# 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

Grant reference JDC2024-054148-1 (Juan de la Cierva Programme 2024)

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)

\* 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)