

LUIS M. ROCHA

School of Informatics & Computing
Indiana University
919 East Tenth Street, Bloomington IN 47408

812-856-1832 • Fax: 812-856-3015
e-mail: rocha@indiana.edu
www: <http://informatics.indiana.edu/rocha> and
<http://casci.informatics.indiana.edu>

PERSONAL DATA

Luis M. Rocha is an Associate Professor of Informatics & Computing and director of the complex systems PhD track in Informatics. He is also core faculty of the *Cognitive Science Program*, Adjunct Associate Professor in *Computer Science* and a member of the *Center for Complex Networks and Systems Research* at *Indiana University, Bloomington*. He is also the director of the *FLAD Computational Biology Collaboratorium* and in the direction of the associated *PhD program in Computational Biology* at the *Instituto Gulbenkian da Ciencia, Portugal*.

RESEARCH INTERESTS

Complex adaptive systems: Agent-based modeling, artificial life, automata, bio-inspired computing, embodied cognition, collective behavior and dynamics, evolutionary and adaptive systems, network analysis, origin of information, theoretical biology.

Computational and Systems biology: Automatic functional annotation, bioinformatics, literature and text mining, microarray analysis, models of biochemical regulation, RNA editing.

Computational intelligence: Collective and adaptive knowledge organization, connectionism, evolutionary computation, fuzzy set theory, generalized information theory, information retrieval, knowledge and document networks, literature and text mining, machine learning, recommender systems, uncertainty modeling.

ACADEMIC EDUCATION

STATE UNIVERSITY OF NEW YORK, BINGHAMTON, NEW YORK

PhD in Systems Science and Computer Science (1992-1997)

Thesis: “*Evidence Sets and Contextual Genetic Algorithms: Exploring Uncertainty, Context, and Embodiment in Cognitive and Evolutionary Systems*”.

INSTITUTO SUPERIOR TÉCNICO, LISBON, PORTUGAL

Licentiate (5 year degree) in Mechanical and Systems Engineering (1985-1990): equivalent to *Bachelor's in Mechanical Engineering* (1985-1988) and *Masters in Systems Engineering* (1988-1990)

Included an exchange semester, as an ERASMUS student, at the STAFFORDSHIRE UNIVERSITY, STAFFORD, ENGLAND, attending the *Msc. in Computer Integrated Manufacturing (CIM)*.

PROFESSIONAL APPOINTMENTS

UNIVERSITY OF INDIANA, SCHOOL OF INFORMATICS & COMPUTING, AND COGNITIVE SCIENCE PROGRAM,
Associate Professor, Since August 2004.

Director of Complex Systems PhD Track, Since October 2008.

Liaison for Cognitive Science PhD Program, Since August 2010.

Director of Informatics Graduate Programs, September 2007-August 2008.

INSTITUTO GULBENKIAN DA CIENCIA, Lisbon Portugal.

Director of the FLAD Computational Biology Collaboratorium and in the direction of the associated PhD program in Computational Biology, 04/00-present. (See <http://bc.igc.gulbenkian.pt>).

LOS ALAMOS NATIONAL LABORATORY, MODELING, ALGORITHMS, AND INFORMATICS GROUP

Postdoctoral Associate, September 1997 to January 1999

Technical Staff Member, February 1999 to July 2004

Leader of the *Complex Systems Team* (<http://informatics.indiana.edu/rocha/complex>)

UNIVERSITY OF CALIFORNIA, LOS ANGELES, INSTITUTE FOR PURE AND APPLIED MATHEMATICS
Fellowship appointment, March-June 2004, Program on "Proteomics: Sequence, Structure, Function"

STATE UNIVERSITY OF NEW YORK AT BINGHAMTON, DEP. OF SYSTEMS SCIENCE AND INDUSTRIAL ENGINEERING
Adjunct Professor, 1995-1997,
Research Assistant, April 1996-January 1997.
Teaching Assistant, Fall 1995, Spring 1996, and Spring 1997.
Information Systems Manager, 1995-1997.

LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL (NATIONAL LABORATORY FOR CIVIL ENGINEERING), LISBON,
PORTUGAL
Research Assistant from June 1990 to December 1990 (part-time)
Graduate Researcher from January 1991 to November 1991 (full-time)

PROFESSIONAL SERVICE

Editorial Boards

Biosemiotics, International Journal of Natural Computing Research, International Journal of Signs and Semiotic Systems, PLoS ONE.

Advisory Boards

Ciência Hoje, Center of Computing Sciences and Technology at the University of Minho, International Forum of Portuguese Scientists, SilicoLife, Journal of Applied Systems Studies, The Open Cybernetics And Systemics Journal, Polimetrica Publisher, Portuguese Conference on Artificial Intelligence, Principia Cybernetica Project.

Ad Hoc Editor

Artificial Life, Biosystems, Communication and Cognition - Artificial Intelligence

Ad Hoc Reviewer

Adaptive Behavior, Advances in Complex Systems, Artificial Intelligence, Artificial Life, Behavioral and Brain Sciences, Biosystems, BMC Bioinformatics, BMC Systems Biology, Clinical Chemistry, Cognitive Science, Complex Systems, Complexity, Constructivist Foundations, Data & Knowledge Engineering journal, Data Mining & Knowledge Discovery, European Physics Journal, Foundations of Science, Genome Biology, IEEE Transactions on Evolutionary Computation, IEEE Transactions on Autonomous Mental Development, IEEE Transaction on Systems Man and Cybernetics, Interacting with computers journal, International Journal of Human-Computer Studies, International Journal of General Systems, International Journal of Operations Research, International Journal of System of Systems Engineering, Journal of Artificial Societies and Social Simulation, Journal of Computational Science, Journal of Information Science and Engineering, Journal of Statistical Mechanics, Journal of Theoretical Biology, Molecular Biosystems, Nucleic Acids Research, Proceedings of the National Academy of Sciences (PNAS), Physical Review E, Software: Practice and Experience, Systems Research, Transactions on Autonomous Mental Development, Tran. on Information Systems.

Conference Organizing Committees

RECOMB 2010: *14th Int. Conf. on Research in Computational Molecular Biology*, April 25-28, Lisbon, Portugal.
EPIA 2009: *14th Portuguese Conf. on Artificial Intelligence*, Aveiro, Portugal (Program Chair)
FIIP 2008: *Brain, Life, and Culture: VI Fórum Int. de Invest. Portugueses*, Lisbon, December 18-20, 2008
ECAL 2007: *European Conference on Artificial Life*, September 2007, Lisbon, Portugal
MA4CS07: *Multi-Agents for modelling Complex Systems*, track chair. Workshop at the *European Conference on Complex Systems 2007 (ECCS'07)* Dresden, Germany, October 1-6, 2007
Artificial Life X: Bloomington, IN, June 3-7, 2006 (Chair of Organizing Committee)
Genetic Regulatory Networks: Theory and Practice workshop at CEC03, Canberra, Australia, December 2003
Int. interdisciplinary seminar on new robotics, evolution and embodied cognition, Lisbon, Portugal, November 12-15, 2002

Conference Program Committees

- IBERAMIA 2012: *13th Ibero-American Conference on Artificial Intelligence*. Cartagena de Indias, Colombia, November 13-16.
- GECCO 2012: *Genetic and Evolutionary Computation Conference*, July 7-11, 2012, Philadelphia, USA.
- PACBB6: *6th International Conference on Practical Applications of Computational Biology & Bioinformatics*. University of Salamanca, Spain, 28-30 March, 2012.
- EPIA 2011: *15th Portuguese Conference on Artificial Intelligence*, October 10-13, 2011, Lisbon, Portugal.
- ECAL 2011: *European Conference on Artificial Life*, August 2011, Paris, France.
- GECCO 2011: *Genetic and Evolutionary Computation Conference*, July 12-16, 2011, Dublin, Ireland.
- ICCS2011: *Eighth International Conference on Complex Systems*. June 26 - July 1, 2011, Boston, MA.
- PACBB5: *5th International Workshop on Practical Applications of Computational Biology & Bioinformatics*. University of Salamanca, Spain, 6-8th April, 2011.
- PAAMS11: *9th International Conference on Practical Applications of Agents and Multi-Agent Systems*. University of Salamanca, Spain, 6-8th April, 2011.
- IEEE ALIFE 2011: *The 2011 IEEE Symposium on Artificial Life, at the IEEE Symposium Series on Computational Intelligence 2011*. April 11 – 15, 2011, Paris, France.
- AAAI-08: *The 24th National Conference on Artificial Intelligence*, Atlanta, Georgia, July 11–15, 2010.
- BIONETICS 2010: *5th International ICST Conference on Bio-Inspired Models of Network, Information, and Computing Systems*. December 1-3, 2010 - Boston, MA
- GECCO 2010: *Genetic and Evolutionary Computation Conference*, July 7-11th, 2010 in Portland, Oregon
- BICS 2010: *Brain Inspired Cognitive Systems*. 14-16 July 2010, Madrid, Spain
- IWPACBB'09: *3rd International Workshop on Practical Applications of Computational Biology & Bioinformatics*. University of Salamanca, Spain, 10 th - 12 th June, 2009.
- BioLINK 2008: *Linking Literature, Information and Knowledge for Biology*. SIG at ISMB 2009, July 18, 2007.
- ISMB 2009: *17th Int. Conf. on Intelligent Systems for Molecular Biology*, June 27 - July 2, Stockholm, Sweden.
- GECCO 2009: *Genetic and Evolutionary Computation Conference*, Montreal, Canada, July 8-12, 2008.
- IWPACBB'08: *2nd International Workshop on Practical Applications of Computational Biology & Bioinformatics*. University of Salamanca, Spain, 22-24 October 2008
- Alife XI: *Artificial Life XI*, 5-8 August, 2008, University of Southampton, Winchester, UK.
- ISMB 2008: *16th International Conference on Intelligent Systems for Molecular Biology*, Toronto, July 17-23
- BioLINK 2008: *Linking Literature, Information and Knowledge for Biology*. SIG at ISMB 2008, July 18, 2007.
- AAAI-08: *The 23rd National Conference on Artificial Intelligence*, Chicago, Illinois, July 13-17, 2008.
- GECCO 2008: *Genetic and Evolutionary Computation Conference*, Atlanta, Georgia, USA, July 12-16, 2008.
- WI-08: *2008 IEEE World Congress on Computational Intelligence*. Hong Kong, China, June 1-6, 2008.
- Social Linking Track at HT2008: the Nineteenth ACM Conference on Hypertext and Hypermedia*. June 19th-21st 2008, Pittsburgh, PA, USA.
- EPIA 2007: *13th Portuguese Conference on Artificial Intelligence*, December 3-7, 2007, Guimarães, Portugal.
- WI-07: *2007 IEEE/WIC/ACM Int. Conference on Web Intelligence*, Silicon Valley, USA, November 2-5.
- AAAI-07: *The 22nd National Conference on Artificial Intelligence*, July 22–26, 2007, Vancouver, Canada
- BioLINK 2007: *Linking Literature, Information and Knowledge for Biology*. SIG at ISMB 2007, July 19, 2007, Vienna, Austria.
- GECCO 2007: *Genetic and Evolutionary Computation Conference*, July 7-11, 2007, London, England.
- KIMAS '07: *International Conference Integration of Knowledge Intensive Multi-Agent Systems: Modeling, Evolution and Engineering*. April 29 – May 3, 2007 Waltham, Massachusetts
- 2006 IEEE/WIC/ACM International Conference on Web Intelligence (WI-06), Hong Kong, Dec. 18-22, 2006
- JBB06: *The Joint BioLINK-BioOntologies Meeting*, in association with the *14th International Conference on Intelligent Systems for Molecular Biology (ISMB'06)*, Fortaleza, Brazil, August 4-10, 2006.
- GECCO 2006: *Genetic and Evolutionary Computation Conference*, July 8-12, 2006, Seattle, USA.
- BioNLP06: *Linking Natural Language Processing and Biology: Towards deeper biological literature exploitation*. Special Workshop of the *Human Language Technology conference - North American chapter of the Association for Computational Linguistics (HLT-NAACL06)*, June 8, 2006, New York City, NY, USA
- Exploration vs. Exploitation in Naturally Inspired Search*: Special workshop for the *UK Society for the Study of Artificial Intelligence and Simulation of Behaviour Conference - AISB 2006*, April 5, 2006, Bristol, England

EPIA 2005: 12th Portuguese Conference on Artificial Intelligence, December 5-8, 2005, Covilhã, Portugal
 ALEA05: Artificial Life and Evolutionary Algorithms - Special Workshop at EPIA'05
 IROBOT'05: 1st International Workshop on Intelligent Robotics. Special Workshop at EPIA '05.
 ECAL 2005: *European Conference on Artificial Life*, September 5-9, 2005, University of Kent, UK.
Active agents and their environments as dynamical systems workshop - at ECAL 2005
 CEC 05: *IEEE Congress on Evolutionary Computation*, Edinburgh, UK, September 2-5, 2005.
 GECCO 2005: *Genetic and Evolutionary Computation Conference*, June 25-29, 2005, Washington, D.C.
 KIMAS 05: *IEEE International Conference on Integration of Knowledge Intensive Multi-Agent Systems*. April 18
 - 21, 2005, Waltham, Massachusetts.
 CEC 2004: *Congress on Evolutionary Computation*, Portland, Oregon, June 19-23
Agent-Based Simulation 5, Lisbon, Portugal May 3-5, 2004
 CEC 2003: *Congress on Evolutionary Computation*, Canberra, Australia, December 2003
 KIMAS 03: *IEEE Integration of Knowledge Intensive Multi-Agent Systems*, Cambridge, MA., 1-3 October 2003.
Oeiras Mathematical and Computational Biology Workshop, Oeiras, Portugal, June 20th 2003.
Autonomy, Delegation, and Control: From Inter-agent to Organizations and Institutions Workshop, 2nd
International Conference on Autonomous Agents and Multi-Agent Systems, Melbourne, Australia, 2003
 EPIA'03: *11th Portuguese Conference on Artificial Intelligence* -, December 4-7, 2003, Beja, Portugal.
Workshop on Distributed Computing Architectures for Digital Libraries, at the 31th *International Conference on*
Parallel Processing ICPP 2002, Vancouver, Canada August 18-21, 2002.
 CEC 2002: *Congress on Evolutionary Computation, part of the IEEE World Congress on Computational*
Intelligence, Hawaii, 2002
10th Mediterranean Conference On Control And Automation Med2002, Lisbon, Portugal July 2002
From Intelligent Networks to the Global Brain: Evolutionary Social Organization through Knowledge
Technology, Brussels, July 3-5, 2001.
Complex Systems 2000, Dunedin, New Zealand, November 2000.
1998 Conference on Intelligent Systems and Semiotics, NIST, Gaithersburg, Maryland – Session Chair.
2nd International Symposium On Intelligent Manufacturing Systems, August 1998, Sakarya , Turkey

Review Panels

Belgian Fund for Scientific Research, 2005 (Vrije Universiteit Brussels - VUB), 2004, 2005, 2006.
Czech Science Foundation, Member of Computing Proposal Review Panel 2010.
Fundação para a Ciência e Tecnologia, Portugal. Computer Engineering, 2007; Ciencia Viva 2008, Chair of
 Robotics, Intelligent and Information Systems Review Panel, 2000, 2003, 2004; Bilateral Scientific
 Cooperation Agreements 2011.
Los Alamos National Laboratory, Computer Science and Software Engineering internal proposal (LDRD) review
 committee, 1998-2000.
National Science Foundation, Computer & Information Science & Engineering, 2006; Cyber-Enabled Discovery,
 2008; IIS-Biomedical Career awards 2008; Science and Technology Center Site review, Computing and
 Communication Foundations (CCF): Core Programs 2010; Networks, Synthetic Biology and Evolution 2011,
 Networks and Regulation Cluster.
Science Foundation Ireland , President of Ireland Young Researcher Award, 2006
UMCEES Review Panel, National Research Council, 2001

EDUCATION AND TRAINING ACTIVITIES

Graduate Student Supervision

Johan Bollen, Ph.D. Thesis co-advisor, *Free University of Brussels*, Belgium (2001). “A cognitive model of
 adaptive web design and navigation.”
 Andreas Rechtsteiner, Ph.D. Thesis co-advisor, *Portland State University* (2004). “Multivariate Analysis of Gene
 Expression Data and Functional Information: Automated Methods for Functional Genomics.”
 Jasleen Kaur, M.Sc. thesis advisor, *Indiana University*, Bloomington, USA (2007). “Agent-based model of RNA
 Editing”.

Humberto Santos, Ph.D. Thesis co-advisor, *Universidade da Beira Interior*, Portugal (2008). “Análise e Simulação do Processo da Inovação Segundo uma Perspectiva Evolucionária”
Alaa Abi-Haidar, Ph.D. Thesis advisor, *Indiana University*, Bloomington, USA (2011). “An adaptive document classifier inspired by T-Cell cross-regulation in the immune system”
Marcio Mourão, Ph.D. Thesis co-advisor, *Indiana University*, Bloomington, USA (2011). “Reverse Engineering the Mechanisms and the Dynamical Behavior of Complex Biochemical Pathways.”
Currently supervising 5 Ph.D students: Tiago Simas, Artemy Kolchinsky, Azadeh Nematzadeh, Zhiping Wang, Santosh Manicka, Indiana University.

Postdoctoral Fellow Supervision

Chien-feng Huang, 2011-2004, *Los Alamos National Laboratory*.
Ana Maguitman, 2005-2006, *Indiana University*.
Manuel Marques-Pita, 2007-present, *Indiana University* and *Instituto Gulbenkian de Ciencia*

Courses Developed and Taught

I609 - Complex Systems Seminar I, 2012, *Indiana University* (<http://informatics.indiana.edu/rocha/icx1>)
I485/I585 - Bio-inspired Computing, 2005-2011, *Indiana University* (<http://informatics.indiana.edu/rocha/i-bic/>)
I601 - Intro to Complex Systems, 2010-1011, *Indiana University* (<http://informatics.indiana.edu/rocha/i-bic/>)
I709 - Complex Systems Seminar II, 2008, 2011, *Indiana University* (<http://informatics.indiana.edu/rocha/icx2>)
I-501 - Introduction to Informatics, 2008, *Indiana University* (<http://informatics.indiana.edu/rocha/i501>).
II01 - Introduction to Informatics, 2005-2007, *Indiana University* (<http://informatics.indiana.edu/rocha/i101>)
Brief introduction to bioinformatics and computational biology, 2001, 2002, 2006, *Instituto Gulbenkian de Ciencia*. <http://informatics.indiana.edu/rocha/bioinformatics>
SSIE 580 - Evolutionary Systems and Artificial Life, 1995-1997, *SUNY Binghamton* (<http://informatics.indiana.edu/rocha/alife.html>) .

PUBLICATIONS

VOLUMES:

Seabra Lopes, L., N. Lau, P. Mariano, L. M. Rocha (Eds.) [2009]. *Progress in Artificial Intelligence: Papers selected from the 14th Portuguese Conference on Artificial Intelligence*. Lecture Notes in Artificial Intelligence (LNAI), **5816**. Springer-Verlag.
Almeida e Costa, F., L.M. Rocha, E. Costa, I. Harvey, A. Coutinho (Eds.) [2007]. *Advances in Artificial Life: Proceedings of the 2007 European Conference on Artificial Life*. Lecture Notes in Artificial Intelligence (LNAI), **4648**. Springer-Verlag.
Rocha, L.M., M. Bedau, D. Floreano, R. Goldstone, A. Vespignani, and L. Yaeger (Eds.) [2006]. *Artificial Life 10: Proceedings of the 10th Int. Conference on the Simulation and Synthesis of Living Systems*. MIT Press.
Almeida e Costa, F., and Luis M. Rocha (Eds.) [2005]. *Embodied and Situated Cognition. Artificial Life*. **11** (1-2). Editorial Preface: *Artificial Life*. **11** (1-2), pp. 5 - 11
Rocha, Luis M. (Ed.) [2001]. *The Physics and Evolution of Symbols and Codes. Biosystems* **60**, No. 1-3. Editorial Preface: *Biosystems* **60**, pp. 1-4.
Rocha, Luis M. (Ed.) [1995]. *Self-Reference in Biological and Cognitive Systems. Communication and Cognition - Artificial Intelligence*. Vol. 12, nos. 1-2.
Rocha, Luis M. [1997a]. *Evidence Sets and Contextual Genetic Algorithms: Exploring Uncertainty, Context, and Embodiment in Cognitive and Biological Systems*. PhD Dissertation. State University of New York at Binghamton.

PEER-REVIEWED JOURNAL ARTICLES:

M. Marques-Pita and L.M.Rocha [2012]. “Characterizing Control in Discrete Models of Genetic Regulation: The Segment Polarity Network.” Submitted.

- A. Lourenço, M. Conover, A. Nematzadeh, F. Pan, A. Wong, H. Shatkay, and L.M. Rocha [2011]. "A Linear Classifier Based on Entity Recognition Tools and a Statistical Approach to Method Extraction in the Protein-Protein Interaction Literature". *BMC Bioinformatics*, **12**(Suppl 8):S12.
- M. Krallinger et al [2011]. "The Protein-Protein Interaction tasks of BioCreative III: classification/ranking of articles and linking bio-ontology concepts to full text". *BMC Bioinformatics*, **12**(Suppl 8):S3.
- A. Abi-Haidar and L.M. Rocha [2011]. "Collective Classification of Textual Documents Using Self-Organized Cross-Regulation in the Adaptive Immune System". *Evolutionary Intelligence*, **4**(2):69-80.
- A. Kolchinsky, A. Abi-Haidar, J. Kaur, A.A. Hamed and L.M. Rocha [2010]. "Classification of protein-protein interaction full-text documents using text and citation network features". *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, **7**(3):400-411.
- A. Lourenço, R.C. Carreira, D. Glez-Peña, J.R. Méndez, S.A. Carneiro, L.M. Rocha, F. Díaz; E.C. Ferreira, I.P. Rocha, F. Fdez-Riverola, M. Rocha [2010]. "BioDR: semantic indexing networks for biomedical document retrieval". *Expert Systems With Applications*. **37**, 3444–3453.
- Z. Wang, S. Kim, S.K. Quinney, Y. Guo, S.D. Hall, L.M. Rocha, and L. Li [2009]. "Literature mining on pharmacokinetics numerical data: A feasibility study". *Journal of Biomedical Informatics*. **42** (4): 726-735.
- T. Simas and L.M. Rocha [2008]. "Stochastic model for scale-free networks with cut-offs". *Physical Review E*. **78**(6):066116.
- A. Abi-Haidar, J. Kaur, A. Maguitman, P. Radivojac, A. Retchsteiner, K. Verspoor, Z. Wang, and L.M. Rocha [2008]. "Uncovering protein-protein interactions in abstracts and text using linear models and word proximity networks". *Genome Biology*. **9**(Suppl 2):S1.
- Rocha, L.M., C. Huang, A. Maguitman, J. Kaur. [2007]. "Agent-based Model of Genotype Editing". *Evolutionary Computation*. **15** (3): 253-89.
- Rocha, Luis M. And W. Hordijk [2005]. "Material Representations: From the Genetic Code to the Evolution of Cellular Automata". *Artificial Life*. **11** (1-2), pp. 189 - 214.
- Verspoor, K., J. Cohn, C. Joslyn, S. Mniszewski, A. Rechtsteiner, L.M. Rocha, T. Simas [2005]. "Protein Annotation as Term Categorization in the Gene Ontology using Word Proximity Networks". *BMC Bioinformatics*. **6**(Suppl 1): S20. doi:10.1186/1471-2105-6-S1-S20.
- Challacombe, J., A. Rechtsteiner, L.M. Rocha, E.P. Brown, T. Shenk, M. Altherr, T. Brettin [2004]. "Evaluation of the host transcriptional response to human cytomegalovirus infection" *Physiol. Genomics*. 10.1152/physiolgenomics.00155.2003.
- Rocha, Luis M. and A. Rechtsteiner [2004]. "Review of Bioinformatics for Geneticists." *Clinical Chemistry*. **50**, No. 9, pp. 2471 - 2472. CLINCHEM/2003/020909.
- Rocha, Luis M. [2001]. "Evolution with material symbol systems". *Biosystems*. Vol. 60, pp. 95-121.
- Rocha, Luis M. [2001]. "Adaptive recommendation and open-ended semiosis". *Kybernetes*. Vol. 30, No. 5/6, pp. 821-851.
- Rocha, Luis M. [1999]. "Evidence Sets: Modeling Subjective Categories." *International Journal of General Systems*. Vol. 27, pp. 457-494.
- Joslyn, Cliff and Luis M. Rocha [1998] "Towards a Formal Taxonomy of Hybrid Uncertainty Representations". *Information Sciences*. Vol. 110, pp. 255-277.
- Rocha, Luis M. and Cliff Joslyn [1998] "Simulations of Embodied Evolving Semiosis: Emergent Semantics in Artificial Environments". *Simulation Series*; Vol. 30, (2), p.233-238.
- Rocha, Luis M. [1998]. "Where is the progress?" *Cybernetics and Human Knowing*. Vol.5, No. 4, pp. 86-90.
- Rocha, Luis M. [1997]. "Relative Uncertainty and Evidence Sets: A Constructivist Framework." *International Journal of General Systems*. Vol. 26 (1-2), pp. 35-61.
- Henry, Charles and Luis M. Rocha [1996] "Language Theory: Consensual Selection of Dynamics". *Cybernetics and Systems*. Vol. 27, pp. 541-553.
- Rocha, Luis M., V. Kreinovich, and R. Kearfott [1996]. "Computing Uncertainty in Interval Based Sets." *Applied Optimization*. Vol. 3, pp. 337-380. Also appears in: *Applications of Interval Computation*. R.B. Kearfott and V. Kreinovich (Eds.). Kluwer Academic Publishers. pp.337-380.
- Rocha, Luis M. [1996]. "Eigenbehavior and symbols." *Systems Research* Vol. 13, No 3, pp. 371-384.
- Rocha, Luis M. [1995]. "Artificial semantically closed objects." *Communication and Cognition - Artificial Intelligence*. Vol. 12, nos. 1-2 (Rocha [1995a]), pp. 63-90.

- S. Karnik, A. Subhadarshini, Z. Wang, L.M. Rocha, and L. Li [2011]. "Extraction of drug-drug interactions using all paths graph kernel". In: *Proceedings of the 1st Challenge task on Drug-Drug Interaction Extraction*. I. Segura-Bedmar, P. Martínez, D. Sánchez. September, 7th, 2011, Huelva, Spain, pp. 83-88.
- A. Kolchinsky, and L.M. Rocha [2011]. "Prediction and Modularity in Dynamical Systems". In: *Advances in Artificial Life, Proceedings of the Eleventh European Conference on the Simulation and Synthesis of Living Systems (ECAL 2011)*. August 8 – 12, 2011, Paris, France., MIT Press, pp. 423-430.
- M. Marques-Pita and L.M.Rocha [2011]. "Schema Redescription in Cellular Automata: Revisiting Emergence in Complex Systems." *The 2011 IEEE Symposium on Artificial Life, at the IEEE Symposium Series on Computational Intelligence 2011*. April 11 – 15, 2011, Paris, France, pp: 233-240.
- A. Lourenço, M. Conover, A. Wong, F. Pan, Alaa Abi-Haidar, A. Nematzadeh, H. Shatkay, and L.M. Rocha [2010]. "Testing Extensive Use of NER tools in Article Classification and a Statistical Approach for Method Interaction Extraction in the Protein-Protein Interaction Literature". *Proceedings of the BioCreative III Workshop 2010*, Bethesda, Maryland, September 13-15, 2010.
- A. Abi-Haidar and L.M. Rocha [2010b]. "Collective Classification of Biomedical Articles using T-Cell Cross-regulation". In: *Artificial Life XII: Twelfth International Conference on the Simulation and Synthesis of Living Systems*, H. Fellermann et al (Eds.) MIT Press, pp. 706-713.
- A. Abi-Haidar and L.M. Rocha [2010a]. "Biomedical Article Classification using an Agent-Based Model of T-Cell Cross-Regulation". In: *Artificial Immune Systems: 9th International Conference, (ICARIS 2010)*. E. Hart, C. McEwan, J. Timmis, and A. Hone (Eds.). *Lecture Notes in Computer Science (LNCS)*. **6209**:237-249. Springer-Verlag.
- A. Kolchinsky, A. Abi-Haidar, J. Kaur, A.A. Hamed and L.M. Rocha [2009]. "Classification of protein-protein interaction documents using text and citation network features". *Proceedings of the BioCreative II.5 Workshop 2009: Special Session on Digital Annotations*, Madrid, Spain, October 7-9, 2009. pp 34.
- A. Lourenço, Sónia Carneiro, Eugénio C. Ferreira, Rafael Carreira, Luis M. Rocha, Daniel Glez-Peña, José R. Méndez, Florentino Fdez-Riverola, Fernando Diaz, Isabel Rocha and Miguel Rocha [2009]. "Biomedical Text Mining Applied To Document Retrieval and Semantic Indexing.". In: *Proc. of the 3rd International Workshop on Practical Applications of Computational Biology & Bioinformatics (IWPACBB'09)*. *Lecture Notes in Computer Science*. Springer-Verlag, **5518**: 954-963.
- A. Abi-Haidar and L.M. Rocha [2008]. "Adaptive Spam Detection Inspired by a Cross-Regulation Model of Immune Dynamics: A Study of Concept Drift". In: *Artificial Immune Systems: 7th International Conference, (ICARIS 2008)*. Bentley, Peter; Lee, Doheon; Jung, Sungwon (Eds.) *Lecture Notes in Computer Science*. Springer-Verlag, **5132**: 36-47.
- M. Marques-Pita, M. Mitchell, and L.M. Rocha [2008]. "The Role of Conceptual Structure in Learning Cellular Automata to Perform Collective Computation". In: *Unconventional Computation: 7th International Conference (UC 2008)*. *Lecture Notes in Computer Science*. Springer-Verlag, **5204**: 146-163.
- A. Abi-Haidar and L.M. Rocha [2008]. "Adaptive Spam Detection Inspired by the Immune System". In: *Artificial Life XI: Eleventh International Conference on the Simulation and Synthesis of Living Systems*, S. Bullock, J. Noble, R. A. Watson, and M. A. Bedau (Eds.). MIT Press, pp. 1-8.
- M. Marques-Pita and L.M. Rocha [2008]. "Conceptual Structure in Cellular Automata: The Density Classification Task". In: *Artificial Life XI: Eleventh International Conference on the Simulation and Synthesis of Living Systems*, S. Bullock, J. Noble, R. A. Watson, and M. A. Bedau (Eds.). MIT Press, pp. 390-397.
- L.M. Rocha and J. Kaur [2007]. "Genotype Editing and the Evolution of Regulation and Memory". *Proceedings of the 9th European Conference on Artificial Life*. LNAI, Springer, **4648**: 63-73.
- A. Abi-Haidar, J. Kaur, A. Maguitman, P. Radivojac, A. Retchsteiner, K. Verspoor, Z. Wang, and L.M. Rocha [2007]. "Uncovering Protein-Protein Interactions in the Bibliome". *Proceedings of the Second BioCreative Challenge Evaluation Workshop* (ISBN 84-933255-6-2), pp.247-255.
- Rechtsteiner, A., Luinstra, J., Rocha, L.M., Strauss, C.E., [2006]. "Use of Text Mining for Protein Structure Prediction and Functional Annotation in Lack of Sequence Homology". In: *Joint BioLINK and Bio-Ontologies Meeting 2006* (ISMB Special Interest Group).

- Maguitman, A.G., A. Rechtsteiner, K. Verspoor, C.E. Strauss, L.M. Rocha [2006]. "Large-Scale Testing Of Bibliome Informatics Using Pfam Protein Families". In: *Pacific Symposium on Biocomputing 2006*. R. Altman, A.K. Dunker, L. Hunter, T. Murray, T.E. Klein (Eds.) World Scientific Press, pp 76-87.
- Rocha, L.M., A. Maguitman, C. Huang, J. Kaur, and S. Narayanan. [2006]. "An Evolutionary Model of Genotype Editing". In: *Artificial Life 10: Tenth International Conference on the Simulation and Synthesis of Living Systems*, L.M. Rocha, M. Bedau, D. Floreano, R. Goldstone, A. Vespignani, and L. Yaeger (Eds.). MIT Press, pp. 105-111.
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- Rocha, Luis M. [2004]. "Evolving Memory: Logical Tasks for Cellular Automata". *Ninth International Conference on the Simulation and Synthesis of Living Systems (ALIFE9)*. MIT Press, pp 256-261.
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PEER-REVIEWED BOOK CHAPTERS:

- Rocha, L.M. [2003]. "Automatic Conversation Driven by Uncertainty Reduction and Combination of Evidence for Recommendation Agents ". In: *Systematic Organization of Information in Fuzzy Systems*. NATO Science Series. P. Melo-Pinto, H.N. Teodorescu and T. Fukuda (Eds.) IOS Press, pp 249-265.
- Wall, Michael E., Andreas Rechtsteiner, and Luis M. Rocha [2003]. "Singular Value Decomposition and Principal Component Analysis ". In: *Understanding And Using Microarray Analysis Techniques: A Practical Guide*. D. P. Berrar, W. Dubitzky, and M. Granzow (Eds.). Kluwer Academic Publishers, pp. 91-109.
- Rocha, Luis M. [2002]. "Semi-metric Behavior in Document Networks and its Application to Recommendation Systems". In: *Soft Computing Agents: A New Perspective for Dynamic Information Systems*. V. Loia (Ed.) International Series Frontiers in Artificial Intelligence and Applications. IOS Press, pp. 137-163.
- Rocha, Luis M. and Johan Bollen [2001]. "Biologically motivated distributed designs for adaptive knowledge management". In: *Design Principles for the Immune System and other Distributed Autonomous Systems*. L. Segel and I. Cohen (Eds.) Santa Fe Institute Series in the Sciences of Complexity. Oxford Univ. Press, pp. 305-334.
- Rocha, Luis M. [2001]. "TalkMine: a Soft Computing Approach to Adaptive Knowledge Recommendation". In: *Soft Computing Agents: New Trends for Designing Autonomous Systems*. Vincenzo Loia and Salvatore Sessa (Eds.). Physica-Verlag, Springer, pp. 89-116.
- Rocha, Luis M. [2000]. "Syntactic autonomy, cellular automata, and RNA editing: or why self-organization needs symbols to evolve and how it might evolve them". In: *Closure: Emergent Organizations and Their Dynamics*. Chandler J.L.R. and G. Van de Vijver (Eds.) *Annals of the N. Y. Academy of Sciences*. Vol. 901, pp 207-223.
- Rocha, Luis M. [1998]. "Selected Self-Organization and the Semiotics of Evolutionary Systems." In: *Evolutionary Systems: Biological and Epistemological Perspectives on Selection and Self-Organization*. S. Salthe, G. Van de Vijver, and M. Delpo (eds.). Kluwer Academic Publishers, pp. 341-358.

SHORT PIECES:

- A. Kolchinsky, and L.M. Rocha [2011]. "Prediction and modularity in complex dynamical systems". In: *Proc. of the 8th Int. Conf. on Complex Systems*. June 26 - July 1, 2011, Quincy, MA, USA. In Press.
- A. Lourenço, L.M. Rocha, and H. Shatkay [2010]. "Establishing an evaluation baseline for document classifiers in biomedical curation". Biocreative III Workshop, Washington DC, September, 2010.
- A. Lourenço, L.M. Rocha, and H. Shatkay [2010]. "Establishing an evaluation baseline for document classifiers in biomedical curation". Biolink@ISMB, Washington DC, September, 2010.
- L.M. Rocha [2009]. "The Logical Mechanisms of Life". *Complex Biological Systems*. Icfai University Press, 2008.
- L.M. Rocha [2009]. "Reality is Stranger than Fiction: What can Artificial Life do about Advances in Biology?". Invited presentation for the "Biocomplexity" discussion section at the *9th European Conference on Artificial Life*, September 12, 2007 in Lisbon, Portugal. Reprinted in *Complex Biological Systems*. Icfai University Press.

- Rechtsteiner, A., Rocha, L.M., Strauss, C.E.,[2005]. "Clustering of Protein Families in Literature Keyword Space. Currents in Computational Molecular Biology". *Proceedings of the 9th Annual International Conference on Research in Computational Molecular Biology* (RECOMB 2005). Boston, MA, 2005.
- Rechtsteiner, A. and L.M. Rocha [2004]. "MeSH Key Terms for Validation and Annotation of Gene Expression Clusters". *Currents in Computational Molecular Biology. Proceedings of the Eight Annual International Conference on Research in Computational Molecular Biology* (RECOMB 2004), San Diego, CA, March 2004. A. Gramada and Philip E. Bourne (Eds). pp. 212-213.
- Rechtsteiner, A., R. Gottardo, L.M. Rocha, and M.E. Wall[2003]. "Singular Value Decomposition for Analysis of Gene Expression". *Currents in Computational Molecular Biology. Proceedings of the The Seventh Annual International Conference on Research in Computational Molecular Biology* (RECOMB 2003), Berlin, April 10-13, 2003. R. Spang, P. Beziat and M. Vingron (Eds). pp. 275-276
- Rechtsteiner, A., R. Gottardo, L.M. Rocha, M.E. Wall and T. Brettin [2003]. "Three Algorithms for Filtering and Analysis of Gene Expression Data". Poster at *Pacific Symposium on Biocomputing 2003*.
- Rocha, Luis M. and Andreas Rechtsteiner [2003]. "Fast Cheap and Synthetic Oracle (FACSO): Proximity Measures to capture Expert Knowledge in the Bibliome". Poster at *Pacific Symposium on Biocomputing 2003*.
- Rocha Luis M. [2003]. "Extraction and Semi-metric Analysis of Social and Biological Networks". Poster at *Networks: Structure, Dynamics and Function*, May 12 - 16, 2003, Santa Fe, New Mexico, USA.
- Rocha, Luis M. [2002]. "Partnership of Fools." *Wired Magazine*, (Rants and Raves) April 2002.
- Rocha, Luis M. [2002]. "Path to Enlightenment?". *New York Times Book Review*, pp. 4, June 23.
- Rocha, Luis M. [1999]. "Complex Systems Modeling: Using Metaphors From Nature in Simulation and Scientific Models". *BITS: Computer and Communications News*. Computing, Information, and Communications Division. Los Alamos National Laboratory. November 1999.
- Rocha, Luis M. [1997]. "Obituary for Professor Gordon Pask". *International Journal of General Systems*. Vol. 26, no. 3, pp. 219-222.

ELECTRONIC PUBLICATIONS:

Introduction to Informatics, with Santiago Schnell. Lecture notes for course taught at University of Indiana:

<http://informatics.indiana.edu/rocha/i101/>

Biologically-inspired Computing. Lecture notes for course taught at Indiana University:

<http://informatics.indiana.edu/rocha/i-bic>

From Artificial Life to Semiotic Agent Models: Review and Research Directions. Los Alamos National Laboratory Internal Report. LA-UR-99-5475. <http://informatics.indiana.edu/rocha/sim/review.html>

Evolutionary Systems and Artificial Life. Lecture notes for the course taught at the Department of Systems Science and Industrial Engineering at the State University of New York at Binghamton

<http://informatics.indiana.edu/rocha/alife.html>

SCIENTIFIC TRANSLATIONS:

Varela F., E. Thompson and E. Rosch [2001]. *A Mente Corpórea: Ciência Cognitiva e Experiência Humana*. Editora Piaget, Portugal. Translation and Scientific Editing by Luis M. Rocha from the original "*The Embodied Mind*".

SUCCESSFUL GRANTS AND FUNDED PROJECTS

INTELLIGENCE ADVANCED RESEARCH PROJECTS ACTIVITY (IARPA), OPEN SOURCE INDICATORS, 2012-2015

EMBERS: Early Model-Based Event Recognition using Surrogates.

with Virginia Tech, U. of Maryland, Harvard U., Cornell U. (IU Component with Johan Bollen \$671K).

FUNDAÇÃO LUSO-AMERICANA PARA O DESENVOLVIMENTO (PORTUGAL) AND NATIONAL SCIENCE FOUNDATION (USA), 2012-2014

Network Mining For Gene Regulation And Biochemical Signaling.

with Predrag Radivijac, IU, \$35K.

INDIANA UNIVERSITY COLLABORATIVE RESEARCH GRANTS FUND (IUCRG), 2011-2012
Drug--Drug Interaction Prediction from Large-scale Mining of Literature and Patient Records.
with Indiana University Medical School, IUPUI, \$56,159.

FUNDAÇÃO PARA A CIÊNCIA E TECNOLOGIA, PTDC/EIA-CCO/114108, 2011-2014
Collective Computation and Control in Complex Biochemical Systems
with Instituto Gulbenkian de Ciéncia and Universidade do Minho, 148,000 €

NATIONAL SCIENCE FOUNDATION, IGERT, 2009-2012
The Dynamics of Brain-Body-Environment Systems in Behavior and Cognition
Faculty in training program. PI Randall Beer.

SIEMENS ACADEMIC/FLAD/GULBENKIAN FOUNDATION/FCT. 2004-2010.
Computational Biology Phd Program and Collaboratorium

NATIONAL SCIENCE FOUNDATION, HUMAN AND SOCIAL DYNAMICS PROGRAM, OCTOBER 2005/SEPTEMBER 2008
DHB: Dynamics of Information Flow and Decisions in Social Networks
with Eliot Smith, Robert Goldstone, Hugh Kelly, \$530K.

DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY, LDRD-DR, 2002-2005
Structural Bioinformatics: Inferring protein function from sequence and structure on a genomic scale
Funded to investigate literature mining techniques, as part of this larger project, to discover protein functions associated with known protein structures. Responsible for a budget of 103K\$

DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY, RESEARCH LIBRARY, 1998-2004
Research and Development of Active Recommendations Systems for the Library Without Walls Project.
Funded to develop the next generation of recommendation systems for distributed information systems. Budget FY03 300K\$. (<http://arp.lanl.gov>).

DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY - LDRD-ER, 2001-2004
Identification of Interests, Trends and Dynamics in Document Networks.
Funded to investigate the metric behavior of distance functions on document graphs as a predictor and identifier of semantic relationships. Budget FY03 105K\$ (<http://wwwinformatics.indiana.edu/rocha/DN/>)

DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY - LDRD- DR, 2002
Discovering Signatures of Human Infection by Biothreat Agents with Application to Bioterrorism Countermeasures-- Literature Analysis Component
Funded to produce text mining techniques to discover novel relationships among components of the immune system. Budget FY02 20K\$

DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY - LDRD- DR, 2002
Advanced Knowledge Integration In Assessing Terrorist Threats – Network Analysis Component
Network analysis methods to discover implicit relationships in databases of documents. Budget FY02 50K\$

DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY, 1998-2001
Gene Expression Array Analysis as Part of the Functional Genomics Research Program
Funded to investigate data-mining techniques to discover hidden relationships in gene expression data. Project leader of a sub-team of 3 researchers. (<http://informatics.indiana.edu/rocha/fungen>)

XEROX CORPORATION/DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY, 2000-2001
Knowledge Management
Funded to investigate adaptive recommendation systems for distributed information systems. Part of a team of 8 researchers. (<http://www.c3.lanl.gov/~josyln/xerox>)

PHYSICAL SCIENCE LABORATORY AT NEW MEXICO STATE UNIVERSITY (NMSU), 1998-2000

Agent-based modeling of socio-technical organizations

Funded as the Los Alamos National Laboratory component (2 research staff members) of a multi-institution project. Actively participated in project proposal and statement of work writing.

(<http://www.c3.lanl.gov/~joslyn/nmsu>).

U.S. NAVY (CINCLANFLT) AND RESEARCH FOUNDATION OF THE STATE UNIVERSITY OF NEW YORK AT BINGHAMTON, 1996-1997

Model design of budget and fleet readiness requirements and Simulation of Port Operations

Research Assistant in a project of seven researchers. Actively participated in project proposal writing. Project leader Prof. Donald Gause.

NATO INT. SCIENTIFIC EXCHANGE PROGRAMMES, ENGLAND-THE NETHERLANDS- PORTUGAL, 1990-1992

Research Assistant, Investigation of Inference Mechanisms in Artificial Intelligence

Developed fuzzy logic and approximate reasoning mathematical structures and algorithms. Results published in Rocha [1991], Medina-Martins and Rocha [1992], and Medina-Martins et al [1993, 1994] (see list of publications). Project Directors: Prof. Gordon Pask Prof. Gerard and de Zeeuw in the University of Amsterdam, The Netherlands, and Prof. Pedro Medina-Martins at I.S.T. Portugal.

INVITED TALKS AND CONFERENCE APPEARANCES

UNIVERSITY OF NEBRASKA AT LINCOLN, OCTOBER 16TH, 2011

Invited Speaker: "Collective Computation in Biochemical Networks: Canalization, Control and Modularity."

NETWORKS AND COMPLEX SYSTEMS TALK SERIES, INDIANA UNIVERSITY, March 7, 2011, Bloomington, IN, USA

Invited Speaker: "Text Classification of the Biomedical Literature"

COGNITIVE SCIENCE PROGRAM, INDIANA UNIVERSITY, March 2, 2011, Bloomington, IN, USA

Invited Speaker: "Schema Redescription in Automata Networks: Revisiting Emergence in Complex Systems"

INSTITUTO GULBENKIAN DE CIENCIA, February 8, 2011, Oeiras, Portugal

Colloquium Speaker: "The complex systems approach to modeling biochemical regulation and organization"

THEORETICAL BIOLOGY SEMINAR SERIES OF THE CREA-CNRS, November 18, 2010, Paris, France

Colloquium Speaker: "Reality is stranger than fiction: Exploring the Evolutionary Role of RNA Editing with Computational Models"

WORKSHOP ON EMERGENCE, Complex Systems Institute, November 17, 2010, Paris, France

Invited Speaker: "Emergent Computation in Biochemical Networks: what material representations tell us about autonomy"

LEHIGH UNIVERSITY, DEPARTMENT OF BIOLOGICAL SCIENCES, September 30th, 2010, Bethlehem, Pennsylvania

Colloquium Speaker: "Exploring the Evolutionary Role of RNA Editing with Computational Models"

COLUMBIA UNIVERSITY, THE BARNARD INTERDISCIPLINARY WORKSHOP ON EMBODIMENT, July 22-24, 2010, New York, NY

Invited Speaker: "Semiotic Closure: material symbols in evolution"

CARNEGIE MELLON UNIVERSITY, XI ANNUAL PORTUGUESE AMERICAN POST-GRADUATE SOCIETY (PAPS) FORUM 2010, April 10th, 2010,, Pittsburgh

Invited Panelist

ESTUDOS AVANÇADOS DE OEIRAS, INSTITUTO GULBENKIAN DE CIENCIA, November 3, 2009, Oeiras, Portugal

Invited Speaker: "Studying the Evolutionary Rationale of RNA Editing with Agent-Based Simulations."

BIOCREATIVE II.5 WORKSHOP 2009: MADRID, SPAIN, October 8, 2009.

High-ranked team invited presentation: "Classification of protein-protein interaction documents using text and citation network features".

EVERYTHING IS CONNECTED CONFERENCE, ESTORIL, PORTUGAL, September 18, 2009

Invited Speaker: "Dynamics in Complex Networks: Preserving robustness in a hyper-connected World".

NETWORKS AND COMPLEX SYSTEMS TALK SERIES, INDIANA UNIVERSITY, BLOOMINGTON, April 20, 2009

Invited Speaker: "Computation and Control in Complex Networks"

DATA AND SEARCH INSTITUTE, INDIANA UNIVERSITY, March 25, 2009, Bloomington, Indiana, USA
Invited Speaker: "Bibliome Informatics in Computational Biology"

DAS SOCIEDADES HUMANAS ÀS SOCIEDADES ARTIFICIAIS SERIES, LISBON, PORTUGAL, March 3, 2009
Invited Speaker: "Darwinian Natural Selection and self-organization in biological and social heterarchies"

INDIANA UNIVERSITY PURDUE UNIVERSITY INDIANAPOLIS, SCHOOL OF INFORMATICS, JANUARY 23, 2009.
 Colloquium Speaker: "Bibliome Informatics and Complex Networks in Proteomics and Systems Biology".

BRAIN, LIFE, AND CULTURE: VI ENCONTRO DO FÓRUM INTERNACIONAL DE INVESTIGADORES PORTUGUESES, LISBON, DECEMBER 18-20, 2008
 Invited Participant.

6TH ANNUAL NATIONAL ACADEMIES KECK FUTURES INITIATIVE (NAKFI) CONFERENCE: COMPLEX SYSTEMS, IRVINE, CALIFORNIA, NOVEMBER 13-15, 2008
 Invited Participant.

FIRST PORTUGUESE FORUM ON COMPUTATIONAL BIOLOGY , OEIRAS, PORTUGAL, JULY 10-12, 2008.
 Invited Speaker: "Complex Networks and Bibliome Informatics: Applications to Computational Biology"

UNIVERSITY OF THE BASQUE COUNTRY, SAN SEBASTIAN, SPAIN, JUNE 23-24, 2008.
 Invited Speaker: "Complex Systems Approaches to Theoretical Biology".

SYSTEMS BIOLOGY IN MEDICINE WORKSHOP, UNIVERSITY OF BARCELONA, HOSPITAL CLINIC, MAY 8-10, 2008.
 Invited Speaker: "Complex Networks and Bibliome Informatics: Applications to Computational Biology"

SOCIAL DATA MINING AND KNOWLEDGE BUILDING WORKSHOP, INSTITUTE FOR PURE & APPLIED MATHEMATICS, UNIVERSITY OF CALIFORNIA AT LOS ANGELES, NOVEMBER 5-9, 2007, LOS ANGELES.
 Invited Speaker: "Semi-metric Knowledge Networks: Applications to Information Retrieval and Social Data-mining"

COMPUTER SCIENCE AND INFORMATICS HONORS SEMINAR. OCTOBER 29, 2007, INDIANA UNIVERSITY.
Invited Speaker: "A Computational Model of RNA Editing and the Evolution of Regulation and Memory in Dynamic Environments"

EUROPEAN CONFERENCE ON ARTIFICIAL LIFE, 2007, SEPTEMBER 10-15, LISBON, PORTUGAL.
Invited Discussant: "Reality is Stranger than Fiction: What to do in Artificial Life About Advances in Biology?"

INSTITUTO GULBENKIAN DE CIENCIA, July, 2007, Oeiras, Portugal
Invited Speaker: "The emergence of regulation in artificial models of genotype editing"

INTERNATIONAL WORKSHOP ON PRACTICAL APPLICATIONS OF COMPUTATIONAL BIOLOGY AND BIOINFORMATICS, June 20-22, 2007, Ourense, Spain.
Invited Speaker: "Uncovering Protein-Protein Interactions in the Bibliome ".

MATHEMATICS DEPARTMENT, UNIVERSITY OF SEVILLE, June 13, 2007, Seville, Spain
Invited Speaker: "Transitivity in weighted graphs: effects on network topology ".

COMPUTER SCIENCE DEPARTMENT, NEW UNIVERSITY OF LISBON, June 4, 2007, Lisbon, Portugal
Invited Speaker: "Complex Adaptive Systems and Computational Intelligence ".

SECOND BIOCREATIVE CHALLENGE WORKSHOP: CRITICAL ASSESSMENT OF INFORMATION EXTRACTION IN MOLECULAR BIOLOGY, April 23-25, 2007, Madrid, Spain .
Session Chair

DATA AND SEARCH INSTITUTE, INDIANA UNIVERSITY, January 31, 2007, Bloomington, Indiana, USA
Invited Speaker: "Bibliome Informatics: uncovering inferences by literature mining"

FORUM INTERNACIONAL DE INVESTIGADORES PORTUGUESES, BIOMEDICINA: INVESTIGACAO, ENSINO E IMPACTO NA SOCIEDADE, September 21-23, 2006, Porto, Portugal.
Invited Speaker: "Knowledge Integration in Biomedicine"

JOINT STATISTICAL MEETINGS, COMPLEX NETWORKS SESSION, August 6-20, 2006, Seattle, WA
Invited Speaker: "Effects of Transitive and Metric Closure on Weighted Graphs"

INSTITUTO SUPERIOR TECNICO, INSTITUTO DE SISTEMAS E ROBOTICA, June 19-20, 2006
Invited Lecturer: two day course "Brief Introduction to Bioinformatics and Computational Biology"

INSTITUTO GULBENKIAN DE CIENCIA, April 3, 2006, Oeiras, Portugal
Invited Lecturer: "Bibliome Informatics"

UNIVERSITY OF BRAGA, DOCTORAL SYMPOSIUM, February 2006, Braga, Portugal
Invited Speaker: "Bibliome Informatics"

NATIONAL SCIENCE FOUNDATION: WORKSHOP ON DYNAMIC DATA-DRIVEN APPLICATIONS SYSTEMS, Arlington, VA, January 19-20, 2006

Invited Participant

UNIVERSITY OF INDIANA, BLOOMINGTON, Cognitive Science Program Seminar Series , November 16, 2005.

Invited Speaker: "The Emergence of Representations".

IEEE/WIC/ACM INTERNATIONAL CONFERENCE ON WEB INTELLIGENCE AND INTELLIGENT AGENT TECHNOLOGY , Compiègne, France, September 19-22, 2005

Session Chair: "Intelligent E-Technology" Session.

UNIVERSITY OF INDIANA, BLOOMINGTON, Biocomplexity Institute Seminar Series, April 16, 2005.

Invited Speaker: "Artificial Life Models of Genotype Editing".

UNIVERSITY OF INDIANA, BLOOMINGTON, Networks Science Seminar, January 24, 2005

Invited Speaker: "Proximity Networks and Semi-Metric Behavior"

UNIVERSIDADE NOVA DE LISBOA, Lisbon, Portugal. December, 10th, 2004.

Invited Speaker: "Proximity Networks and Fuzzy Graphs"

INSTITUTO GULBENKIAN DE CIENCIA, Lisbon, Portugal. December, 22nd 2004

Invited Speaker: "Mathematical and Computational Biology"

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN. Nonlinear Dynamics and Complex Systems Seminar, October 29th, 2004.

Invited Speaker: "Extraction and Semi-metric Analysis of Social and Biological Networks"

UNIVERSITY OF INDIANA, BLOOMINGTON, School of Informatics and Computer Science Department Colloquium, October 8th, 2004.

Invited Speaker: "From Document Networks to the Adaptive Web"

COGNITIVE SYSTEMS: HUMAN COGNITIVE MODELS IN SYSTEM DESIGN. Santa Fe, NM, June 30th, 2004

Invited Speaker: "Evidence sets: Using uncertainty as an engine for adaptive recommendation".

INDIANA UNIVERSITY, BLOOMINGTON, SCHOOL OF INFORMATICS, February 16th, 2004

Invited Speaker

GENETIC REGULATORY NETWORKS: THEORY AND PRACTICE, Canberra, Australia, 8th - 12th December 2003

Co-Chair: http://www.itee.uq.edu.au/~complexity/CEC_Special_Session/

OEIRAS MATHEMATICAL AND COMPUTATIONAL BIOLOGY WORKSHOP, Oeiras, Portugal, June 20th 2003.

Co-Chair: <http://informatics.indiana.edu/rocha/cbigc>

INFORMATION SCIENCE AND TECHNOLOGY COLLOQUIUM, NASA GODDARD SPACE FLIGHT CENTER, Jan. 29, 2003

Featured speaker

CENTER FOR THE STUDY OF COMPLEX SYSTEMS, UNIVERSITY OF MICHIGAN, ANN ARBOR, December 5, 2002

Invited Speaker

ENTREPRENEURSHIP IN BIOTECHNOLOGY, VENTURING IDEAS ACROSS THE ATLANTIC WORKSHOP, Newark, NJ, January 31, 2003

Invited Speaker

INTERNATIONAL INTERDISCIPLINARY SEMINAR ON NEW ROBOTICS, EVOLUTION AND EMBODIED COGNITION, LISBON, PORTUGAL, NOVEMBER 12-15 2002.

Co-Chair and Invited Speaker: <http://wwwinformatics.indiana.edu/rocha/embrob>

2002 INNOVATIVE STUDIES RESEARCH PROGRAM WORKSHOP, Santa Fe, NM October 15th

invited speaker

WORKSHOP ON ENABLING CONCEPTS IN BIOSYSTEMS ANALYSIS, SEPTEMBER 19-20, 2002, SANTA FE, NM

Invited Speaker

CRITICAL STUDIES WORKSHOP, STANFORD UNIVERSITY, MAY 8, 2002.

Invited speaker.

WORKSHOP OF THE SYSTEMS THEORY OF BIO-INFORMATICS AND ITS EXTENSION TOWARDS ENGINEERING DESIGN THEORY PROJECT, GRADUATE SCHOOL OF ENGINEERING, KYOTO UNIVERSITY, KYOTO, JAPAN, NOVEMBER 2001.

Invited Speaker

1ST PORTUGUESE MEETING ON THEORETICAL AND COMPUTATIONAL BIOLOGY. INSTITUTO GULBENKIAN DE CIENCIA, OEIRAS, PORTUGAL, 23RD-26TH OF OCTOBER 2001

Invited Speaker

NATO ADVANCED RESEARCH WORKSHOP ON SYSTEMATIC ORGANISATION OF INFORMATION USING FUZZY SYSTEMS, VILA REAL, PORTUGAL, 24TH-26TH OF OCTOBER 2001

Invited Speaker

FROM INTELLIGENT NETWORKS TO THE GLOBAL BRAIN: EVOLUTIONARY SOCIAL ORGANIZATION THROUGH KNOWLEDGE TECHNOLOGY, BRUSSELS, JULY 3-5, 2001.

Invited Speaker

III ENCONTRO DO FORUM INTERNACIONAL DE INVESTIGADORES PORTUGUESES, FARO, PORTUGAL APRIL 7-10, 2001.

Invited Speaker in Computer Science Session

INSTITUTO GULBENKIAN DA CIENCIA, LISBON PORTUGAL, MARCH 2001.

Invited Speaker

GORDON RESEARCH CONFERENCE ON RNA EDITING, JANUARY 21-26, 2001, VENTURA, CA.

Keynote Session Speaker.

HETERARCHIES: DISTRIBUTED INTELLIGENCE AND THE ORGANIZATION OF DIVERSITY, SANTA FE INSTITUTE WORKSHOP OCTOBER 13 AND 14, 2000, SANTA FE, NM.

Invited Speaker

INSTITUTO DE SISTEMAS E ROBOTICA, INSTITUTO SUPERIOR TECNICO, LISBON, PORTUGAL. AUGUST 2000 AND SEPTEMBER 2001.

Invited Speaker

XEROX PARC, PALO ALTO. JUNE 2000

Invited Speaker at the User-Interaction Group

DESIGN PRINCIPLES FOR THE IMMUNE SYSTEM AND OTHER DISTRIBUTED AUTONOMOUS SYSTEMS, SANTA FE INSTITUTE, JULY 1999, SANTA FE, NEW MEXICO.

Invited Speaker

INTERNATIONAL MEETING ON EMERGENT ORGANIZATIONS AND THEIR DYNAMICS, MAY 1999, UNIVERSITY OF GHENT, GHENT, BELGIUM

Invited Speaker

ISIC/CIRA/ISAS '98: IEEE INTERNATIONAL SYMPOSIUM ON INTELLIGENT CONTROL (ISIC), INTERNATIONAL SYMPOSIUM ON COMPUTATIONAL INTELLIGENCE IN ROBOTICS AND AUTOMATION (CIRA), INTELLIGENT SYSTEMS AND SEMIOTICS (ISAS), SEPTEMBER 1998, GAITHERSBURG, MARYLAND U.S.A.

Co-Chair of the "Semiotics of Autonomous Information Systems" session

WORKSHOP ON EMERGENT SEMANTIC AND COMPUTATIONAL PROCESSES IN DISTRIBUTED INFORMATION SYSTEMS, AUGUST 1998, LOS ALAMOS, NEW MEXICO

Co-organizer (<http://www.c3.lanl.gov/~joslyn/pcp/workshop98.html>)

2ND INTERNATIONAL SYMPOSIUM ON INTELLIGENT MANUFACTURING SYSTEMS, AUGUST 1998, SAKARYA, TURKEY

Chair of the "Emergent Computation and Intelligent Manufacturing Systems" session, and member of the Program Committee

THE PHILOSOPHY OF ARTIFICIAL LIFE, MARCH 1997. CHRIST CHURCH, OXFORD, UNITED KINGDOM

Invited Participant

WORKSHOP ON CONTROL MECHANISMS FOR COMPLEX SYSTEMS, DECEMBER 1996, U.S. AIR FORCE BASE, LAS CRUCES, NEW MEXICO, U.S.A.

Invited Speaker

THE LOS ALAMOS NATIONAL LABORATORY, (CNLS/XCM), AUGUST 1996, LOS ALAMOS, NEW MEXICO, U.S.A.

Invited Speaker

THE SANTA FE INSTITUTE, AUGUST 1996, SANTA FE, NEW MEXICO, U.S.A.

Invited Speaker

WASHINGTON EVOLUTIONARY SYSTEMS SOCIETY, SEPTEMBER 21, 1995 WASHINGTON D.C., U.S.A.

Invited Speaker

INTERNATIONAL MEETING ON EVOLVING SYSTEMS, MARCH 1995, KONRAD LORENZ INSTITUTE, VIENNA, AUSTRIA

Invited Speaker

JOINT CONFERENCE OF THE NORTH AMERICAN FUZZY INFORMATION PROCESSING SOCIETY (NAFIPS), INTERNATIONAL FEDERATION OF INFORMATION SYSTEMS (IFIS), AND NORTH AMERICAN SPACE AGENCY (NASA): NAFIPS/IFIS/NASA'94, DECEMBER 1994, SAN ANTONIO, TEXAS, U.S.A.

Session Chair

ARTIFICIAL LIFE: A BRIDGE TOWARDS A NEW ARTIFICIAL INTELLIGENCE, DECEMBER 1993, SAN SEBASTIAN, SPAIN
Invited participant

SCHOLARSHIPS, AWARDS, AND MEDIA COVERAGE

LA REPUBBLICA, ITALY: "L'Italia, un paese felice e lo scrive su Facebook", December 23th, 2011.
http://www.repubblica.it/tecnologia/2011/12/23/news/italia_felicit_facebook-27084219/

BEST PAPER AWARD OF THE *PROGRAMME COMMITTEE OF THE 9TH INTERNATIONAL CONFERENCE ON ARTIFICIAL IMMUNE SYSTEMS (ICARIS 2010)*, EDINBURGH, U.K. JULY 26-29 2010
to the contribution "Biomedical Article Classification Using an Agent-Based Model of T-Cell Cross-Regulation",
Abi-Haidar and Rocha [2010a]

JORNAL DE LETRAS, PORTUGAL ON APRIL 6TH: Interview: "Somos todos Cyborgs."
<http://aeiou.visao.pt/somos-todos-cyborgs=f554308>

RTP2, PORTUGAL ON JANUARY 26TH, 2010: Long interview to major Portuguese TV network.
http://www.youtube.com/watch?v=iZ8D_NzFpJw

BBC DIGITAL PLANET, U.K.: Forthcoming World Service interview about immune-inspired spam-detection system.
http://www.bbc.co.uk/worldservice/programmes/digital_planet.shtml

SIC NEWS, PORTUGAL: TV interview (leading 24-hour news channel in Portugal) about immune-inspired spam-detection system.
<http://sic.aeiou.pt/online/noticias>

RÁDIO RENASCENÇA, PORTUGAL: Radio interview about immune-inspired spam-detection system, October 5, 2008.
<http://www.rr.pt/>

L'ATELIER, FRANCE: "Spams et bacteries : meme combat", August 22th, 2008.
<http://parentheses.atelier.fr/recherche/article/spams-et-bacteries-meme-combat>

TECNOMANIA, SPAIN: "Podemos hacer software que nazca a la vida?", August 12th, 2008.
<http://www.tecnomania.com/?p=1065>

CIÊNCIA HOJE, PORTUGAL: "Cientistas portuguesas criaram «aspirador» de lixo electrónico", August 11th, 2008.
<http://www.cienciahoje.pt/index.php?oid=27058&op=all>

PORTUGUESE PRESS on August 7th, 2008: CORREIO DA MANHÃ (p20), DIARIO DE NOTÍCIAS (p15), JORNAL DE NOTÍCIAS (p5), PÚBLICO (p8), etc.

SILICON REPUBLIC, IRELAND: "Fighting spam and thinking robots -- bio-inspired AI", August 6th, 2008.
<http://www.siliconrepublic.com/news/article/11162/randd/>

THE DAILY TELEGRAPH, U.K.: "Can we make software that comes to life?", August 5th, 2008.
<http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/08/05/scicomputers.xml>

OTHER INTERNATIONAL PRESS on August 5-6th, 2008. ACM TECHNEWS (USA), INNOVATION REPORT (GERMANY), SCIENCE DAILY (USA), SLASHDOT (USA), ALPHAGALILEO (EUROPEAN UNION), SILOBREAKER (UK), ETC.

NEW YORK TIMES. "On Facebook, Scholars Link Up With Data." December 17, 2007. This article describes some of the work we are pursuing with Elliot Smith on our DHB NSF grant.
<http://www.nytimes.com/2007/12/17/style/17facebook.html>

RADIO TELEVISÃO PORTUGUESA (RTP): Interview for 2010 program on Artificial Life. : September 24, 2007, Portugal.

JORNAL DA MADEIRA: "Computadores também sentem...": September 22, 2007, Madeira, Portugal.
<http://www.jornaldamadeira.pt/not2008sup.php?Seccao=16&id=77737&sup=5&sdata=2007-09-22>

RADIODIFUSÃO PORTUGUESA ANTENA 1: Interview for news service about Artificial Life. September 12, 2007, Portugal.

RADIO CLUBE PORTUGUÊS: Interview in "Janela Aberta", apresentado por Ana Sousa Dias, September 10, 2007, Portugal.

UNIVERSIA.PT WEB PORTAL: "IGC Organiza Ecal 2007 Em Lisboa". September 10, 2007, Portugal.

FUNDAÇÃO CALOUSTE GULBENKIAN NEWSLETTER: "Tecendo Redes Para A Biologia Computacional", September, 2007, Portugal. <http://www.gulbenkian.pt/v1/newsletters/86.pdf>

CIÊNCIA HOJE WEB PORTAL: "Luis Rocha: FLAD and the Portuguese Scientists in America", October 1, 2006
<http://www.cienciahoje.pt/index.php?oid=9116&op=all>

CORREIO DA MANHÃ NEWSPAPER: "Aposta na investigação", Portugal., June 22, 2006.
<http://www.correiomanha.pt/noticia.asp?id=205996&idCanal=10>

CIÊNCIA HOJE WEB PORTAL: "IGC e FLAD criam laboratório de biologia computacional", June 22, 2006.
<http://www.cienciahoje.pt/index.php?oid=3452&op=all>

LUSA NEWS AGENCY: "Biologia Computacional: Parceria luso-americana para co-laboratório", June 21, 2006.
<http://www.lusa.pt/print.asp?id=SIR-8102084>

COMPLEXITY DIGEST WEB PORTAL: Interview at the Alife X Conference, June 6, 2006.
<http://complexity.vub.ac.be/~comdig/ALifeX/>

INDIANA DAILY STUDENT: "IU to showcase AI technology", June 1, 2006
<http://www.idsnews.com/news/story.php?id=36111&adid=news>

DEFRENTE WEB PORTAL: "Luis Rocha": May 29, 2006
<http://www.algebraica.pt/Arquivo/Newsletters/defrente/44/index.htm>

THE INDIANAPOLIS STAR NEWSPAPER: "Indiana noteworthy": May 22, 2006
<http://www.indystar.com/apps/pbcs.dll/article?AID=/20060522/BUSINESS/605220344&SearchID=73245320450948>

INDIANA UNIVERSITY, SCHOOL OF INFORMATICS, May 2006
Teaching Excellence Award 2006

LABORATORYTALK WEB PORTAL: "Integrating artificial life simulation with synthetic biology": May 22, 2006
<http://www.laboratorytalk.com/news/iqd/iqd126.html>

BIOHEALTHMATHEMATICS WEB PORTAL: "Integrating artificial life simulation with synthetic biology", May 19, 2006
<http://news.biohealthmatics.com/PressReleases/2006/05/20/000000004557.aspx>

TECHPOINT WEB PORTAL: "Scientists to Get 'Alife' at International Conference", March 15, 2006
<http://www.techpoint.org/pressreleasesdetails.aspx?id=293>

CIENCIA HOJE WEB PORTAL: "Luís Rocha preside a conferência sobre duas décadas de Vida Artificial", March 15, 2006, Portugal
<http://www.cienciahoje.pt/index.php?oid=2703&op=all>

COMPLEXITY DIGEST WEB PORTAL: Interview at the Artificial Life 9 Conference, Boston, MA, September 14, 2004
<http://complexity.vub.ac.be/~comdig/ALife9/Rocha.asf>

UNIVERSITY OF CALIFORNIA, LOS ANGELES, INSTITUTE FOR PURE AND APPLIED MATHEMATICS
Fellowship, March-June 2004, Program on "Proteomics: Sequence, Structure, Function"

INTERVIEW WITH EXPRESSO NEWSPAPER (LARGEST CIRCULATION IN PORTUGAL). N. 1653, JULY 2004.

NEWSPAPER ARTICLE "Web May Hold the Key to Achieving Artificial Intelligence" in *The Washington Post*, September 6, 2002; Page A01. <http://www.washingtonpost.com/wp-dyn/articles/A43363-2002Sep5.html>. Also appeared at MSNBC: <http://www.msnbc.com/news/804291.asp?0dm=C13KT>.

TELEVISION INTERVIEW in 2010, *Rádiatelevisão Portuguesa* (RTP2) concerning new approaches to Artificial Intelligence and Robotics, November 2002. [Http://informatics.indiana.edu/rocha/videos/2010rtp_high.rm](http://informatics.indiana.edu/rocha/videos/2010rtp_high.rm)

NEWSPAPER ARTICLE "Insetos, neurônios e sistema imunológico. Esses são os modelos das redes do futuro" in *Estado de São Paulo*, Brazil, September 16, 2002.
<http://www.estado.estadao.com.br/suplementos/info/2002/09/16/info041.html>. As well as two other pieces including the translation of the Washington Post Article above.

NEWSPAPER ARTICLE "O Português de Los Alamos" in *Expresso* Newspaper, Portugal, August 31, 2002.
http://semanal.expresso.pt/economia/artigos/interior.asp?edicao=1557&id_artigo=ES69166

NEWSPAPER ARTICLE "Nova robótica apresenta-se em Lisboa" in *Expresso* Newspaper, Portugal, August 17, 2002.
http://semanal.expresso.pt/economia/artigos/interior.asp?edicao=1555&id_artigo=ES68023

MAGAZINE ARTICLE: *Informar Portugal* - ICEP, Ano II, N. 7, Setembro 2002, page 13.

MAGAZINE ARTICLE "Evolution and scientific literature: towards a decentralized adaptive web" in *Nature: WebDebates*, 2001. <http://www.nature.com/nature/debates/e-access/Articles/luce.html>

MCDONNELL-PEW CENTRE FOR COGNITIVE NEUROSCIENCE GRADUATE STUDENT BURSARY to attend the conference *THE PHILOSOPHY OF ARTIFICIAL LIFE* at CHRIST CHURCH, OXFORD, MARCH 1997

BEST PAPER AWARD OF THE *PROGRAMME COMMITTEE OF THE THIRTEENTH EUROPEAN MEETING ON CYBERNETICS AND SYSTEMS RESEARCH*, FOR THE ENTIRE MEETING, AND THE GORDON PASK MEMORIAL AWARD, VIENNA, APRIL 1996 to the contribution "*Language Theory: Consensual Selection of Dynamics*", Henry, Charles and Luis Rocha [1996]

PRAXIS XXI PROGRAM, JUNTA NACIONAL DE INVESTIGAÇÃO CIENTÍFICA E TECNOLÓGICA, PORTUGAL-EUROPEAN UNION-USA, 1995-1996

PhD Scholarship, Fuzzy Logic and Adaptive Systems

The PRAXIS XXI program is jointly funded by the Portuguese Government and the European Union for continuing doctorate research.

BEST PAPER AWARD OF THE *TWELFTH EUROPEAN MEETING ON CYBERNETICS AND SYSTEMS RESEARCH*, FOR THE SYMPOSIUM "HUMANITY, ARCHITECTURE AND CONCEPTUALIZATION", VIENNA, APRIL 1994 to the contribution "*Von Foerster's Cognitive Tiles: Semantically Closed Building Blocks for AI and Alife*".

CIENCIA PROGRAM, JUNTA NACIONAL DE INVESTIÇÃO CIENTÍFICA E TECNOLÓGICA, PORTUGAL-EUROPEAN UNION-USA, 1992-1995

PhD Scholarship, Fuzzy Logic and Adaptive Systems

The CIENCIA program is jointly funded by the Portuguese Government and the European Union.

ERASMUS PROGRAM SCHOLARSHIP, EUROPEAN UNION, 1990

Exchange Student in the Masters Program of the Staffordshire University, Stafford, England. Computer Integrated Manufacturing.

LONG RESEARCH VISITS AND COLLABORATIONS

UNIVERSITY OF CALIFORNIA, LOS ANGELES, INSTITUTE FOR PURE AND APPLIED MATHEMATICS

Fellowship appointment, March-June 2004

Program on “Proteomics: Sequence, Structure, Function”

INSTITUTO DE SISTEMAS E ROBOTICA, INSTITUTO SUPERIOR TÉCNICO, Lisbon Portugal.

Visiting Professor, 09/00-present.

Works with graduate students and fellow faculty on computational biology.

THE SANTA FE INSTITUTE, SANTA FE, NEW MEXICO, U.S.A.

Member of Research Community, Since August 1996

Joined the SFI’s research community. Visited the Institute and worked with Melanie Mitchell and others, on models of Evolutionary Systems utilizing Fuzzy Logic and Genetic Algorithms. Delivered a talk.

THE PRINCIPIA CYBERNETICA PROJECT

Associate, Since 1991

Computer-supported collaborative development of an evolutionary-systemic philosophy. This project has been at the forefront of the development hypertext technology and the World Wide Web since 1990.

<http://pespmc1.vub.ac.be/>

FUZZY SETS AND SYSTEMS GROUP, DEPARTMENT OF COMPUTER SCIENCE AND APPLIED MATHEMATICS, UNIVERSITY OF GHENT, BELGIUM

Visiting Researcher, Summer 1993

Worked with Etienne Kerre and Bernard de Baets.

SHORT DEGREES

LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL (NATIONAL LABORATORY FOR CIVIL ENGINEERING), LISBON, PORTUGAL

4-month intensive post-graduate course (6 hours daily) on Digital Control Systems, 1991.

INSTITUTO SUPERIOR TÉCNICO, LISBON, PORTUGAL

3-month intensive (6 hours daily) summer course, sponsored by the Social European Fund, on Computer Control of Noise Pollution, 1988.