Medical School, University of Michigan to complete the work for his Ph. D. and in a short Post doctoral stay.
January 2000-December 2000	Research assistant at the Microbiology And Immunology Dept. of the University of Michigan Medical School, in Prof. Michael Savageau's Lab.
January 2001-December 2001	Research Fellow at the Imperial Cancer Research Fund and Imperial College of London, in Prof. Michael Sternberg's Lab.
January 2002-December 2002	Invited Professor, Biostatistics Group at the University of Lleida Medical School.
January 2003-	Invited Research Fellow, Biostatistics Group at the University of Lleida Medical School.
September 2003-	Post Graduate Researcher, Biomedical Engineering Department, UC Davis

Teaching

1997	Teaching Assistant in 2 Sessions of the Course "Cellular and Molecular Networks". Head: Prof. Michael Savageau, University of Michigan

1998 Teaching Assistant in the Practical Sessions of "**Power Law Modeling In Biology**" (DE-IGC) 1 October - 3 October 1998, Oeiras, Portugal –Course for 1st year students of the PGDBM (Gulbenkian Ph. D. Program in Biology and Medicine).

2000 Teaching Assistant in the Practical Sessions of "**Modeling In Biology**" (DE-IGC) 22 May - 27 May 2000, Oeiras, Portugal –Course for 1st year students of the PGDBM (Gulbenkian Ph. D. Program in Biology and Medicine).

2002 Invited Professor, Biomathematics and Biostatistics Group, University of Lleida

2002 Co-supervisor of Ph. D. student José Maria Muiño, University of Lleida

2003 Invited Professor, University of Lleida Medical School, Bioinformatics.

2003 Invited Lecturer of the "Biochemical Systems Analysis" course, UC Davis

2005 Invited Professor, Instituto Gulbenkia de Ciencia, Theoretical Biology, short course for Ph. D. students.

2005 Professor, Computational Biology Module, Universidad de Lleida Medical School, Course for Ph. D. students

Additional activities

1997-98 Co-Organizer, International Symposium on Power-Law Modeling of Biological Systems, Lisbon, Portugal, 4th of October-7th of October 1998

1998 Organizer, "**Power Law Modeling In Biology**" (Instituto Gulbenkian de Ciencia) 1st of October – 3rd of October 1998 –Short Course.

2000 Organizer, "**Modeling In Biology**" (Instituto Gulbenkian de Ciencia) April –Short Course.

2001 Co-Organizer, "**4th Gulbenkian Autumn Meeting/1st Portuguese Meeting on Theoretical and Computational Biology**" (Instituto Gulbenkian de Ciencia).

2003 **"Internal Seminar Series"**, Organizer, Department de Ciencies Mediques Basiques, Universidad de Lleida

2003 **"Programa de Doutoramentos Gulbenkian em Bioinformatica",** Organizing Committee

2004 **"International Symposium on Molecular Biology Systems",** Organizing Committee, Lake Tahoe, California, USA

2005 **Computational Biology,** Organizer, Universidad de Lleida, Course for Ph. D. students

Honors and awards

1995-1999	Joint Ph. D. Fellowship, PGDBM, Instituto Gulbenkian de Ciência (IGC) and PRAXIS, Portugal
1996	Joint FLAD/PGDBM Grant for equipment acquisition
2001	Research Fellowship, ICRF/BBSRC, UK
2002	Invited Professor Fellowship, Spanish Government
2003-2004	Post-Doctoral Fellowship, Fundaçao para a Ciencia e Tecnologia, Portugal.
2005-	Ramon y Cajal Fellowship, Spanish Government

Pending Applications For Support:

NIH RO1 Research Grant (Co-PI)

NSF Research Grant (Co-PI)

Membership in professional societies

Sociedade Portuguesa de Bioquímica

Sociedad Espanola de Biologia Molecular y Bioquímica

Reviewer Service:

Has acted as *ad hoc* reviewer for:

Journal of Theoretical Biology, Mathematical Biosciences, Proceedings of the National Academy of Sciences and SIAM Journal on Control and Optimization.

Co-Supervised Ph. D. Students:

Raphael Challeil, ICRF/Imperial College, London, UK

Jose Maria Muino, Universidad de Lleida, Lleida, Spain

Ester Vilaprinyo, Universidad de Lleida, Lleida, Spain

Rick Fassani, UC. Davis, Davis, USA

Articles in scientific journals

1. Antunes, F., Salvador, A., Marinho, S., Alves, R., Pinto, R. E. (1996) "Lipid Peroxidation In Mitochondrial Inner Membranes: I. An Integrative Model". *Free Radic. Biol. Med.*, **21**, 917-943.

2. Alves, R. & Savageau M. A. (2000) Comparing Systemic Properties Of Ensembles Of Biological Networks By Graphical And Statistical Methods, *Bioinformatics,* **16***: 527-533*

3. Alves, R. & Savageau M. A. (2000) Systemic Properties Of Ensembles Of Metabolic Networks: Application Of Graphical And Statistical Methods To Simple Unbranched Pathways, *Bioinformatics,* **16***: 534-547*

4. Alves, R. & Savageau M. A. (2000) Numerical Mathematically Controlled Comparisons: Effect Of Overall Feedback In An Unbranched 3-Step Pathway, *Bioinformatics,* **16***:786-798*

5. Alves, R. & Savageau M. A. (2000) Effect Of Overall Feedback Inhibition In Unbranched Biosynthetic Pathways, *Biophysical Journal,* **79***: 2290-2304*

6. Alves, R. & Savageau M. A. (2001) Reversibility In Unbranched Pathways: Preferred Positions Based On Regulatory Considerations, *Biophysical Journal,* **80***: 1174-1185*

7. Alves, R., Chaleil, R. A. G. & Sternberg M. J. E. (2002) Evolution of Enzymes in Metabolism: A Network Perspective. *Journal of Molecular Biology*, **320**:751-770.

8. Alves, R. & Savageau M. A. (2003) Comparative analysis of prototype two-component systems with either bifunctional or monofunctional sensors: Differences in molecular structure and physiological function. *Mol. Microbiol.* **48**: 25-51.

9. Alves, R., Herrero, E. & Sorribas, A. (2004) Predictive Reconstruction of the Mitochondrial Iron-Sulfur Cluster Assembly Metabolism : I- The role of the protein pair Ferredoxin/Ferredoxin Reductase (Yah1/Arh1). *Proteins: Structure Function and Bioinformatics,* **56**:354-366.

10. Vilella, F., Alves, R., Rodríguez-Manzaneque, M. T., Belli, G., Sunnerhagen, P. & Herrero, H. (2004). Evolution and cellular function of monothiolic Glutaredoxins: involvement in iron/sulfur cluster assembly. *Comparative and Functional Genomics,* **5**:328-341.

11. Alves, R., Herrero, E. & Sorribas, A. (2004) Predictive Reconstruction of the Mitochondrial Iron-Sulfur Cluster Assembly Metabolism : II- The role of the protein glutaredoxin Grx5. *Proteins: Structure Function and Bioinformatics,* **57**:481-492.

12. Alves, R. & Savageau, M. A. (2005) Composition of amino acid biosynthesis evolved to avoid a "catch 22" situation in *Escherichia coli. Molecular Microbiology,* **56**: 10017-10034.

13. Vilaprinyo, E., Alves, R. & Sorribas, A. (2005) Use of Physiological Constraints to Identify Quantitative Design Principles for Gene Expression in Yeast Adaptation to Heat Shock, *Submitted*

14. Alves, R., Antunes, F. & Salvador, A. (2005). Setting up multicompartmental models of biochemical processes. *Submitted.*

15. Alves, R., & Sorribas, A. (2005) Predictive Metabolic Reconstruction Combining Structural Modeling, Protein Docking and Systemic Modeling: Application to the Mitochondrial Iron-Sulfur Cluster Assembly Metabolism. *In preparation.*

16. Alves, R. & Sorribas, A. (2006) A stochastic mathematical model of the *S. cerevisiae* Mitotic Exit Network in Cell Cycle Regulation. *In preparation.*

Chapters in books

1. Alves, R., Antunes, F., Salvador, A., Pinto, R. E. (1996) "Bioenergética: Termodinâmica e Cinética em Bioquímica". In Halpern, M. (Ed.) "Bioquímica". Porto: Lidel.

2. Antunes, F., Alves, R., Salvador, A., Pinto, R. E. (1996) "Regulação Metabólica". In Halpern, M. (Ed.) "Bioquímica". Porto: Lidel.
3. Salvador, A., Garcia, J., Sousa, J., Antunes, F., Alves, R., Pinto, R. E. (1996) "PARSYS – A tool for theoretical analysis of metabolic processes". In Yamakawa, T., Matsumoto, G. (Eds.) "Methodologies for the Conception, Design, and Application of Intelligent Systems" Vol. 2, pp 963-966. Singapore: World Scientific

Manuals, reports and Dissertations

1. Alves, R. (1994) "Construção e Análise de um Modelo Matemático da Fosforilação Oxidativa Mitocondrial" (Construction and Analysis of a Model for Mitochondrial Phosphorylative Oxidation), Monograph, Faculdade de Ciências , Universidade de Lisboa.
2. Alves, R. (1996) "Some Methodologies for Simulation of Metabolic Networks. Application to a Signal Transduction Pathway", Monograph, Departamento de Ensino, Fundação Calouste Gulbenkian, Oeiras
3. Alves, R., Preto da Silva, M.; Tavares, A. (1996) "The Origins of Life", Monograph, Departamento de Ensino, Fundação Calouste Gulbenkian, Oeiras
4. Alves, R. (2000) "Development of Methodologies to Analyze and Compare Metabolic Networks: Application to Specific Classes of Metabolic Pathways". Ph. D. Dissertation, Universidade de Lisboa

Invited Seminars

2002 - "Evolutionary Design Principles in Subcelular Networks", Sociedade Catalana de Biologia, Universidad de Lerida, Lerida, España

2003 - "Predictive Reconstruction of Iron-Sulfur Cluster Metabolism in Saccharomyces cerevisiae" Instituto de Biologia Molecular e Celular, Porto, Portugal

2004 – "Design Principles in Molecular Biology", University of Coimbra, Coimbra, Portugal

2004 – "Design Principles in Molecular Biology", Instituto Gulbenkian de Ciencia, Oeiras, Portugal

2004 - Predictive Reconstruction of the Mitochondrial Iron-Sulfur Cluster Assembly Metabolism :- The role of the protein pair Ferredoxin/Ferredoxin Reductase (Yah1/Arh1). SEBBM Meeting, Lleida, Spain.

2005 – "Using theoretical and computational techniques to study metabolic reconstruction, evolution and biological design", UC Davis Microbiology Section, Davis, USA, January 2005

2005 – "Metabolic reconstruction, evolution and biological design", EMBL, Heidelberg, Germany,, February 2005

2005 – "Metabolic reconstruction, evolution and biological design", IGC, Oeiras, Portugal, February 2005

2005 – "Cognate bias in Amino acid biosynthetic pathways", Universidad de Lleida, Lleida, Spain, March 2005

Abstracts, Posters and Lectures in Meetings

1. Alves, R.; Salvador, A.; Antunes, F.; Pinto, R. E. (1994) "Comparison of the accuracy of the GMA and S system approach in predicting the steady state behavior of a complex kinetic model", Poster & Short Seminar Symposium of Integrative Biochemistry, Barcelona, Spain.
2. Alves, R., Salvador, A., Antunes, F., Pinto, R. E. (1995) "O_2 binding to cytochrome oxidase: Different kinetic models", Poster, 1st Portuguese-Spanish Biophysics Congress, Lisboa, Portugal.
3. Alves, R.; Savageau, M. (1997) "Analysis of the design of two component systems in bacteria", Communication, 3rd PGDBM meeting, Curia, Portugal
4. Alves, R.; Savageau, M. (1998) "Regulatory design of unbranched pathways" , Communication, 4th PGDBM meeting, Curia, Portugal
5. Alves, R.; Savageau, M. (1998) "Regulatory design of unbranched pathways revisited: illustration of a statistical approach to mathematically controlled comparisons", Communication, "PowBioSys: International Symposium on Power-Law Modeling of Biological Systems", Oeiras, Portugal
6. Alves, R.; Savageau, M. (1999) " A Theoretical Study on the Selection of Two Alternative Designs for Two Component Systems" , Communication, 5th PGDBM meeting, Curia, Portugal
7. Alves, R.; Savageau, M (2000) "Systemic properties of ensembles of metabolic networks: application of graphical and statistical methods to simple unbranched pathways", Communication, VI International Symposium on Biochemical Systems Theory, Tenerife, Spain
8. Alves, R., Sternberg M. J. E. (2001) "Evolution of Enzymes in Metabolism: A Network Perspective",Communication, 4th Gulbenkian Autumn Meeting/1st Portuguese Meeting on Theoretical and Computational Biology, Portugal.
9. Alves, R., Sternberg M. J. E. (2002) "Evolution of Enzymes in Metabolism", Communication, VII Biochemical Systems Theory Meeting, Norway.
10. Muiño, J. M.; Alves, R.; Sorribas, A. (2003) "A New and Generalized Theoretical Formalism for Growth Functions", Poster, ACMS meeting, Madrid, Spain.
11. Alves, R. & Sorribas, "A. Predictive Reconstruction of the Mitochondrial Iron-Sulfur Cluster Assembly Metabolism :- The role of the protein pair Ferredoxin/Ferredoxin Reductase (Yah1/Arh1)", Communication, **"International Symposium on Molecular Biology Systems",** Lake Tahoe, California, USA
12. Alves, R. & Savageau, M. A. "Amino acid Bias in Amino acid Biosynthesis", Communication, **"International Symposium on Molecular Biology Systems",** Lake Tahoe, California, USA

Short Selection of Attended Workshops, Courses and Meetings

1 - Symposium of Integrative Biochemistry", (Barcelona, Spain, 1994) June 24-27.

2 - Non-linear Aspects of Physicochemical Phenomena", (Girona, Spain, 1994), July 4-9.

3 - Workshop on Brain Dynamics, Fractals, Chaos and Neural Networks on Brain Activity" (Lisbon, Portugal, 1994), 18 - 20 July.

4 - 1st Symposium of the Iberic Biophysics Society" (Lisboa, Portugal, 1995), 4-7 December.

5 - NATO Advanced Studies Institute on Mathematical Problems Arising from Biology (Fields Institute, U. Toronto, Toronto, 1999) 14 –24 June. Organized by Rick Durrett & Claudia Neuhauser.

6 – Phylogenetic Methods Workshop, (University of Cambridge, 2001) May. Organized by David Judge.

7 – Bioinformatics and Computational Biology Workshop (Universidad de Madrid, 2002)25th-26th April. Organized by Alfonso Valencia and Roderic Guigo

Languages:

Native Language: Portuguese.

Reads: English, French, Spanish, Catalan and Italian.

Speaks: English, French, Spanish and Catalan.

Writes: English, French, and Spanish.

Hobbies:

Biking, Jogging, Swimming, Reading, Listening to Music, Collecting Comic Books, Theatre (attending and performing), Movies, Concerts, Mountain Hiking.