

Luis M. Rocha

Professor

Luddy School of Informatics, Computing & Engineering

Indiana University, Bloomington,

919 East 10th Street, Bloomington, IN 47408

Phone (812) 856-1832, Fax (812) 855-0600

E-Mail: rocha@indiana.edu

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

A. Professional Preparation

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|--|------------------------|---------|------|
| Instituto Superior Técnico, Lisbon, Portugal | Mechanical Engineering | B.S. | 1988 |
| Instituto Superior Técnico, Lisbon, Portugal | Systems Engineering | M.S. | 1990 |
| State University of New York, Binghamton | Systems Science | Ph.D. | 1997 |
| Los Alamos National Laboratory, NM, USA | Complex Systems | PostDoc | 1998 |

B. Appointments

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| 2019-Present | <u>Visiting Professor</u> , NOVA School of Business and Economics, Portugal |
| 2018-Present | <u>Advisory Council Member</u> Indiana University Network Science Institute |
| 2017-Present | <u>Director</u> NSF-NRT Interdisciplinary Training Program in Complex Networks and Systems |
| 2017-Present | <u>Visiting Professor</u> , Center for Theoretical Physics, Aix-Marseille University, France |
| 2016-2018 | <u>Visiting Professor</u> , Neuroscience & Clinical Sciences, Fundação Champalimaud, Portugal |
| 2013-Present | <u>Professor</u> , School of Informatics, Computing & Engineering, Indiana University |
| 2008-Present | <u>Director</u> , Complex Networks & Systems track, Informatics PhD Program, Indiana University |
| 2002-Present | <u>Principal Investigator</u> , Instituto Gulbenkian de Ciencia, Portugal |
| 2005-2015 | <u>Director</u> , Computational Biology Collaboratorium, and co-director of Ph.D Program in Computational Biology, Instituto Gulbenkian de Ciencia, Portugal |
| 2004-2013 | <u>Associate Professor</u> , School of Informatics & Computing, Indiana University |
| 1998-2002 | <u>Team Leader</u> of the Complex Systems Modeling Team, Los Alamos National Laboratory |
| 1999-2004 | <u>Technical Staff Member</u> , Los Alamos National Laboratory |
| 1995-1997 | <u>Adjunct Professor</u> , State University of New York, Binghamton, Dep. of Systems Science |
| 1990-1991 | <u>Graduate Research Assistant</u> , Laboratorio Nacional de Engenharia Civil, Portugal |

C. Publications

Most related to proposed project

1. R.B. Correia, L.P. de Araújo, M.M. Mattos, L.M. Rocha [2019]. City-wide Analysis of Electronic Health Records Reveals Gender and Age Biases in the Administration of Known Drug-Drug Interactions. *NPJ Digital Medicine*. In Press. *ArXiv:1803.03571*.
2. I. B. Wood, P.L. Varela, J. Bollen, L.M. Rocha, and M.J. Sá [2017] "Human Sexual Behavior is driven by culture and collective moods." *Scientific reports* **7** (1): 17973. PMC5740080.
3. A. Gates, A. and L.M. Rocha [2016]. "Control of complex networks requires both structure and dynamics". *Scientific Reports*. **6**, 24456. PMC4834509.
4. A. Kolchinsky, A. Gates and L.M. Rocha. [2015] "Modularity and the spread of perturbations in complex dynamical systems." *Phys. Rev. E Rapid Communications*. **92**, 060801(R).
5. C. Joslyn and L.M Rocha [2000]. "Towards semiotic agent-based models of socio-technical organizations." *Proc. AI, Simulation & Planning High in Autonomy Systems* (AIS 2000), Tucson, Arizona.

Other relevant and significant publications

1. Correia, R.B., A. Gates, X. Wang, L.M. Rocha [2018]. "CANA: A python package for quantifying control and canalization in Boolean Networks." *Frontiers in Physiology: Systems Biology*. **9**: 1046.
2. R.B. Correia, L. Li, L.M. Rocha [2016]. "Monitoring potential drug interactions and reactions via network analysis of Instagram user timeliness". *Pac. Symp. Biocomp*. **21**:492-503.
3. G.L.Ciampaglia, P.Shiralkar, L.M.Rocha, J. Bollen, F. Menczer, A. Flammini [2015]. "Computational fact checking from knowledge networks." *PloS ONE*. **10**(6):e0128193.

4. T. Simas and L.M. Rocha [2015]. "Distance Closures on Complex Networks." *Network Science* **3**(2):227-268.
5. M. Marques-Pita and L.M.Rocha [2013]. "Canalization and control in automata networks: body segmentation in *Drosophila melanogaster*." *PLOS One*, **8**(3): e55946. PMC3592869.

D. Synergistic activities

1. Commitment to interdisciplinary graduate training: Director and PI of NSF-NRT: *Interdisciplinary Training in Complex Networks and Systems* at Indiana University. Large training grant whereby trainees enroll in a dual-major PhD program in Complex Networks and Systems and an empirical domain such as biology, ecology, neuroscience, economics, cognitive science, sociology, etc. We plan to involve students from this training grant in the proposed research, as well as extend its training activities to graduate and undergraduate students and faculty in all participating institutions. Training Faculty: NSF IGERT on "The Dynamics of Brain-Body-Environment Systems in Behavior and Cognition." Director of Complex Systems PhD track (2008-present), Indiana University. Director of interdisciplinary FLAD Computational Biology Collaboratorium and direction of associated PhD Program in Computational Biology at the Instituto Gulbenkian de Ciencia in Portugal.
2. Involvement and Commitment to Network Science and Complex Adaptive Systems: Formed the *Complex Systems Modeling Team* at the Los Alamos National Laboratory (1999-2004), member of the *Santa Fe Institute* research community (1996-2004), member of *the Center for Complex Networks and Systems*, Indiana University (2006-2019), member of the advisory council of the *Indiana University Network Science Institute* (2018- Present), member of the advisory council of the *Complex Systems Society* (2018-Present), co-director *Center for Social and Biomedical Complexity*, Indiana University (2019-present), program and general chair of *Complex Networks* 2018 and 2019, respectively. Chaired the *Artificial Life X* conference and member of the organizing committees of RECOMB 2010 and ECAL07, and several other conferences and workshops in the field. In program committees of key conferences in field such as *Complex Networks* 2015-2019 and *Conference on Complex Systems* 2016-2019. In review committees of major centers such as the *Center for the Study of Complex Systems* (CSCS) at the University of Michigan and the *Biocomputational Evolution in Action CONsortium* (BEACON) NSF Science & Technology Center at Michigan State University.
3. Teaching excellence: Trustees Award for Teaching Excellence 2006 and 2015. School of Informatics & Computing, Indiana University. Course Development: "Biologically-inspired computing" (Undergraduate 2005-15, Graduate, 2005-12), "Advanced Complex Systems Seminar" (Graduate, 2012-16), Introduction to Informatics (Graduate, 2008-15).
4. Fulbright Scholar 2016-Present: U.S. Department of State Bureau of Educational and Cultural Affairs
5. Selected invited talks and keynotes: Artificial Intelligence and Biomedicine: a new gate to knowledge, Barcelona Supercomputing Center, 2019; Complex Systems @ Purdue University, 2019; Universidad Nacional del Sur, Bahia Blanca, Argentina, 2018; Network Medicine (NetMed18): Personalized Medicine in the Era of Big Data; Week of Complexity Sciences 2018, Universidad Nacional Autonoma de México, Mexico City; Controlling Complex Systems 2017 (at NetSci 2017); Humboldt-Universität zu Berlin, Germany (2017); Institute for Scientific Interchange, Turin, Italy (2016); Mathematical Biosciences Institute, Ohio State University (2016); Santa Fe Institute, New Mexico (2015); University of Tokyo, Japan (2015); National Academies Keck Futures Initiative (2014); European Conference on Complex Systems, Lucca, Italy (2014); Fundação Champalimaud, Lisbon, Portugal (2014); Institut des Systèmes Complexes, Paris, France (2013); Aalto Complex Networks Factory, Aalto University, Finland (2012); The Gulbenkian Alan Turing Centenary Symposium, Lisbon, Portugal (2012); AMS Sectional Meeting, University of Nebraska at Lincoln (2012); Lehigh University, Bethlehem, Pennsylvania (2011); Columbia University, New York (2010); Carnegie Mellon University (2010); University of Barcelona (2008); Institute for Pure & Applied Mathematics, University of California at Los Angeles (2007); European Conference on Artificial Life (2007); Joint Statistical Meetings (2006); Center for the Study of Complex Systems, University of Michigan, Ann Arbor, Michigan (2005); University of Illinois at Urbana-Champaign (2004); Stanford University (2002); NASA Goddard Space Flight Center (2001).