

GIULIO BURGIO

Postdoctoral Researcher

Institute of Functional Biology and Genomics (IBFG), CSIC - Universidad de Salamanca
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ACADEMIC POSITIONS

Institute of Functional Biology and Genomics (IBFG), CSIC - Universidad de Salamanca

Salamanca, Spain 2025 - present
Postdoctoral Researcher
- Advisor: Álvaro Sánchez
- Objective: Deciphering the role of context-dependent interactions in microbial communities and beyond

Vermont Complex Systems Institute, University of Vermont

Burlington, VT, USA 2024 - 2025
Postdoctoral Researcher
- Advisors: Juniper Lovato & Laurent Hébert-Dufresne
- Objective: Modeling and measuring the spread of social contagions

EDUCATION

Department of Computer Engineering and Mathematics, Universitat Rovira i Virgili

Tarragona, Spain 2020 - 2024
Ph.D., Complex Networks
- Advisors: Alex Arenas & Sergio Gómez
- Thesis: *Contagion Processes on Higher-Order Networks*
- Final grade: Excellent cum Laude

Department of Physics and Astronomy, Università di Catania

Catania, Italy 2017 - 2019
M.Sc., Physics (Theoretical Physics curriculum)
- Advisors: Andrea Rapisarda & Alex Arenas
- Thesis: *Evolution of Cooperation in the Presence of Higher-Order Interactions*
- Final grade: 110/110 cum Laude

Department of Physics and Astronomy, Università di Catania

Catania, Italy 2013 - 2017
B.Sc., Physics
- Advisor: Alessandro Pluchino
- Thesis: *Synchronization, Correlations and Pattern Formation in a 2D Lattice of Coupled Maps*
- Final grade: 110/110 cum Laude

TEACHING

University of Vermont - PhD Programme in Complex Systems and Data Science

Modeling Complex Systems I - Instructor Fall 2024

FUNDING & AWARDS

Government of Spain (MICIU/AEI - ESF+) - Juan de la Cierva Postdoctoral Scholarship

2026 - 2027

Universitat Rovira i Virgili - Special Doctoral Prize

2025

Top-ranked doctoral thesis in Computer Science and Mathematics for the 2024-25 academic year

U.S. National Science Foundation (SES): "HNDS-R: Altruistic stress, economic networks, and endogenous organizational change" (grant proposal co-writer) 2025

European Commission & Universitat Rovira i Virgili - Martí i Franquès Doctoral Programme Plus 2021 - 2024
European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 945413 and Universitat Rovira i Virgili

European Commission - Erasmus+ Traineeship Programme 2019

European Union's programme to support education, training, youth and sport in Europe

PUBLICATIONS

Articles published or accepted in a peer-reviewed journal

- A. E. Biondo*, G. Burgio*, L. Mazzarino*, A. Pluchino*, *Others as our own interests*, *Journal of Economic Interaction and Coordination* (2025): 1-23
- L. Hébert-Dufresne, J. Lovato, G. Burgio, J. P. Gleeson, S. Redner, P. L. Krapivsky, *Self-Reinforcing Cascades: A Spreading Model for Beliefs or Products of Varying Intensity or Quality*, *Physical Review Letters* 135 (2025): 087401
- G. Burgio, G. St-Onge, L. Hébert-Dufresne, *Characteristic scales and adaptation in higher-order contagions*, *Nature Communications* 16 (2025): 4589
- B. Steinegger, G. Burgio, P. Castioni, C. Granell, A. Arenas, *The spread of the Delta variant in Catalonia during summer 2021: Modelling and interpretation*, *Journal of Infection and Public Health* 18.7 (2025): 102771
- O. Fajardo-Fontiveros, M. Mattei, G. Burgio, C. Granell, S. Gómez, A. Arenas, M. Sales-Pardo, R. Guimerà, *Machine learning mathematical models for incidence estimation during pandemics*, *PLOS Computational Biology* 20.12 (2024): e1012687
- J. St-Onge*, G. Burgio*, S. F. Rosenblatt, T. M. Waring, L. Hébert-Dufresne, *Paradoxes in the co-evolution of contagions and institutions*, *Proceedings of the Royal Society B* 291.2028 (2024): 20241117
- G. Burgio, S. Gómez, A. Arenas, *Triadic Approximation Reveals the Role of Interaction Overlap on the Spread of Complex Contagions on Higher-Order Networks*, *Physical Review Letters* 132.7 (2024): 077401
- G. Burgio, S. Gómez, A. Arenas, *Spreading dynamics in networks under context-dependent behavior*, *Physical Review E* 107.6 (2023): 064304
- A. E. Biondo*, G. Burgio*, A. Pluchino*, D. Puglisi*, *Taxation and evasion: a dynamic model*, *Journal of Evolutionary Economics* (2022): 1-30
- G. Burgio, B. Steinegger, A. Arenas, *Homophily impacts the success of vaccine roll-outs*, *Communications Physics* 5.1 (2022): 1-7
- G. Burgio*, B. Steinegger*, G. Rapisardi, A. Arenas, *Homophily in the adoption of digital proximity tracing apps shapes the evolution of epidemics*, *Physical Review Research* 3.3 (2021): 033128
- G. Burgio, A. Arenas, S. Gómez, J. T. Matamalas, *Network clique cover approximation to analyze complex contagions through group interactions*, *Communications Physics* 4.1 (2021): 1-10
- G. Burgio, J. T. Matamalas, S. Gómez, A. Arenas, *Evolution of Cooperation in the Presence of Higher-Order Interactions: From Networks to Hypergraphs*, *Entropy* 22.7 (2020): 744
- A. Pluchino, G. Burgio, A. Rapisarda, A. E. Biondo, A. Pulvirenti, A. Ferro, T. Giorgino, *Exploring the Role of Interdisciplinarity in Physics: Success, Talent and Luck*, *PLOS ONE* 14(6) (2019): e0218793

Preprints

- J. St-Onge, R. Harp, G. Burgio, T. M. Waring, J. Lovato, L. Hébert-Dufresne, *Defining and classifying models of groups: The social ontology of higher-order networks*, *arXiv preprint arXiv:2507.02758* (2025)

- A. E. Biondo*, G. Burgio*, A. Pluchino*, D. Puglisi*, *A dynamic model of Tax Evasion*, arXiv preprint [arXiv:2010.11589 \(2020\)](https://arxiv.org/abs/2010.11589)

* These authors contributed equally

TALKS

- DIMACS Workshop on Spreading on Social Networks – Theory and Applications, New Brunswick (NJ, USA), 21 – 23 October 2024
- SFI 'Postdocs in Complexity Global Conference', Santa Fe (NM, USA), 23 – 26 September 2024
- International School and Conference on Network Science 2024, Québec (QC, Canada), 16 – 21 June 2024
- Vermont-KIAS Workshop: Group Interactions in Network Science, Burlington (VT, USA), 25 – 28 September 2023 [invited talk]
- International School and Conference on Network Science 2023, Vienna (Austria), 10 – 14 July 2023
- 8th URV Doctoral Workshop in Computer Science and Mathematics, Tarragona (Spain), 3 May 2023
- 14th International Conference on Complex Networks, Aveiro (Portugal), 24 – 28 April 2023
- Conference on Complex Systems 2022, Palma de Mallorca (Spain), 17 – 21 October 2022
- VII COMSOTEC Workshop, Tarragona (Spain), 31 March – 1 April 2022
- International Workshop BRIDGES, Dialogues between Humanities and Science, Ragusa (Italy), 13 December 2021 [invited talk]
- Conference on Complex Systems 2021, Lyon (France), 25 – 29 October 2021
- Networks 2021: A Joint Sunbelt and NetSci Conference, TopoNets 2021 Satellite, 30 June 2021
- 12th International (Online) Conference on Complex Networks, 24 – 26 May 2021
- Conference on Complex Systems 2019, Satellite Workshop of Computational Social Science, Singapore, 2 – 3 October 2019
- VI Mediterranean School of Complex Networks, Salina (Italy), 31 August – 6 September 2019

OTHER RELEVANT EXPERIENCES

Internships

- Visiting Ph.D. student | January – March 2023
 - Laboratory for Structure and Dynamics, Vermont Complex Systems Institute, University of Vermont, Burlington (VT, USA)
 - Advisor: Laurent Hébert-Dufresne
- Visiting M.Sc. student (Erasmus+ Traineeship Programme) | April – June 2019
 - Alephsys Lab, Department of Computer Engineering and Mathematics, Universitat Rovira i Virgili, Tarragona (Spain)
 - Advisor: Alex Arenas

Schools

- Complex Networks Winter Workshop 2025, Québec (QC, Canada), 14 – 19 December 2025
- VII Mediterranean School of Complex Networks, Catania (Italy), 25 June – 2 July 2022
- Winter Workshop on Complex Systems, Besançon (France), 24 – 28 January 2022
- VI Mediterranean School of Complex Networks, Salina (Italy), 31 August – 6 September 2019

SCIENTIFIC SERVICE

Reviewer

Journals

Physical Review Letters, Physical Review E, Physical Review Research, Communications Physics, Journal of Physics: Complexity, PNAS Nexus, npj Complexity, Scientific Reports, Journal of Complex Networks, PLOS ONE, Journal of Theoretical Biology, Journal of Computational Social Science

Conferences

17th International Conference on Complex Networks, Zaragoza (Spain), 4 - 8 May 2026

Chair

International School and Conference on Network Science 2024 - [5-Ea Dynamics on Networks](#) Session
DIMACS Workshop on Spreading on Social Networks - Theory and Applications - [Flash Talks II](#) Session

Tutor

Complex Networks Winter Workshop 2025 - Dynamical Processes on Networks

TRANSVERSAL SKILLS

Programming languages and tools

Julia, R, Python, Mathematica, C++, Netlogo, LaTeX, Git, MySQL

Languages

Italian (native), Spanish (proficient), English (advanced)