

# LUIS M. ROCHA

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

## PERSONAL DATA

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Luis M. Rocha is the George J. Klir Professor of Systems Science. He is also director of the *Center for Social and Biomedical Complexity*, between Binghamton University and Indiana University, Bloomington. He has been the director of the *NSF-NRT Interdisciplinary Training Program in Complex Networks and Systems*, and Professor of Informatics in the Luddy School of Informatics, Computing, and Engineering at Indiana University, where he was a member of the advisory council of the *Indiana University Network Science Institute*, and core faculty of the *Cognitive Science Program* at *Indiana University, Bloomington*. Dr. Rocha is a *Fulbright Scholar* and is also Principal Investigator at the *Instituto Gulbenkian da Ciencia*. He also has been a Visiting Professor of the *Center for Theoretical Physics* at the *Aix-Marseille University*, France and the *Champalimaud Foundation*, and the *NOVA School of Business and Economics*, Portugal.

## RESEARCH INTERESTS

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**Complex networks & systems:** collective behavior, computational social science, control and redundancy in complex networks, discrete dynamical systems & automata, evolutionary systems & agent-based modeling, information theory, interdisciplinary and systems science.

**Computational biology and biomedical informatics:** control in systems biology, brain and ecological networks, dynamical models of biochemical regulation, electronic health records and multiomic health, genomic multivariate analysis, information extraction and automatic annotation, literature and social media mining, theoretical biology.

**Computational intelligence:** artificial intelligence, artificial life, bio-inspired computing, collective intelligence, data science, embodied cognition, evolutionary and adaptive systems, information retrieval, knowledge networks, machine learning, recommender systems, text mining, uncertainty modeling, web intelligence.

## ACADEMIC EDUCATION

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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)*

## PROFESSIONAL APPOINTMENTS

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BINGHAMTON UNIVERSITY (SUNY), THOMAS J. WATSON COLLEGE OF ENGINEERING AND APPLIED SCIENCE,  
DEPARTMENT OF SYSTEMS SCIENCE AND INDUSTRIAL ENGINEERING  
*George J. Klir Professor of Systems Science, 2021-Present*

INDIANA UNIVERSITY, LUDDY SCHOOL OF INFORMATICS, COMPUTING, AND ENGINEERING

*Director of the Center for Social and Biomedical Complexity, 2019-2022*

*Director of the NSF-NRT Interdisciplinary Training Program in Complex Networks and Systems, 2017-2022*

*Full Professor, 2013-2022*

*Director of Complex Networks & Systems PhD Track of Informatics PhD Program, 2008-2019*

*Associate Professor, 2004-2013 (Tenured since 2007)*

*Director of Informatics Graduate Programs, 2007-2008*

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>).*

NOVA SCHOOL OF BUSINESS AND ECONOMICS, Carcavelos, Portugal.

*Invited Professor, 01/2019-2021.*

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

*Postdoctoral Associate, September 1997 to January 1999*

*Technical Staff Member and Leader of the Complex Systems Team, February 1999 to July 2004*

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

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### Editorial Boards

*Biosemiotics, BMC Bioinformatics, Complexity, EmbodiedMind.org, Frontiers in Computational Intelligence, Immune Computation, International Journal of Natural Computing Research, International Journal of Semiotics and Visual Rhetoric, PLoS ONE.*

### Advisory Boards and Councils

*Center of Computing Sciences and Technology at the University of Minho, Complex Systems Society Council (elected member), Indiana University Network Science Institute Advisory Council, International Forum of Portuguese Scientists, SilicoLife, Journal of Applied Systems Studies, The Open Cybernetics And Systemics Journal, 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, CPT: Pharmacometrics & Systems, Data & Knowledge Engineering journal, Data Mining & Knowledge Discovery, European Physics Journal, Foundations of Science, Genome Biology, IEEE/ACM Transactions on Computational Biology and Bioinformatics, IEEE Transactions on Evolutionary Computation, IEEE Transactions on Autonomous Mental Development, IEEE Transaction on Systems Man and Cybernetics, Information, 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, iScience, Journal of Artificial Societies and Social Simulation, Journal of Biomedical Informatics, Journal of Computational Science, Journal of Information Science and Engineering, Journal of Statistical Mechanics, Journal of Theoretical Biology, Molecular Biosystems, Natural Computing, Nature Communications, Network Science, Nucleic Acids Research, Proceedings of the National Academy of Sciences (PNAS), Physical Review E, Science Advances, Scientific Reports, Software: Practice and Experience, Systems Research, Tran. on Information Systems.*

### Conference Organizing Committees

Complex Networks 2021: *10<sup>th</sup> Int. Conference on Complex Networks & Their Applications*, Madrid, Spain, November 30 - December 2, 2021, (Program Chair)

Complex Networks 2020: *9<sup>th</sup> Int. Conference on Complex Networks & Their Applications*, Online, December 1-3, (Program Chair)

Complex Networks 2019: *8<sup>th</sup> Int. Conference on Complex Networks & Their Applications*, Lisbon, Portugal December 9- 12, (General Chair)

*Charting interdisciplinary research opportunities between data and life sciences, Instituto Gulbenkiande Ciencia, Oeiras and ISI Foundation, Turin*, March 6-7th, @019, Oeiras, Portugal (Workshop Chair)

Complex Networks 2018: *7<sup>th</sup> Int. Conference on Complex Networks & Their Applications*, Cambridge, UK December 11- 13, (Program Chair)

*Interdisciplinarity, networks, data and complex systems: promise and challenges*. Special Session at *Ciência 2016: Encontro com a Ciência e Tecnologia em Portugal*, July 4-6, Lisbon, Portugal,

*The Gulbenkian Alan Turing Centenary Symposium*, December 11th, 2012 Lisbon, Portugal (Program Chair)

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. 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. interdisc. seminar on new robotics, evolution and embodied cognition*, Lisbon, Portugal, November, 2002

### Conference Program Committees

CCS'21, *Conference on Complex Systems 2021*, October 25-29, Lyon, France.

ALIFE 2021: *the 2021 Int. Conf. on Synthesis & Simulation of Living Systems*, Prague, Czech Rep. , July 19-23.

IC2S2 2020: *6<sup>th</sup> International Conference on Computational Social Science*, Cambridge, MA, July 17-20, 2020

NetSci 2020: *International School and Conference on Network Science*, Rome, Italy, July 6-10, 2020.

ICCS 2020: *International Conference on Computational Science*, Amsterdam, Netherlands, June 3-5, 2020

CompleNet 2020, *11<sup>th</sup> International Conference on Complex Networks*. Exeter, UK, March 31-April 3, 2020

CCS'19, *Conference on Complex Systems 2019*, September 30 - October 4 2019, Singapore.

NetSci 2019: *International School and Conference on Network Science*, Burlington, Vermont, May 27-30, 2019.

CCS'18, *Conference on Complex Systems 2018*, 23-28 September 2018, Thessaloniki, Greece.

ALIFE 2018: *the 2018 Int. Conf. on Synthesis & Simulation of Living Systems*, Tokyo, Japan, July 23-27, 2018.

NetSci 2018: *International School and Conference on Network Science*, Paris, France, June 11-15, 2018.

COMPLEX NETWORKS 2017, *The 6th International Workshop on Complex Networks and their Applications*, November 29 - December 01 2017, Lyon, France.

IEEE ALIFE 2017: IEEE Symposium on Artificial Life, November 27-December 1 Honolulu, Hawaii.

COMPLEX NETWORKS 2017, *The 6th International Workshop on Complex Networks and their Applications*, November 29 - December 01 2017, Lyon, France.

CCS'17, *Conference on Complex Systems 2017*, 17-22 September 2017, Cancun, Mexico.

ECAL 2017: *14th European Conference on Artificial Life*, 4-8 September 2017, Lyon, France.

COMPLEX NETWORKS 2016, *The 5th International Workshop on Complex Networks and their Applications*, November 30 - December 02 2016, Milan, Italy.

IBERAMIA 2016: *15<sup>th</sup> Ibero-American Conf. Artificial Intelligence*. San Jose, Costa Rica. 23-25 November, 2016

ALIFE 2016: *the 15<sup>th</sup> Int. Conf. on Synthesis & Simulation of Living Systems*, Cancun, Mexico, July 4-8, 2016.

GLBIO 2016: *Great Lakes Bioinformatics Conference*, May16-19, 2015, Toronto, Canada.

PSB 2016: 21<sup>st</sup> Pacific Symposium on Biocomputing, Big Island of Hawaii, January 4-8, 2016.

WCCI 2015: IEEE Symposium Series on Computational Intelligence. December 7-10, Cape Town, South Africa

IEEE ALIFE 2015: IEEE Symposium on Artificial Life, December 7-10, Cape Town, South Africa

FCTA 2015: 7th Int. Conf. Fuzzy Computation Theory and Applications. Lisbon, Portugal November 12-14, 2015

EPIA 2015: *17th Portuguese Conference on Artificial Intelligence*, September 8-11, 2013, Coimbra, Portugal .

ECAL 2015: *13<sup>th</sup> European Conference on Artificial Life*, July 20-24 2015, York, United Kingdom.

ICSI'3 2015: *1st International Congress on Systems Immunology, Immunoinformatics & Immune-Computation*. Taormina, Italy, July 17-18, 2015.

PACBB'15: *9<sup>th</sup> Int. Conf. Practical Applications of Computational Biology & Bioinformatic*. Salamanca, Spain, 3-5 June, 2015.

GLBIO 2015: *Great Lakes Bioinformatics Conference*, May 18-20, 2015, West Lafayette, Indiana

SSCI 2014: *IEEE Symposium Series on Computational Intelligence 2014*, December 9-12, 2014, Orlando, USA.

BICT 2014: *8th International Conference on Bio-inspired Information and Communications Technologies*, December 1-3, 2014, Boston, Massachusetts., USA.

IBERAMIA 2014: *14<sup>th</sup> Ibero-American Conference on Artificial Intelligence*. Santiago, Chile, on November 24-27, 2014.

ALIFE 14: *the 14th International Conference on the Synthesis & Simulation of Living Systems*, New York City, USA July 30<sup>th</sup> – August 2<sup>nd</sup>, 2014.

BioLINK 2014: *Supporting Bioscience through Text Mining*. SIG at ISMB 2014, July 11-12.

PACBB'14: *International Conference on Practical Applications of Computational Biology & Bioinformatics 2014*. University of Salamanca, Spain, 4-6 June.

PSB 2014: *Pacific Symposium on Biocomputing 2014*. Big Island of Hawaii, January 3-7, 2014

WI'13: *2013 IEEE/WIC/ACM International Conference on Web Intelligence*. Atlanta, Georgia, USA, November 17-20, 2013.

ECAL 2013: *12<sup>th</sup> European Conference on Artificial Life*, September 2-6 2013, Taormina, Italy

EPIA 2013: *16th Portuguese Conference on Artificial Intelligence*, September 9-1, 2013, Angra do Heroísmo, Azores, Portugal .

BioLINK 2013: *Linking Literature, Information and Knowledge for Biology*. SIG at ISMB/ECCB 2013, July 20.

Evolutionary Patterns: *Horizontal and Vertical transmission and Micro- and Macro-evolutionary Patterns of Biological and Sociocultural Evolution*. May 27<sup>th</sup>-29<sup>th</sup>, 2013, Lisbon, Portugal.

IEEE ALIFE 2013: *The 2013 IEEE Symposium on Artificial Life, at the IEEE Symposium Series on Computational Intelligence 2013*. April 15 – 19, 2013, Singapore.

*IEEE Symposium Series on Computational Intelligence 2013*. April 15 – 19, 2013, Singapore.

ICARIS 2012: *11th International Conference on Artificial Immune Systems*. August 2012. Sicily, Italy, 28-31

IBERAMIA 2012: *13<sup>th</sup> 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: *6<sup>th</sup> 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: *5<sup>th</sup> International Workshop on Practical Applications of Computational Biology & Bioinformatics*. University of Salamanca, Spain, 6-8<sup>th</sup> April, 2011.

PAAMS11: *9<sup>th</sup> International Conference on Practical Applications of Agents and Multi-Agent Systems*. University of Salamanca, Spain, 6-8<sup>th</sup> 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 24<sup>th</sup> 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 7-11<sup>th</sup>, 2010 in Portland, Oregon

BICS 2010: *Brain Inspired Cognitive Systems*. 14-16 July 2010, Madrid, Spain

IWPACBB'09: *3<sup>rd</sup> International Workshop on Practical Applications of Computational Biology & Bioinformatics*. University of Salamanca, Spain, 10<sup>th</sup> - 12<sup>th</sup> June, 2009.

BioLINK 2009: *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: *2<sup>nd</sup> 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 *14<sup>th</sup> 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 20<sup>th</sup> 2003.

*Autonomy, Delegation, and Control: From Inter-agent to Organizations and Institutions Workshop*, 2<sup>nd</sup> *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**

*National Institutes of Health (NIH), Center for Scientific Review, Clinical Informatics and Digital Health (CIDH) study section, 2021; Biomedical Computing and Health Informatics (BCHI) study section, 2020.*  
*University of Michigan, Member of External Review Committee of the Center for the Study of Complex Systems in the College of Literature, Science, and the Arts, 2018.*  
*J. William Fulbright Foreign Scholarship Board, Portugal PhD student proposal review board, 2017.*  
*Michigan State University, Site Visit Committee of the Biocomputational Evolution in Action CONSortium (BEACON) NSF Science and Technology Center, 2014.*  
*National Academy of sciences Keck Futures Initiative, Complex Systems Grants Review Panel, 2013*  
*National Science Foundation, Computer & Information Science & Engineering, 2006; Cyber-Enabled Discovery, 2008; IIS-Biomedical Career awards 2008; Computing and Communication Foundations (CCF): Core Programs 2010; Networks, Synthetic Biology and Evolution 2011, Networks and Regulation Cluster; Science and Technology Centers: Directorate for Biological Sciences, 2014, 2018.*  
*University of Nebraska at Omaha, Office of Research and Creative Activity, 2012.*  
*Killam Research Fellowships, Canada Council for the Arts, 2012.*  
*Royal Society of New Zealand, James cook Research Fellowship Program, 2012.*  
*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.*  
*Czech Science Foundation, Member of Computing Proposal Review Panel 2010.*  
*Belgian Fund for Scientific Research, 2005 (Vrije Universiteit Brussels - VUB), 2004, 2005, 2006.*  
*Los Alamos National Laboratory, Computer Science and Software Engineering internal proposal (LDRD) review committee, 1998-2000.*  
*Science Foundation Ireland , President of Ireland Young Researcher Award, 2006*  
*UMCEES Review Panel, National Research Council, 2001.*

## **EDUCATION AND TRAINING ACTIVITIES**

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### **Undergraduate Thesis Supervision**

Thomas Parmer, Project co-advisor, Individualized Major Program (B.Sc. in Cognitive Science and B.A. in Biophysics), *Indiana University*, 2012. “Inducing Apoptosis: The Study of a Random Boolean Network Modelling Survival Signalling in T-LGL Leukemia.”  
Involvement of undergraduate students in funded research projects via Luddy School’s “*Undergraduate Research Opportunities in Computing*” program.

### **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.” Current position: Associate Professor, *Indiana University*, USA.  
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.” Current Position: Associate Staff Scientist, Bioinformatics, MCD Biology, *University of California, Santa Cruz*, USA.  
Jasleen Kaur, M.S. Advisor, *Indiana University* (2007). “Agent-based model of RNA Editing”. Current Position: Data Scientist at *Philips Lighting*, USA.  
Humberto Santos, Ph.D. Thesis co-advisor, *Universidade da Beira Interior*, Portugal (2008). “Análise e Simulação do Processo da Inovação Segundo uma Perspectiva Evolucionária.” Current Position: deceased.  
Alaa Abi-Haidar, Ph.D. (Informatics Program, Complex Systems Track) Thesis advisor, *Indiana University* (2011). “An adaptive document classifier inspired by T-Cell cross-regulation in the immune system.” Current Position: Senior Data Scientist at *SNIPS*, France.  
Marcio Mourão, Ph.D. (Informatics Program, Complex Systems Track) Thesis co-advisor, *Indiana University* (2011). “Reverse Engineering the Mechanisms and the Dynamical Behavior of Complex Biochemical Pathways.” Current Position: Data Science Consultant for the Consulting for Statistics, Computing & Analytics Research (CSCAR) center at the *University of Michigan*, USA.

Tiago Simas, Ph.D. (Cognitive Science Program) Thesis advisor, *Indiana University* (2012). “Stochastic Models and Transitivity In Complex Networks.” Current Position: Senior Data Scientist at Telefonica Alpha and University of Barcelona, Spain.

Zhiping Wang, Ph.D. (Computer Science Program) Thesis advisor, *Indiana University* (2012). “Biomedical Literature Mining for Pharmacokinetics Numerical Parameter Collection.” Current Position: Director of Bioinformatics Core at University of Pennsylvania, USA.

Artemy Kolchinsky, Ph.D. (Informatics Program, Complex Systems Track), Thesis advisor, *Indiana University* (2015). “Measuring Scales: Integration and Modularity in Complex Systems.” Current Position: Postdoctoral Fellow at the Santa Fe Institute, USA

Alexander Gates, double-major Ph.D. (Informatics Program, Complex Systems Track and Cognitive Science Program), Thesis co-advisor, *Indiana University* (2017). “The anatomical and effective structure of complex systems.” Current Position: Postdoctoral fellow at the Center for Complex Network Research, Northeastern University, USA.

Santosh Manicka, Ph.D. (Informatics Program, Complex Systems Track), Thesis advisor, *Indiana University* (2017). “The Role of Canalization in the Spreading of Perturbations in Boolean Networks.” Current Position: Postdoctoral fellow at Michael Levin’s lab, Biology Department, Tufts University, USA.

Rion Brattig Correia, Ph.D. (Informatics Program, Complex Systems Track), Thesis advisor, *Indiana University* (2019). “Prediction of Drug Interaction and Adverse Reactions, with data from Electronic Health Records, Clinical Reporting, Scientific Literature, and Social Media, using Complexity Science Methods.” Current Position: Postdoctoral fellow at Indiana University and Instituto Gulbenkian de Ciencia, Portugal.

Steven Williams, double-major Ph.D. (Informatics Program, Complex Systems Track and Cognitive Science Program), Thesis co-advisor, *Indiana University* (2019). “Neural Correlates of Adaptive Behavior: Structure, Dynamics, and Information Processing.” Current position, Software Developer, The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention.

Sikander Khare, M.S. Advisor, *Indiana University* (2020). “Canalization in Stochastic Boolean Networks”. Current Position: PhD student University of Florida, USA.

Kelly McClinton, Ph.D. Thesis co-Advisor, *Indiana University* (2021). “Computationally Modeling Roman Domestic Art and Architecture”. Current Position: Research fellow, Oxford University.

Currently supervising 10 Ph.D students: Ian Wood, Thomas Parmer, Xuan Wang, John Metzcar, Herbert Sizek, Monica Marion, Patrick Wall, Indiana University; Jack Felag, Felipe Xavier Costa, Ziqi Gui, at Binghamton University.

### Postdoctoral Fellow Supervision

Chien-feng Huang, 2011-2004, *Los Alamos National Laboratory*.

Ana Maguitman, 2005-2006, *Indiana University*.

Manuel Marques-Pita, 2007-2016, *Indiana University* and *Instituto Gulbenkian de Ciencia*

Rion Brattig Correia, 2019-Present, *Indiana University* and *Instituto Gulbenkian de Ciencia*

Andreia Sofia Teixeira, 2019- Present, *Indiana University*

### Courses Developed and Taught

I609 - Complex Systems Seminar I, 2012-2020 *Indiana University* (<http://informatics.indiana.edu/rocha/icx1>)

I501 - Intro to Informatics, 2008, 2014-2017 *Indiana University* (<http://informatics.indiana.edu/rocha/i501>)

I485/I585 - Bio-inspired Computing, 2005-2015, *Indiana University* (<http://informatics.indiana.edu/rocha/i-bic/>)

I601 - Intro to Complex Systems, 2010-2012, *Indiana University* (<http://informatics.indiana.edu/rocha/i-bic/>)

I709 - Complex Systems Seminar II, 2008, 2011, *Indiana University* (<http://informatics.indiana.edu/rocha/icx2>)

I101 - 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/publications/alife.html> )

### Teaching Awards

Indiana University, School of Informatics & Computing, Trustees Award for Teaching Excellence 2015

Indiana University, School of Informatics, Teaching Excellence Award, 2006

## PUBLICATIONS

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### VOLUMES:

- Benito, R.M., Cherifi, C., Cherifi, H., Moro E., Rocha, L.M., Sales-Pardo, M. (Eds.) [2021] *Complex Networks and Their Applications IX: Proceedings The 9th International Conference on Complex Networks and Their Applications COMPLEX NETWORKS 2020*. Studies in Computational Intelligence Series. Vol. 943-944. Springer. DOI: 10.1007/978-3-030-65347-7 and 10.1007/978-3-030-65351-4. (Two Volumes)
- Cherifi, C., Gaito, S., Mendes, J.M., Moro E., Rocha, L.M. (Eds.) [2020] *Complex Networks and Their Applications VIII: Proceedings The 8th International Conference on Complex Networks and Their Applications COMPLEX NETWORKS 2019*. Studies in Computational Intelligence Series. Vol. 881-2. Springer. DOI: 10.1007/978-3-030-36687-2.
- Aiello, L.M., Cherifi, C., Cherifi, H., Lambiotte, R., Lio, P., Rocha, L.M. (Eds.) [2019] *Complex Networks and Their Applications VII: Proceedings The 7th International Conference on Complex Networks and Their Applications COMPLEX NETWORKS 2018*. Studies in Computational Intelligence Series. Vol. 812-3. Springer. DOI: 10.1007/978-3-030-05411-3.
- Bento dos Santos, L., N. Crato, A. Coutinho, J. Caraça, L.M. Rocha (Eds.) [2010]. *Everything is Connected*. Verbo.
- 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.
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- Medina-Martins, Pedro R. and Luis M. Rocha [1992]. "The in and the out: an evolutionary approach." In: *Cybernetics and Systems '92*. Robert Trappl. World Scientific Press. pp 681-689.
- L.M. Rocha [1991]. "Fuzzification of Conversation Theory." In: *Principia Cybernetica Conference*, Free University of Brussels, Brussels, June 1991. Ed. Francis Heylighen.

#### PEER-REVIEWED BOOK CHAPTERS:

- Rocha, L.M. [2010]. "Dynamics in Complex Networks: Preserving robustness in a hyper-connected World." In: *Everything is Connected*. Bento dos Santos, L., N. Crato, A. Coutinho, J. Caraça, L.M. Rocha (Eds.). Verbo.
- 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.
- L.M. Rocha [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.
- L.M. Rocha 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.
- L.M. Rocha [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.
- L.M. Rocha [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.
- L.M. Rocha [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.

#### MEDIA WRITINGS:

- L.M. Rocha [2021]. "O sexo dos anjos, ou como a complexidade das pandemias exige pensamento sistémico". *Público*. February 18, 2021.
- L.M. Rocha [2021]. "Lixívia ideológica não resolve a pandemia". *Público*. January 20, 2021.
- L.M. Rocha [2020]. "Privacy apocalypse or data science for the common good: Preparing Western Nations for Pandemics to Come". *Towards data science*. November 22, 2020.
- L.M. Rocha [2020]. "Apocalípticos da privacidade vs. StayAway Covid e a ciência de dados para o bem comum". *Observador*. October 25, 2020.
- L.M. Rocha [2020]. "É necessário mais investimento em ciência de complexidade e resiliência para lidar com pandemias". *Público*. March 31, 2020.
- L.M. Rocha [2014]. "Ciência 2.0: do elitismo à decisão coletiva". *Expresso*. 8 Fevereiro, 2014, pp. 35.
- L.M. Rocha [2014]. "Get in Sync". *Herald Times*, Bloomington, IN. August 7, 2014.
- L.M. Rocha [2013]. "Summer Education". *Herald Times*, Bloomington, IN. August 29, 2013.
- 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.

L.M. Rocha [2002]. "Partnership of Fools." *Wired Magazine*, (Rants and Raves) April 2002.

L.M. Rocha [2002]. "Path to Enlightenment?". *New York Times Book Review*, pp. 4, June 23.

L.M. Rocha [1999]. "Complex Systems Modeling: Using Metaphors From Nature in Simulation and Scientific Models". *BITS: Computer and Communications News*. Los Alamos National Laboratory. November 1999.

#### BLOGS:

*Sciber* [2008-Present]: <http://sciber.blogspot.com/>, *Life Inspired* [2007-Present]: <http://life-inspired.blogspot.com/>  
*Hey City Zen* [2004-Present]: <http://hey-city-zen.blogspot.com/>, *InfoPort* [2004-2008]: <http://infoport.blogspot.com/>

#### 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".

#### INSTALLATIONS AND CREATIVE PRODUCTIONS:

Marques Pita, M., S. Costa, A. Paio, M.J. Oliveira, S. Oliveira, Luis M. Rocha [2016]. *Morfogénese musical Visita-instalação interativa (Musical Morphogenesis: Interactive Installation)*. MAAT - Museu de Arte, Arquitetura e Tecnologia, Semana da Ciencia e Tecnologia. Lisbon, November 21-27, 2016. <http://bit.ly/2ihVHIA>, [http://youtu.be/ZR-UpyB9W\\_0](http://youtu.be/ZR-UpyB9W_0).

Marques Pita, M., S. Costa, A. Paio, M.J. Oliveira, S. Oliveira, Luis M. Rocha [2016]. *Morfogénese musical Visita-instalação interativa (Musical Morphogenesis: Interactive Installation)*. Belém Art Fest, Museu de Marinha, Lisbon, May 6-7, 2016. <http://bit.ly/1TAHFSy> and <http://bit.ly/1TANDCO>.

Marques Pita, M., S. Costa, A. Paio, M.J. Oliveira, S. Oliveira, Luis M. Rocha [2013]. *Morfogénese musical Visita-instalação interativa (Musical Morphogenesis: Interactive Installation)*. Fundação Calouste Gulbenkian Museum, Lisbon, October 5<sup>th</sup>, 2013. <http://bit.ly/1hqEzXR> and <http://on.fb.me/L7HKRU>.

#### 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>

#### SUCCESSFUL GRANTS, CONTRACTS AND FUNDED PROJECTS

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PREPARED FOR ENVIRONMENTAL CHANGE (PFEC) GRAND CHALLENGE INITIATIVE, INDIANA UNIVERSITY, 2019-2021  
PR-IUB: *A River Runs Through It: Restoring Biodiversity and Empowering Resilient Community-Environment Interactions in Urban Waterways*.  
Co-PI, \$208K

SCIENTIFIC RESEARCH AND TECHNOLOGICAL DEVELOPMENT IN DATA SCIENCE AND ARTIFICIAL INTELLIGENCE IN PUBLIC ADMINISTRATION, FUNDAÇÃO PARA A CIÊNCIA E TECNOLOGIA, PORTUGAL, DSAIPA/DS/0102/2019-2022  
*Factors to Promote Healthy Dialogue and Behaviours in Online School Communities*  
Co-PI, Instituto Gulbenkian de Ciencia, €222K (PI Manuel Marques-Pita)

NATIONAL INSTITUTES OF HEALTH, NATIONAL LIBRARY OF MEDICINE PROGRAM, OCTOBER 2018/SEPTEMBER 2022  
1R01LM012832-01 *myAURA: Personalized Web Service for Epilepsy Management*  
PI with co-PIs Katy Borner and Wendy Miller, \$1,446K. <http://bit.ly/MyAuraR01>

NATIONAL SCIENCE FOUNDATION, RESEARCH TRAINEESHIP PROGRAM, SEPTEMBER 2017/AUGUST 2022  
NSF - 1735095: *Interdisciplinary Training in Complex Networks and Systems*  
PI, \$2,997K. <https://cns-nrt.indiana.edu/>

SCIENTIFIC RESEARCH AND TECHNOLOGICAL DEVELOPMENT IN DATA SCIENCE AND ARTIFICIAL INTELLIGENCE IN PUBLIC ADMINISTRATION, FUNDAÇÃO PARA A CIÊNCIA E TECNOLOGIA, PORTUGAL, DSAIPA/AI/0087/2018-2021  
*Identification and Forecasting Hospital Emergency Demand*  
Co-I, Instituto Gulbenkian de Ciencia , €283K (PI Joana Sa)

FUNDAÇÃO PARA A CIÊNCIA E TECNOLOGIA, PORTUGAL, PTDC/MEC-AND/30221/2017 (2018-2021)  
*The sperm cell core genetic program: combined clinical and research approach to the diagnosis of male infertility*  
Co-PI, Instituto Gulbenkian de Ciencia , €300K (PI Paulo Navarro e Costa)

NATIONAL SCIENCE FOUNDATION, DIVISION OF ENVIRONMENTAL BIOLOGY (DEB), FEBRUARY 2018/FEBRUARY 2019  
NSF - 1754207: *OPUS: Synthesizing Ecology with Ecological Networks*  
co-PI, \$170K (PI Neo Martinez)

NATIONAL INSTITUTES OF HEALTH, NATIONAL LIBRARY OF MEDICINE PROGRAM, OCTOBER 2014/SEPTEMBER 2019  
R01LM011945-01 *BLR: Evidence-based Drug-Interaction Discovery: In-Vivo, In-Vitro and Clinical*  
PI with co-PIs Lang Li and Hagit Shatkay, \$ 1,771K. <http://bit.ly/DDIR01>

PRECISION HEALTH INITIATIVE, INDIANA UNIVERSITY, 2017-2019  
Population Health and Data and Informatics Clusters, Indiana Cohort Enhancement Study (4K Hoosiers).  
Member of Person to Person Team, \$ 120K

FUNDAÇÃO LUSO-AMERICANA PARA O DESENVOLVIMENTO (PORTUGAL), PROGRAM WITH NATIONAL SCIENCE FOUNDATION (USA), PROJ 276/2016, 2017-2018  
*Large-scale analysis of social network data for detecting drug-interaction via population behavior*  
PI with co-PI Johan Bollen, IU, \$30K.

COMPLEX SYSTEMS & HEALTH PROJECT DEVELOPMENT TEAM, INDIANA CLINICAL TRANSLATIONAL SCIENCES INSTITUTE (ICTSI) NIH/NCRR UL1TR001108. AUG. 2016/ FEB. 2018 *Sudden Unexpected Death in Epilepsy: Identifying Risk Factors with Social Media Mining.*  
PI with Wendy Renee Miller. 15K\$

FULBRIGHT U.S. SCHOLAR GRANT, J. WILLIAM FULBRIGHT FOREIGN SCHOLARSHIP BOARD (FFSB) . 2016-2017  
*Fellowship*  
PI, \$12K.

PERSISTENT SYSTEMS, LTD., 2014-2017  
*Large-Scale Text and Social Data Analytics for Health*  
PI, \$70K.

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 co-PI with Johan Bollen \$671K).

INDIANA UNIVERSITY COLLABORATIVE RESEARCH GRANTS FUND (IUCRG), 2013-2014  
*Social SLAM: Creating Dynamical Socio-Environmental Models for Mobile Robots.*  
with Co-PI Selma Sabanovic, \$70K.

CAREERBUILDER.COM, 2013-2014  
*Recommendation Systems for Job Applications.*  
PI, \$50K.



FUNDAÇÃO LUSO-AMERICANA PARA O DESENVOLVIMENTO (PORTUGAL) AND NATIONAL SCIENCE FOUNDATION (USA), 2012-2014, PROJ. FLAD/NSF (171/2011)

*Network Mining For Gene Regulation And Biochemical Signaling.*

Co-PI with Predrag Radivojac, 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*

PI, Instituto Gulbenkian de Ciencia and Universidade do Minho, 148,000 €.

FUNDAÇÃO PARA A CIÊNCIA E TECNOLOGIA, FCT/SFRH/BCC/33823, 2009-2010

*Complex Systems methods for computational biology*

PI, Instituto Gulbenkian de Ciencia , 32,000 €.

CAMERA MUNICIPAL DE OEIRAS, BOLSAS CIENTÍFICAS DE OEIRAS -PROFESSOR ANTÓNIO XAVIER 2009-2010

*Automata models of complex biochemical networks*

PI, Instituto Gulbenkian de Ciencia , 36,000 €.

NATIONAL SCIENCE FOUNDATION, IGERT, 2009-2013

*The Dynamics of Brain-Body-Environment Systems in Behavior and Cognition*

Faculty in training program. PI Randall Beer.

SIEMENS ACADEMIC/FCT/ FLAD/GULBENKIAN FOUNDATION. 2004-2012.

*Director, Computational Biology Phd Program and Collaboratorium*

Yearly Budget aprox. 1,300K € (<http://bc.igc.gulbenkian.pt/>)

NATIONAL SCIENCE FOUNDATION, HUMAN AND SOCIAL DYNAMICS PROGRAM, OCTOBER 2005/SEPTEMBER 2008

*DHB: Dynamics of Information Flow and Decisions in Social Networks*

co-PI 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 co-PI of this larger project, to discover protein functions associated with known protein structures. Responsible for a budget of 309K\$

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 as PI to develop the next generation of recommendation systems for distributed information systems.

Budget 2,100K\$,. (<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 as PI to investigate the metric behavior of distance functions on document graphs as a predictor and identifier of semantic relationships. Budget 315K\$ (<http://informatics.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 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 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. Co-PI of a team of 8 researchers. Budget 1,000K\$ (<http://www.c3.lanl.gov/~joslyn/xerox>)

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

*Agent-based modeling of socio-technical organizations*

Funded as co-PI in the Los Alamos National Laboratory component of a multi-institution project. Budget 600K\$ (<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

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COMPLEX NETWORKS: FROM SOCIO-ECONOMIC SYSTEMS TO BIOLOGY AND BRAIN, Lipari Workshop and Summer School, Lipari, Italy, July 12-18, 2022

*Invited Speaker:* “Actionable models of control in complex systems for the biomedical domain.”

SCUOLA INTERNAZIONALE SUPERIORE DI STUDI AVANZATI, THE PHD PROGRAMME IN PHYSICS AND CHEMISTRY OF BIOLOGICAL SYSTEMS, July 28<sup>th</sup> 2021, Trieste, Italy.

*Colloquium Speaker:* “Redundancy in the Structure and Dynamics of Complex Systems.”

INTERNATIONAL CONFERENCE ON ROBOT ETHICS AND STANDARDS SERIES, DATA ANALYTICS, A TOOL FOR DEVELOPMENT: TECHNICAL, ETHICAL, AND LEGAL COMPLEXITIES SESSION. Troy, New York , July 26-27, 2021.

*Invited Speaker:* “Bias as a limitation of modeling the World.”

INSTITUTO GULBENKIAN DE CIENCIA, April 20<sup>th</sup> 2021, Oeiras, Portugal

*Colloquium Speaker:* “Redundancy in the Structure and Dynamics of Biomedical Complexity.”

GENDER BIAS IN ARTIFICIAL INTELLIGENCE AND HEALTH: BUILDING A FUTURE FOR EQUALITY, Barcelona Supercomputing Center, Spain, April 14, 2021

*Invited Speaker:* “Sex and Gender perspective in the future of Personalized Medicine.”

NERCCS 2021: 4<sup>TH</sup> NORTHEAST REGIONAL CONFERENCE ON COMPLEX SYSTEMS, Online, March 31-April 2, 2021

*Keynote Speaker:* “Redundancy in Structure and Dynamics of Complex Systems.”

COMPLEX NETWORKS 2020, Madrid, Spain, December 1-3, 2020

*Program Chair, session Chair*

5TH EUROPEAN CONFERENCE ON TRANSLATIONAL BIOINFORMATICS: BIOMEDICAL BIG DATA SUPPORTING PRECISION MEDICINE, Spanish National Cancer Research Center, Madrid, Spain, November 30<sup>th</sup>-December 1<sup>st</sup>, 2020

*Keynote Speaker*

CISE NRT WRITING A WINNING PROPOSAL WORKSHOP, National Science Foundation, USA. September 18<sup>th</sup> 2020

*Invited Speaker* “Writing an Interdisciplinary Training Grant with Systems Thinking.”

ARTIFICIAL INTELLIGENCE TALK SERIES, Indiana University, Bloomington, USA. July 14<sup>th</sup> 2020

*Invited Speaker* “Actionable Models of Control in Complex Systems for the Biomedical Domain.”

DEPARTMENT OF SYSTEMS SCIENCE AND INDUSTRIAL ENGINEERING, Binghamton University, Binghamton, New York, February 3<sup>rd</sup>, 2020

*Colloquium Speaker*: “Complex Systems Science Modeling in the XXI Century.”

ARTIFICIAL INTELLIGENCE, HPC AND BIOMEDICINE: IMPLICIT BIASES, SCIENTIFIC, TECHNICAL AND ETHICAL CHALLENGES, Barcelona Supercomputing Center, Spain, January 22-24, 2020

*Keynote Speaker*: “Actionable models of control in complex systems for the biomedical domain.”

COMPLEX NETWORKS 2019, Lisbon, Portugal., December 10-12, 2019

*General Chair, session Chair and Opening Speaker*

DATA AND NETWORK SCIENCE FOR SOCIAL GOOD, COMPLEX NETWORKS SATELLITE 2019, Carcavelos, Portugal, December 9, 2019

*Keynote Speaker*: “Towards understanding biosocial complexity of human health with actionable models”

INSTITUTO GULBENKIAN DE CIENCIA, December 3<sup>rd</sup> 2019, Oeiras, Portugal

*Colloquium Speaker*: “Actionable models of control in complex biochemical systems.”

1<sup>ST</sup> WORKSHOP ON MODELING COMPLEX SYSTEMS. Post-graduate program in complex systems modeling (PPG-SCX), University of São Paulo, Brasil, October 21-25, 2019.

*Distinguished Lecture Series Speaker*: “Interdisciplinarity, Data Science and Complex Systems.”

CONFERENCE ON COMPLEX SYSTEMS 2019, Singapore, September 30 - October 4 2019

*Session Chair and Speaker*: “Biological & Biomedical Complexity”

SCHRÉDER HYPERION INAUGURATION CEREMONY, Nova School of Business and Economics (Nova SBE), Carcavelos, Portugal September 12<sup>th</sup>, 2019.

*Invited Speaker*: “Smart cities ecosystem in a changing environment”

JOINT SORBONNE UNIVERSITÉ AND INDIANA UNIVERSITY SYMPOSIUM ON A.I. (SUIUAI19), Sorbonne Université, Paris, Campus Pierre et Marie Curie, June 24- 26, 2019

*Invited Speaker*: “Towards understanding biosocial complexity of human health with network and data science”

HOW SYSTEMS LEARN, CHANGE, AND SELF-ORGANIZE: INSIGHTS FROM NETWORK SCIENCE WORKSHOP, Indiana University, Bloomington, Indiana, USA May 17-18.

*Invited Speaker*: “Redundancy in Complex Brain Networks”

COMPLEX SYSTEMS @ PURDUE, Purdue University, West Lafayette, Indiana, USA May 13-16, 2019

*Invited Speaker*: “Representation and measurement of complex systems”

NOVA SCHOOL OF BUSINESS AND ECONOMICS EXECUTIVE EDUCATION, Carcavelos, Portugal, March 7<sup>th</sup>, 2019

*Panel Speaker*: “AI, Society and Organizations.”

CHARTING INTERDISCIPLINARY RESEARCH OPPORTUNITIES BETWEEN DATA AND LIFE SCIENCES, Instituto Gulbenkian de Ciencia, March 6-7<sup>th</sup> Oeiras, Portugal.

*Invited Speaker*: “Exploring Redundancy in Biochemical Networks”.

COMPLEX NETWORKS 2018, Cambridge, U.K., December 13, 2018

*Program Chair and Panel Speaker*: “Multiomic Social and Biomedical Complexity.”

INDIANA UNIVERSITY COMPLEX NETWORKS & SYSTEMS NSF-NRT COLLOQUIUM SERIES, Bloomington, IN, November 28<sup>th</sup>, 2018

*Colloquium Speaker*: “Redundancy in Social Contact Networks for Epidemic Spread Models and in the Control of Biochemical Regulation.”

UNIVERSIDAD NACIONAL DEL SUR, Bahia Blanca, Argentina, November 20-22, 2018

*Lecture Series Speaker*: “Complex Systems from Cybernetics to Network Science: Modeling Multilevel Human Complexity.”

NOVA SCHOOL OF BUSINESS AND ECONOMICS, Carcavelos, Portugal, October 24, 2018

*Colloquium Speaker*: “Complex Networks and Systems: using data-driven and interdisciplinary nonlinear thinking for decision making.”  
 INSTITUTO GULBENKIAN DE CIENCIA, October 23<sup>rd</sup> 2018, Oeiras, Portugal  
*Colloquium Speaker*: “Redundancy In Social Contact Networks for Epidemic Spread Models and in the Control of Biochemical Regulation”  
 INSTITUTO DE SISTEMAS E ROBOTICA, INSTITUTO SUPERIOR TECNICO, Lisbon, Portugal, July 4, 2018  
*Colloquium Speaker*: “Redundancy in the Structure and Dynamics of Complex Networks.”  
 NOVA SCHOOL OF BUSINESS AND ECONOMICS, Lisbon, Portugal, June 28, 2018  
*Colloquium Speaker*: “Towards understanding biosocial complexity in human health with network & data science.”  
 FRONTIÈRES DU VIVANT PHD PROGRAM SORBONNE PARIS UNIVERSITY RETREAT, Sesimbra, Portugal, June 23, 2018  
*Keynote Speaker*: “Towards understanding biosocial complexity in human health: from biochemical control to social factors in DDI and reproduction.”  
 NETWORK MEDICINE (NETMED18): PERSONALIZED MEDICINE IN THE ERA OF BIG DATA. NETSCI 2018 Satellite symposium. Paris, France. June 11, 2018.  
*Keynote Speaker*: “Towards understanding biosocial complexity in human health: from control of biochemical regulation of disease to social factors in drug-interaction and human reproduction”.  
 FUNDAÇÃO CHAMPALIMAUD, April 19<sup>th</sup> 2018, Lisboa, Portugal  
*Clinical Seminar Speaker*: “Towards understanding the multi-level complexity of human health: from control of biochemical regulation of disease to social factors in drug-interaction.”  
 INTELLIGENT & INTERACTIVE SYSTEMS TALK SERIES, Indiana University, Bloomington, USA. February 12<sup>th</sup> 2018  
*Invited Speaker*: “Towards understanding the multi-level complexity of human health: from drug-interaction to human reproduction cycles”.  
 2ND WEEK OF COMPLEXITY SCIENCES, Centro de Ciencias de la Complejidad C3, Universidad Nacional Autonoma de México, Mexico City, Mexico, January 31<sup>st</sup> - February 2<sup>nd</sup> 2018  
*Keynote Speaker*: “Towards understanding the multi-level complexity of human health: from drug-interaction to human reproduction cycles”.  
 COMPLEX NETWORKS 2017, THE 6TH INTERNATIONAL WORKSHOP ON COMPLEX NETWORKS AND THEIR APPLICATIONS, Lyon, France, November 29 - December 01 2017  
*Session Chair*: “Resilience, Control & Synchronisation”  
 INSTITUTO GULBENKIAN DE CIENCIA, October 31<sup>st</sup> 2017, Oeiras, Portugal  
*Colloquium Speaker*: “City-wide and social media analysis of drug-drug-interactions: towards understanding the multi-level complexity of human health”  
 JARDINS DE VERÃO, FUNDAÇÃO GULBENKIAN, Lisbon, Portugal, July 15, 2017  
*Keynote Speaker*: “From social networks to biological behaviours”.  
 CONTROLLING COMPLEX SYSTEMS. NETSCI2017 SATELLITE. Indianapolis, Indiana. June 19-20, 2017  
*Invited Speaker*: “Canalization in the dynamics of complex networks drives dynamics, criticality and control”.  
 INSTITUTO DE SISTEMAS E ROBOTICA, INSTITUTO SUPERIOR TECNICO, Lisbon, Portugal, February 22, 2017  
*Colloquium Speaker*: “Structure and Dynamics of Complex Systems: from social media mining to control of biochemical networks”  
 EMERGING ACTIVITY. RELATING THINGS. Hermann von Helmholtz-Zentrum für Kulturtechnik, Humboldt-Universität zu Berlin, February 17, 2017  
*Keynote Speaker*: “Material Turing Machines: The Active and Passive Modes of Information in Life and Collective Intelligence”.  
 ANTECIPAR O FUTURO : 10 TECNOLOGIAS QUE PODEM MUDAR AS NOSSAS VIDAS , PUBLIC DEBATE SPONSORED BY THE EU COMMISSIONER FOR RESEARCH, SCIENCE AND INNOVATION , Universidade de Lisboa, Lisbon January 6<sup>th</sup>, 2017.  
*Discussant*: “The impact of automation and online technologies in society.”  
 MATHEMATICS OF COMPLEX SYSTEMS: FROM PRECISION MEDICINE TO SMART CITIES. COLLABORATORY FOR EMERGING TECHNOLOGIES UT AUSTIN | PORTUGAL PROGRAM, December 5-6, Coimbra, Portugal, 2016  
*Plenary Speaker*: “Structure and Dynamics of Complex Systems: from social media mining to control of biochemical networks”  
 COMPLEX NETWORKS 2016, THE 5TH INTERNATIONAL WORKSHOP ON COMPLEX NETWORKS AND THEIR APPLICATIONS, Milan, Italy, November 30 - December 02 2016  
*Session Chair*: “Resilience, Control & Synchronisation”  
 ISI FOUNDATION, INSTITUTE FOR SCIENTIFIC INTERCHANGE, Turin, Italy, November 29<sup>th</sup>, 2016

*Colloquium Speaker:* “Social media mining for public health monitoring in precision medicine.”  
 THE 6<sup>TH</sup> TRANSLATIONAL BIOINFORMATICS CONFERENCE (TCB 2016), OCTOBER 15-17, 2016, JEJU ISLAND, KOREA

*Highlight Speaker:* “Public health monitoring of drug interactions, patient cohorts, and behavioral outcomes via network analysis of Instagram and Twitter user timelines .”

À CONVERSA COM CIENTISTAS, OPEN DAY AT INSTITUTO GULBENKIAN DE CIENCIA, Oct. 1st, 2016, Oeiras, Portugal

*Public Debate and Q&A:* “The Science of Behavior: from the Biology to Social Networks”  
 INSTITUTO GULBENKIAN DE CIENCIA, September 13<sup>th</sup> 2016, Oeiras, Portugal

*Colloquium Speaker:* “The effective structure of complex networks drives dynamics, criticality and control ”  
 INTERDISCIPLINARITY, NETWORKS, DATA AND COMPLEX SYSTEMS: PROMISE AND CHALLENGES. SPECIAL SESSION AT CIÊNCIA 2016: ENCONTRO COM A CIÊNCIA E TECNOLOGIA EM PORTUGAL, JULY 4-6, LISBON, PORTUGAL.

*Chair and Invited Speaker:* “The challenge and promise of a two-dimensional science.”  
 2016 SUMMER SOLSTICE: 8TH INTERNATIONAL CONFERENCE ON DISCRETE MODELS OF COMPLEX SYSTEMS, Aveiro Portugal, June 20-22, 2016

*Invited Speaker:* “Redundancy and control in complex networks.”  
 CONTROL AND OBSERVABILITY OF NETWORK DYNAMICS, MATHEMATICAL BIOSCIENCES INSTITUTE WORKSHOP, APRIL 11-15, 2016, COLUMBUS, OH.

*Invited Speaker:* “Redundancy and control in complex networks.”  
 FUNDAÇÃO CHAMPALIMAUD, March 3<sup>rd</sup> 2016, Lisboa, Portugal

*Clinical Seminar Speaker:* “Social Media Mining for Precision Medicine.”  
 INFERENCE ON NETWORKS: ALGORITHMS, PHASE TRANSITIONS, NEW MODELS AND NEW DATA, SANTA FE INSTITUTE WORKSHOP DECEMBER 14-18, 2015, SANTA FE, NM.

*Invited Speaker:* “Redundancy and control in complex networks.”  
 TRANSLATIONAL BIOINFORMATICS CONFERENCE (TCB 2015), NOVEMBER 7-9<sup>TH</sup>, TOKYO, JAPAN

*Highlight Speaker:* “Extraction of pharmacokinetic evidence of drug Interactions in literature and social media.”  
 UNIVERSITY OF TOKYO, COMPUTER SCIENCE DEPARTMENT COLLOQUIUM, NOVEMBER 6<sup>TH</sup> 2015, TOKYO, JAPAN

*Invited Speaker:* “Genes, Computers, and Collective Behavior.”  
 FUNDAÇÃO CHAMPALIMAUD, July 9<sup>th</sup> 2015, Lisboa, Portugal

*Seminar Speaker:* “Structure and Dynamics on Networks: from fact-checking to biochemical control.”  
 INSTITUTO GULBENKIAN DE CIENCIA, July 7<sup>th</sup> 2015, Oeiras, Portugal

*Colloquium Speaker:* “Network Science Delivers: from fact-checking to understanding biochemical control and collective behavior in human pathology.”  
 12TH ANNUAL NATIONAL ACADEMIES KECK FUTURES INITIATIVE (NAKFI) CONFERENCE: COLLECTIVE BEHAVIOR: FROM CELLS TO SOCIETIES, IRVINE, CALIFORNIA, NOVEMBER 12-15, 2014

*Invited Participant*  
 FUNDAÇÃO CHAMPALIMAUD, DELIBERATION CONFERENCE , October 25<sup>th</sup> 2014, Lisboa, Portugal

*Plenary Speaker:* “Collective decision in the global brain: science and policy”  
 FUNDAÇÃO CHAMPALIMAUD, October 21<sup>st</sup> 2014, Lisboa, Portugal

*Colloquium Speaker:* “Collective behavior and control of network dynamics.”  
 NETWORKS AND COMPLEX SYSTEMS TALK SERIES, INDIANA UNIVERSITY, October 13<sup>th</sup>, 2014, Bloomington, IN, USA

*Invited Speaker:* “Redundancy, control and collective computation in network dynamics.”  
 EUROPEAN CONFERENCE ON COMPLEX SYSTEMS 2014, DYNAMICS ON AND OF COMPLEX NETWORKS VII WORKSHOP September 24<sup>th</sup>, 2014, Lucca, Italy

*Invited Speaker:* “Redundancy, control and collective computation in network dynamics.”  
 ALIFE 14: THE 14TH INTERNATIONAL CONFERENCE ON THE SYNTHESIS & SIMULATION OF LIVING SYSTEMS, July 30<sup>th</sup> - August 2<sup>nd</sup>, 2014, New York City, USA.

*Best paper award committee chair and Boolean and Neural Network session chair*  
 INSTITUTO GULBENKIAN DE CIENCIA, July 17<sup>th</sup> 2014, Oeiras, Portugal

*Colloquium Speaker:* “Collective behavior on networks: models and big data analysis.”  
 FUNDAÇÃO CALOUSTE GULBENKIAN, LISBON, OCTOBER 5<sup>TH</sup>, 2013

*Art/Science installation:* “Musical Morphogenesis.”  
 GREENFEST, BANCO SANTANDER TOTTA WORKSHOP ON COOPERATIVE NETWORKS, Estoril, Portugal Oct. 3<sup>rd</sup> 2013

*Keynote Speaker:* “Um passeio no Jardim de caminhos que se bifurcam: Informação, Controlo, Cooperação e Redundância na Inteligência Colectiva.”  
 INSTITUTO GULBENKIAN DE CIENCIA, 2 July 2013, Oeiras, Portugal

*Colloquium Speaker:* “Genes, Computers, and Collective Behavior: A personal tour on the garden of forking paths.”

INTERNATIONAL CONFERENCE ON EVOLUTIONARY PATTERNS: HORIZONTAL AND VERTICAL TRANSMISSION AND MICRO- AND MACRO-EVOLUTIONARY PATTERNS OF BIOLOGICAL AND SOCIOCULTURAL EVOLUTION, May 27th-29th, 2013, Lisbon, Portugal

*Invited Speaker:* “The Evolutionary Biosemiotics of Turing’s Tape.”

IMMUNOCOMPLEXIT NETWORK: UNDERSTANDING THE COMPLEXITY OF THE IMMUNE SYSTEM, INSTITUT DES SYSTÈMES COMPLEXES PARIS (ISC-PIF), April 8-9, 2013, Paris, France

*Invited Speaker:* “Turing’s Tape and Immunocomplexity.”

THE GULBENKIAN ALAN TURING CENTENARY SYMPOSIUM, December 11, 2012, Lisbon, Portugal

*Invited Speaker:* “Turing’s Tape and the Cybernetics of Biocomplexity.”

INSTITUTO GULBENKIAN DE CIENCIA, 31 July 2012, Oeiras, Portugal

*Colloquium Speaker:* “Semi-metric topology and collective computation in complex networks.”

AALTO COMPLEX NETWORKS FACTORY, AALTO UNIVERSITY, June 4–8, 2012, Finland,

*Invited Speaker and session chair:* “Semi-metric topology and collective computation in complex networks.”

TURING SYMPOSIUM: A CELEBRATION OF ALAN TURING'S CENTENARY, INDIANA UNIVERSITY, May 8, 2012

*Invited Speaker:* “Turing’s Tape and the Cybernetics of Biocomplexity.”

AMS SECTIONAL MEETING, SESSION ON DISCRETE METHODS AND MODELS IN BIOMATHEMATICS, 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 10<sup>th</sup>, 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, 10<sup>th</sup>, 2004.  
*Invited Speaker:* "Proximity Networks and Fuzzy Graphs"

INSTITUTO GULBENKIAN DE CIENCIA, Lisbon, Portugal. December, 22<sup>nd</sup> 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 8<sup>th</sup>, 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 16<sup>th</sup>, 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/](http://www.itee.uq.edu.au/~complexity/CEC_Special_Session/)

OEIRAS MATHEMATICAL AND COMPUTATIONAL BIOLOGY WORKSHOP, Oeiras, Portugal, June 20<sup>th</sup> 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*

PRINCIPIA CYBERNETICA CONFERENCE, Free University of Brussels, Brussels, June 1991.

*Invited Speaker*

## SCHOLARSHIPS, AWARDS, AND MEDIA COVERAGE

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COVERAGE OF OUR PNAS PAPER AND COVER "The effective graph reveals redundancy, canalization, and control pathways in biochemical regulation and signaling": March 16th, 2021. Press Release: "Uncovering the 'master switches' of biochemical networks can explain the effects of drugs in the destruction of cancer cells'. Publico, Sabado, Jornal Economico, Sol, Expresso, etc.

BINGHAMTON NEWS: " Binghamton University. Named Professorship At Watson College Honors Systems Science Pioneer: Luis Rocha, PhD '97, to start next fall as first George Klir Professor in Systems Science". October 23, 2020.

COVERAGE OF OUR PAPER "City-wide Analysis of Electronic Health Records Reveals Gender and Age Biases in the Administration of Known Drug-Drug Interactions." August-November, 2019.

Paper was covered widely, especially in portuguese-speaking media: Globo News, Futurity, Lusa Agency, Observador, TSF, Medical X Press, Diario de Noticias, SIC Noticias, Medical News, Noticias ao Minuto, Sapo, Newswire, SOL, etc.

INDIANAPOLIS BUSINESS JOURNAL: MAY 31, 2019. "Universities focus on training students in AI (Innovation Issue)"

SCHOOL OF INFORMATICS, COMPUTING, AND ENGINEERING RESEARCH AWARD, APRIL 2019. In recognition of the NSF Research Traineeship (NRT) and NIH NLM Awards.

REUTERS: DECEMBER 21, 2018. "More Google Searches for Sexual Harassment Facts since #MeToo."

VICE NEWS: DECEMBER 20, 2018. "Broadly: Why Do the Holidays Make Us So Horny?"

PUBLICO: DECEMBER 16, 2018. "Pesquisas por pornografia aumentam no Natal. Há uma alegria no ar"

EUREKALERT, NEWSWISE: OCTOBER 17-19, 2018. "NIH awards \$1.55 million to Indiana University to improve chronic-disease management." [https://www.eurekalert.org/pub\\_releases/2018-10/iu-na101818.php](https://www.eurekalert.org/pub_releases/2018-10/iu-na101818.php)

COMPLEX SYSTEMS SOCIETY COUNCIL, 2018-Present  
Elected member of the society's governing council.

RADIODIFUSÃO PORTUGUESA (RDP): APRIL 18, 2018. ANTENA ABERTA: "Inteligência Artificial. Prof. Luis Rocha talks about Artificial Intelligence."

VIRAL COVERAGE OF OUR PAPER "HUMAN SEXUAL CYCLES ARE DRIVEN BY CULTURE AND MATCH COLLECTIVE MOODS." December 21-30, 2017

Paper was covered around the globe in many venues such as The Independent, Time, Publico, Health, Gizmodo, ScienceDaily, Phys.org, The National Post, DailyMail, The Hindustan Times, Men's Fitness, Mother Jones, IndyStar, The Times, ArsTechnica, Newsweek, The Sun, Drive with Yasmeen Khan, etc. Discussion of the paper was a top trending topic on Reddit. <https://www.altmetric.com/details/30751199/news>

COMPLEX NETWORKS 2017, THE 6TH INTERNATIONAL WORKSHOP ON COMPLEX NETWORKS AND THEIR APPLICATIONS, Lyon, France, November 29 - December 01 2017  
Special Recognition Award for Service to the Conference

INDIANA BUSINESS INSIDER, IU NEWS, AUGUST 23, 2017. "NSF awards IU \$3 million to train researchers 'fluent' in complex networks and data." Reported by. <http://bit.ly/2vtpN7q>, <http://bit.ly/2vtpkSV>.

FULBRIGHT SCHOLAR 2016-2017: INFORMATION SCIENCES/ SYSTEMS SCIENCE AND THEORY. The J. William Fulbright Foreign Scholarship Board, Washington, D.C.

COMPLEX NETWORKS 2016, THE 5TH INTERNATIONAL WORKSHOP ON COMPLEX NETWORKS AND THEIR APPLICATIONS, Milan, Italy, November 30 - December 02 2016

Special Mention Award for Service to Community

TOP 30 PAPER (PMC4720984) IN TRANSLATIONAL BIOINFORMATICS. RUSS ALTMAN 2016 YEAR IN REVIEW.

<http://bit.ly/1VhtgAP>

PR NEWSWIRE. OCTOBER 3, 2016. "Social Media is a Promising New Frontier for Insights Into Large-scale Medical and Treatment Patterns". <http://prn.to/2eYETuh> and <http://youtu.be/jygmNKYqHXI>

NATURE **522**, 395 (25 JUNE 2015) DOI:10.1038/522395F: "Computer fact-checker and news reader grab attention online." <http://bit.ly/1HRQv9p>

PÚBLICO, PORTUGAL, JUNE 26, 2015: "Quando o computador consegue distinguir a verdade da mentira."

<http://bit.ly/1HRQUZr> .

WIRED, JUNE 18, 2015: "Robot fact-checkers will soon be able to verify the web." <http://bit.ly/1HRRmqK>.

COMPUTATIONAL FACT-CHECKING, JUNE 2015: various news pieces at ACM Tech news, Deutschlandfunk, GCN, Pacific Standard, Phys.org, Scientific Computing, Gizmodo, Big Think, etc.

INDIANA UNIVERSITY, SCHOOL OF INFORMATICS & COMPUTING, April 2015

*Trustees Award for Teaching Excellence Award 2015*

NOVA , ITALY, FEBRUARY 1, 2015: "Il vero e il falso tweet." <http://bit.ly/1BY2O0n>

EUROSCIENTIST, JANUARY 28, 2015: "When Real Science Falls Short In Hollywood." <http://bit.ly/1BY4Qh1>

NAUTILUS , USA, APRIL 16, 2014: "Scientists Create Cybernetic Links Between People—by DJing"

<http://bit.ly/1shkl3U> .

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PÚBLICO, PORTUGAL, DECEMBER 27, 2012: "O cérebro é uma máquina de Turing? E os computadores ficarão inteligentes?" <http://bit.ly/ZJVB1d> .

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/](http://www.repubblica.it/tecnologia/2011/12/23/news/italia_felicit_facebook-27084219/)

BEST PAPER AWARD OF THE *PROGRAMME COMMITTEE OF THE 9<sup>TH</sup> 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 6<sup>TH</sup>: Interview: "Somos todos Cyborgs."

<http://aeiou.visao.pt/somos-todos-cyborgs=f554308>

RTP2, BAIRRO ALTO, PORTUGAL ON JANUARY 26<sup>TH</sup>, 2010: Long interview to major Portuguese TV network.

[http://www.youtube.com/watch?v=iZ8D\\_NzFpJw](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](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.aciou.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 22<sup>th</sup>, 2008.

<http://parentheses.atelier.fr/recherche/article/spams-et-bacteries-meme-combat>

TECNOMANIA, SPAIN: "Podemos hacer software que nazca a la vida?", August 12<sup>th</sup>, 2008.

<http://www.tecnomania.com/?p=1065>

CIÊNCIA HOJE, PORTUGAL: "Cientistas portuguesas criaram «aspirador» de lixo electrónico", August 11<sup>th</sup>, 2008.

<http://www.cienciahoje.pt/index.php?oid=27058&op=all>

PORTUGUESE PRESS on August 7<sup>th</sup>, 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 6<sup>th</sup>, 2008.

<http://www.siliconrepublic.com/news/article/11162/randd/>

THE DAILY TELEGRAPH, U.K.: "Can we make software that comes to life?", August 5<sup>th</sup>, 2008.

<http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/08/05/scicomputers.xml>

OTHER INTERNATIONAL PRESS on August 5-6<sup>th</sup>, 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, *Radiotelevisão 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](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](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*

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 INVESTIGAÇÃO 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

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DATA SCIENCE KNOWLEDGE CENTER, NOVA SCHOOL OF BUSINESS AND ECONOMICS, PORTUGAL  
*Visiting Professor, May 2019-Present*

CENTER FOR THEORETICAL PHYSICS, CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS), AIX-MARSEILLE UNIVERSITY, FRANCE  
*Visiting Professor, June 2017-2019*  
Collaboration in Complex Networks, Epidemic Models and Data Science with Dr. Alain Barrat.

FUNDAÇÃO CHAMPALIMAUD, LISBON, PORTUGAL  
*Visiting Professor, June 2016-2018*  
To collaborate in Neuroscience and Clinical Sciences

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, 1996-2004*

*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.

*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.

STAFFORDSHIRE UNIVERSITY, M.SC. PROGRAM IN COMPITER INTEGRATED MANUFACTURING, STAFFORD, U.K.

*Erasmus Exchange Student, January-June 1989*

## SHORT DEGREES

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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.*