

IDENTIFYING INFORMATION:

NAME: Rocha, Luis M

ORCID iD: <https://orcid.org/0000-0001-9402-887X>

POSITION TITLE: George J. Klir Professor of Systems Science

PRIMARY ORGANIZATION AND LOCATION: Binghamton University (SUNY), Binghamton, New York, United States

Professional Preparation:

| ORGANIZATION AND LOCATION | DEGREE (if applicable) | RECEIPT DATE | FIELD OF STUDY |
|--|---------------------------|----------------------|---------------------------|
| Los Alamos National Laboratory, Los Alamos, NM, USA | Postdoctoral Fellow | 07/1997 - 12/1998 | Complex Systems |
| Binghamton University, Binghamton, NY, US | PHD | 05/1997 | Systems Science |
| Instituto Superior Técnico, Lisbon, Not Applicable, N/A, Portugal | MENG | 04/1990 | Systems Engineering |
| Instituto Superior Técnico, Lisbon, Not Applicable, N/A, Portugal | BENG | 06/1988 | Mechanical Engineering |

Appointments and Positions

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|----------------|--|
| 2021 - present | George J. Klir Professor of Systems Science, Binghamton University (SUNY), Department of Systems Science and Industrial Engineering, Binghamton, New York, United States |
| 2019 - present | Director, Consortium for Social & Biomedical Complexity, Binghamton University (SUNY), Binghamton, New York, United States |
| 2002 - present | Principal Investigator, Instituto Gulbenkian de Ciencia, Oeiras, Not Applicable, N/A, Portugal |
| 2017 - 2023 | Director (PI), NSF-NRT Interdisciplinary Training Program in Complex Networks and Systems, Indiana University, Bloomington, Indiana, United States |
| 2017 - 2019 | Visiting Professor, Center for Theoretical Physics, Aix-Marseille University, Marseille, Not Applicable, N/A, France |
| 2016 - 2018 | Visiting Scientist, Neuroscience & Clinical Sciences, Fundação Champalimaud, Portugal, Lisbon, Not Applicable, N/A, Portugal |
| 2008 - 2020 | Director, Complex Networks & Systems track, Informatics PhD Program,, Indiana University, Bloomington, Indiana, United States |
| 2005 - 2015 | Director, Computational Biology Collaboratorium and Ph.D Program, Instituto Gulbenkian de Ciencia, Oeiras, Not Applicable, N/A, Portugal |
| 2004 - 2021 | Professor, Indiana University Bloomington, School of Informatics and Computing, Bloomington, IN, United States |
| 1999 - 2004 | Technical Staff Member, Los Alamos National Laboratory, Modeling, Algorithms, and Informatics (CCS-3), Los Alamos, NM, US |
| 1997 - 1999 | Postdoctoral Associate, Los Alamos National Laboratory, Modeling, Algorithms, and Informatics , Los Alamos, NM, US |

Products

Products Most Closely Related to the Proposed Project

1. Brattig Correia R, Barrat A, Rocha LM. Contact networks have small metric backbones that maintain community structure and are primary transmission subgraphs. *PLoS Comput Biol.* 2023 Feb;19(2):e1010854. PubMed Central PMCID: [PMC9949650](#).
2. David Soriano Paños, Felipe Xavier Costa, Luis M. Rocha. Semi-metric topology characterizes epidemic spreading on complex networks. 2023. Available from: <https://arxiv.org/abs/2311.14817> DOI: 10.48550/ARXIV.2311.14817
3. Gates AJ, Brattig Correia R, Wang X, Rocha LM. The effective graph reveals redundancy, canalization, and control pathways in biochemical regulation and signaling. *Proc Natl Acad Sci U S A.* 2021 Mar 23;118(12) PubMed Central PMCID: [PMC8000424](#).
4. Simas T, Correia R, Rocha L. The distance backbone of complex networks. *Journal of Complex Networks.* 2021 December 01; 9(6):- . Available from: <https://academic.oup.com/comnet/article/doi/10.1093/comnet/cnab021/6403661> DOI: 10.1093/comnet/cnab021; NIHMSID: NIHMS1933354
5. Brattig Correia R, Almeida J, Wyrwoll M, Julca I, Sobral D, Misra C, Di Persio S, Guilgur L, Schuppe H, Silva N, Prudêncio P, Nóvoa A, Leocádio A, Bom J, Laurentino S, Mallo M, Kliesch S, Mutwil M, Rocha L, Tüttelmann F, Becker J, Navarro-Costa P. The conserved genetic program of male germ cells uncovers ancient regulators of human spermatogenesis. [Preprint]. 2022 March 02. DOI: 10.1101/2022.03.02.482557

Other Significant Products, Whether or Not Related to the Proposed Project

1. Parmer T, Rocha LM, Radicchi F. Influence maximization in Boolean networks. *Nat Commun.* 2022 Jun 16;13(1):3457. PubMed Central PMCID: [PMC9203747](#).
2. Rocha LM. On the feasibility of dynamical analysis of network models of biochemical regulation. *Bioinformatics.* 2022 Jul 11;38(14):3674-3675. PubMed Central PMCID: [PMC9272802](#).
3. Correia R, Wood I, Bollen J, Rocha L. Mining Social Media Data for Biomedical Signals and Health-Related Behavior. *Annual Review of Biomedical Data Science.* 2020 July 20; 3(1):433-458. Available from: <https://www.annualreviews.org/doi/10.1146/annurev-biodatasci-030320-040844> DOI: 10.1146/annurev-biodatasci-030320-040844
4. Gates AJ, Rocha LM. Control of complex networks requires both structure and dynamics. *Sci Rep.* 2016 Apr 18;6:24456. PubMed Central PMCID: [PMC4834509](#).
5. Ciampaglia GL, Shiralkar P, Rocha LM, Bollen J, Menczer F, Flammini A. Computational Fact Checking from Knowledge Networks. *PLoS One.* 2015;10(6):e0128193. PubMed Central PMCID: [PMC4471100](#).

Synergistic Activities

1. Translational research: For decades, I have partnered with life scientists in institutions such as the Santa Fe Institute and the Instituto Gulbenkian de Ciencia, to develop and apply complex networks & systems, AI, and data science methods to biomedical problems. I formed the Complex Systems Modeling Team at the Los Alamos National Laboratory in 1999 and currently direct the new Consortium for Biomedical and Social Complexity between Binghamton

University and Indiana University.

2. Innovations in training: As Director and PI of the NSF-NRT: Interdisciplinary Training in Complex Networks and Systems at Indiana University, I have led the unique design and implementation of a large student program wherein trainees enroll in a dual-major PhD program in Complex Networks and Systems and an empirical domain (e.g. biology, ecology, neuroscience, economics, cognitive science, sociology).
3. Innovations in teaching: I have developed and presented multiple classes and short courses in novel areas of study and been the recipient of the IU Trustees' Award for Teaching Excellence in 2006 and 2015. Examples relevant to the proposal include: "Intro to Systems Science" (2021-23), "Evolutionary Systems & Bioinspired computing" (2005-15, IU; 2022-24, BU), "Advanced Complex Systems" (Graduate, 2012-21), "Introduction to Informatics" (Graduate, 2008-15).
4. Knowledge transfer: I have delivered more than 130 invited and keynote presentations. Selected examples from the past three years: keynote at the Social Media Mining for Health workshop, at the American Medical Informatics Association 2023 Annual Symposium, New Orleans, USA; keynote at the Multiscale & Integrative Complex Networks: Experiments & Theories Symposium at the International School and Conference on Network Science, Vienna, Austria; Keynote at the Network Science for The Sustainable Development Goals, Symposium at the International School and Conference on Network Science, Vienna, Austria; invited speaker at the Centre for Urban Mental Health, University of Amsterdam, Netherlands, April 12, 2023; invited speaker at the Northwestern Institute on Complex Systems Seminar Series, 2022; keynote speaker at the Artificial Intelligence, HPC and Biomedicine: implicit biases, scientific, technical and ethical challenges, Barcelona Supercomputing Center, 2021.
5. Service to the scientific community - advisory roles: : External advisory board member of the Environmental Health Institute (Instituto de Saúde Ambiental), University of Lisbon Medical School (ISAMB-FMUL); Member of the advisory council of the Complex Systems Society (elected member 2021-2023); member of the advisory council of the Indiana University Network Science Institute (2018-2021); external review committee member of 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; Editorial Board member of various journals such as PLOS Complex Systems (Section Leader: Complex Systems in Nature), BMC Bioinformatics, Complexity, Journal of Computational Science, Frontiers in Physics - Complex Systems, Frontiers in Computational Intelligence, PLoS ONE, etc; organizing committee member of key conferences in field such Complex Networks Conference (since 2018), RECOMB 2010, ECAL (2007), ALIFE (2006), etc; program committee member of Conference on Complex Systems, NetSci, CompleNet, etc.

Certification:

When the individual signs the certification on behalf of themselves, they are certifying that the information is current, accurate, and complete. This includes, but is not limited to, information related to domestic and foreign appointments and positions. Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§ 287, 1001, 1031 and 31 U.S.C. §§ 3729-3733 and 3802.

Certified by Rocha, Luis M in SciENCv on 2024-02-07 20:50:21