

RÉSUMÉ OF ALEX ARENAS



PERSONAL DATA

LAST NAME: Arenas

NAME: Alex

DATE OF BIRTH: 09/04/1969 Barcelona, Catalonia, Spain

CITIZENSHIP: Catalonia, Spain

LANGUAGES: Catalan, Spanish, English, French, Italian and Chinese (Level HSK 3).

ACADEMIC TRAINING

Bachelors Degree	University	Date
Physics	Physics. Univ. de Barcelona	87-93
Doctorate	University	Date
Physics	Physics. Univ. de Barcelona	93-96

EMPLOYMENT AND COORDINATES:

Full Professor

Universitat Rovira i Virgili

Escola Tècnica Superior d'Enginyeria

Department of Computer Sciences and Mathematics

Avda. Països Catalans 26 (Tarragona - 43007)

Phone: 977559687

POSITIONS

- 2010-now: **Full Professor** Dept. Computer Science & Mathematics Dept. **Universidad Rovira i Virgili**. Spain.
- 2022-now: **Chief Scientist on Complex Systems Science**. Joint Appointment at **Pacific Northwest National Laboratory**, Richland, WA, USA.

- 2017-now: **External Faculty Complexity Science Hub**, Vienna, Austria.
- 2022-now: **Scientific member**, Network of Epidemic Intelligence of Catalonia **XIEC. Departament de Salut, Generalitat de Catalunya**.
- 2021-now: **Scientific member**, Committee for the assessment of the evolution of COVID-19 in Catalonia (**CACC, Generalitat de Catalunya**).
- 2022-2023: **Scientific member**, Grup Horitzó. Departament d'Universitats i Recerca. **Departament d' Universitats, Generalitat de Catalunya**.
- 2008-2009 **Visiting Professor** at **Lawrence Berkeley Lab**. in the Applied Mathematics group of Prof. Alexandre Chorin (University of California, Berkeley).
- 2007-2008 **Visiting Researcher** at **Lawrence Berkeley Lab**. in the Applied Mathematics group of Prof. Alexandre Chorin (University of California, Berkeley).
- 2000 - 2001 **Visiting Scholar** at **Lawrence Berkeley Lab**. in the Applied Mathematics group of Prof. Alexandre Chorin (University of California, Berkeley).
- 1997- 2010: **Associate Professor** (permanent position) Dept. Computer Science & Mathematics. **Universidad Rovira i Virgili**. Spain.
- 1995- 1997: **Assistant Professor** (tenure track) at Dept. Computer Science & Mathematics. **Universidad Rovira i Virgili**. Spain.
- 1991-1995: **F.P.I. Research fellow** at Dept. Fundamental Physics. **Universitat de Barcelona**. Spain.

RESEARCH AREAS

- Physics; Applied Mathematics; Epidemic spreading; Complex networks; Mathematical modelling; Synchronization; Neural networks; Optimal prediction; Turbulence; Real time systems; Computational chemistry; Neuroscience; Personalized medicine.

GRANTED RESEARCH STAYS ABROAD

- Organization: **Institute Universitaire Kurt Bösch**
Place: Sion Country: Switzerland Year: 1992 Duration: 10D
Issue: Mathematical foundations of artificial neural networks
- Organization: **Organization of Complex Systems, Brandeis University**
Place: Boston Country: USA Year: 1993 Duration: 04M
Issue: Computational neural networks
- Organization: **University of California Berkeley**
Place: Berkeley Country: USA Year: 2001 Duration: 06M
Issue: Mathematical and computational models for optimal prediction
- Organization: **University of California Berkeley**
Place: Berkeley Country: USA Year: 2004 Duration: 20D
Issue: Mathematical and computational models in turbulence

- Organization: **Max Planck Institute for the Physics of Complex Systems**
Place: Dresden Country: Germany Year: 2006 Duration: 07D
Issue: Dynamics on complex networks and applications
- Organization: **University of California Berkeley**
Place: Berkeley Country: USA Year: 2006 Duration: 20D
Issue: Mathematical and computational models in turbulence
- Organization: **Lawrence Berkeley Laboratory**
Place: Berkeley Country: USA Year: 2007 Duration: 01Y
Issue: Optimal prediction in molecular dynamics
- Organization: **ISI Foundation**
Place: Torino Country: Italy Year: 2009 Duration: 15D
Issue: Spreading on complex networks
- Organization: **Oxford University, OCCAM**
Place: Oxford Country: UK Year: 2012 Duration: 1 month
Issue: Multiplex Networks, Structure and Dynamics
- Organization: **Aalto University**
Place: Oxford Country: UK Year: 2015 Duration: 10D
Issue: Community Structure and Dynamics
- Organization: **Alan Turing Institute**
Place: London Country: UK Year: 2024 Duration: 21D
Issue: Higher-order dynamical models

PARTICIPATION IN COMMITTEES AND INTERNATIONAL DELEGATIONS

- Committee title: **Editorial Board Member Physical Review E**
Organization that runs it: AMPS - American Physical Society
Issue: editorial committee
Year: 2008-2010
- Committee title: **Editor Physical Review E**
Organization that runs it: APS - American Physical Society
Issue: editorial committee
Year: 2010- 2024
- Committee title: **Editorial Board Member Frontiers in Physics**
Organization that runs it: Frontiers Media SA
Issue: editorial committee
Year: 2022-now
- Committee title: **Editorial Board Member Journal of Complex Networks**
Organization that runs it: Oxford University Press

Issue: editorial committee

Year: 2012-now

- Committee title: **Editorial Board Member Network Neuroscience**
Organization that runs it: MIT Press
Issue: editorial committee
Year: 2016-now
- Committee title: **Editorial Board Member Journal of Computational Social Science**
Organization that runs it: Springer
Issue: editorial committee
Year: 2017-now
- Committee title: **Executive Committee Complex Systems Society**
Organization that runs it: CSS – Complex Systems Society
Issue: executive committee
Year: 2014- 2019
- Committee title: **Committee Member Network Science Society**
Organization that runs it: NSS – Network Science Society
Issue: executive committee
Year: 2016- now
- Committee title: **Board member Complexitat.cat**
Organization that runs it: Complexitat.cat
Issue: Founder and board committee
Year: 2014- now

CURRENT Ph.D.- STUDENTS

- Mr. Piergiorgio Castioni (3rd year); PhD focused on data-driven epidemic modelling
- Mr. Mattia Mattei (2nd year); PhD focused on theoretical models of data assimilation on complex networks
- Mr. Oliver Ribordy (1st year); PhD focused on theoretical models of higher-order dynamical processes on complex networks
- Mr. Arnau Peris (1st year); PhD focused on applications of artificial intelligence in cancer immunology

VISITING Ph.D.- STUDENTS

- Dr. Fereshteh Asgari; Year: 2015; Telecom SudParis/Institut Mines-Telecom, CNRS, France
- Mrs. Hongrun Wu; Year: 2015; Wuan University, China
- Mr. Yong Zhuang; Year: 2016; Carnegie Mellon University, Silicon Valley, USA
- Mrs. Maryam Zamani; Year: 2017; Eötvös Loránd University, Hungary

- Mr. Maxime Lucas; Year: 2018; Lancaster University, UK
- Mr. Yong Ye; Year: 2022; School of Science, Harbin Institute of Technology, Shenzhen, China
- Mr. Yi Zhao; Year: 2021; School of Science, Harbin Institute of Technology, Shenzhen, China

FORMER Ph.D.- STUDENTS

1. Dr. Joan Ferré i Giné; Year: 1999; Current Position: Associate Professor, Computer Science, Universitat Rovira i Virgili, Tarragona, Spain
2. Dr. Gabriela Espinosa Porrugas; Year: 2002; Current Position: Associate Professor, Chemical Engineering, Universitat Rovira i Virgili, Tarragona, Spain
3. Dr. Roger Guimerà Manrique; Year: 2002; Current position: ICREA Professor, Universitat Rovira i Virgili, Tarragona, Spain
4. Dr. M. Angels Moncusí Mercadé; Year: 2006; Current Position: Associate Professor, Computer Sciences, Universitat Rovira i Virgili, Tarragona, Spain
5. Dr. Leon Danon; Year: 2006; Current Position: Professor, Applied Math, University of Warwick, England
6. Dr. Jordi Duch i Gavalda; Year: 2008 ; Current Position: Associate Professor, Computer Sciences, Universitat Rovira i Virgili, Tarragona, Spain
7. Dr. Josep Maria Banús i Alsina; Year: 2008; Current Position: Associate Professor, Computer Sciences, Universitat Rovira i Virgili, Tarragona, Spain
8. Dr. Sergi Lozano Perez; Year: 2008; Current Position: Associate Professor, Economics, Universitat de Barcelona, Barcelona, Spain
9. Dr. Albert Fernandez I Sabater; Year: 2008; Current Position: Associate Professor, Chemical Engineering and Computer Sciences, Universitat Rovira i Virgili, Tarragona, Spain
10. Dr. Javier Borge; Year: 2011; Current Position: Associate Professor, Universitat Oberta de Catalunya, Barcelona, Spain.
11. Dr. Clara Granell; Year: 2016; Current Position: Distinguished researcher, Universitat Rovira i Virgili, Tarragona, Spain.
12. Dr. Pau Erola; Year: 2016; Current Position: Researcher, Bioinformatics, University of Edinburgh, Scotland.
13. Dr. Joan Matamalas; Year: 2018; Current Position: Researcher, Harvard Medical School, Massachusetts, USA.
14. Dr. Lluís Arola Fernández; Year 2021; Current Position: Postdoc, IFISC CSIC/UIB, Mallorca, Spain.
15. Dr. Benjamin Steinegger; Year 2021; Current Position: Data scientist. Zurich Insurance Group, Switzerland.
16. Dr. Giulio Burgio; Year 2024; Current Position: Postdoc Vermont University, USA.

FORMER POSTDOCS

- Dr. Joan Acebrón de Torres; Year 2008; Current Position: Researcher, Applied Math, CEMAT, Lisboa, Portugal
- Dr. Jesus Gómez-Gardenes; Year 2009; Current Position: Assistant Professor, Universidad de Zaragoza, Zaragoza, Spain
- Dr. Jose A. Capitán; Year: 2011; Current Position: Researcher, Theoretical and Computational Ecology Group. Center for Advanced Studies (CEAB-CSIC), Blanes, Spain
- Dr. Sara Cuenda; Year: 2011; Current Position: Assistant Professor, Universidad Autónoma de Madrid. Facultad de Ciencias Económicas y Empresariales, Madrid, Spain
- Dr. Julia Poncela-Casanovas; Year: 2014-2015; Current Position: Postdoc, Northwestern Institute on Complex Systems (NICO), Evanston, USA
- Dr. Per Sebastian Skardal; Year: 2013-2015; Current Position: Assistant Professor, Trinity college, USA
- Dr. Manlio De Domenico; Year: 2014-2017; Current position: Professor, University of Padova, Italy.
- Dr. Albert Sole; Year: 2014-2016; Current Position: Researcher, Universitat Oberta de Catalunya, Barcelona, Spain.
- Dr. Elisa Omodei; Year: 2014-2017; Current position: UNICEF Data analysis, USA
- Dr. Eugenio Valdano; Year: 2016-2018; Current position: INSERM & Sorbonne Universités, Paris, France
- Dr. Giacomo Rapisardi; Year: 2018-2022; Current position: Data Scientist at EOLOS Floating Lidar Solutions, Barcelona, Spain
- Dr. Aleix Bassoles; Year: 2020-2022; Current position: Data Scientist at EURECAT, Barcelona, Spain

OTHER MERITS, ACHIEVEMENTS OR COMMENTS

Referral services for Scientific International Journals: Physical Review Letters; Physical Review E; Science; Nature; Scientific Reports; Nature Physics; Nature communications; Proceedings National Academy of Science USA; New Journal of Physics; Journal of Statistical Mechanics; Applied Physics Letters; Journal of Physics A: Mathematics and General; European Physics Letters; European Journal of Physics B; Chaos: An interdisciplinary journal of nonlinear Science; Physica A; Physica D; IET Systems Biology; Environmental Science & Technology magazine; Connections (Journal of the International Network for Social Network Analysis); New Journal of Physics; PloS Computational biology; Data & Knowledge Engineering; PloS One;

Evaluation committees: European Science Foundation (**ESF**); European Research Council (**ERC**) EU; Fonds de la Recherche Scientifique (**FNRS**); European Innovation Council and SME's Executive Agency (EISMEA) Established by the European Commission; Ministerio Ciencia e Innovación (**MICIN**) Spain; Agència de Gestió d'Ajuts

Universitat de Recerca (**AGAUR**) Catalonia; Premios de excelencia Universidad Carlos III (**UC3M**) Madrid; Ministerio Ciencia y Tecnología (**MINCYT**) Argentina; Research Council of Finland (**RCF**) – Data science, artificial intelligence and statistics review panel.

BIBLIOGRAPHIC INDICATORS

H index (Google Scholar, September 2024) = **80**

i10 index (Google Scholar, September 2024) = **229**

75 Highly cited papers (+100)

Number of citations > **43.000**

Referred publications **267**

PRIZES AND AWARDS

- 2011- **James McDonnell Foundation** award for the study of Complex Systems
- 2011- **ICREA Academia** award for outstanding contribution to the analysis of complex networks
- 2017- **ICREA Academia** award for outstanding contribution to the analysis of complex networks
- 2018- **Fellow American Physical Society**. Citation: For foundational research in network science and complex systems — including in community detection, synchronization, and multilayer networks — and his outstanding editorial and mentoring contributions.
- 2020- **Fellow Network Science Society**. Citation: In recognition of his foundational research in network science — including in community detection, synchronization, and multilayer networks — and of his outstanding editorial and mentoring contributions.
- 2020- **Award Fundació Ferran Sunyer i Balaguer: Mathematics and Society**. Citation: In recognition to the visualization of mathematics as a tool of fundamental response to the social challenge in this time of pandemic. For its ability to adapt mathematical models based on population mobility and studying the spread of epidemics in Covid-19, including epidemiological data obtained so far and also predicting the influence of those individuals. asymptomatic that can cause new infections.
- 2022- **Award Communication in Social Networks: Catalunya Radio**. Citation: In recognition to the public visualization and dissemination of mathematical models for the epidemic forecasting as a tool of fundamental response to the social challenge of the COVID pandemics.
- 2022- **Scientific Award “Ciutat de Tarragona”**: Ciutat de Tarragona award for scientific and technological achievements to distinguish people and that, due to their merits, have made a significant contribution to the development of science.
- 2022- **Award “Narcís Monturiol Medal”**: Narcís Monturiol Medal for scientific and technological merit to distinguish people and entities that,

due to their merits, have made a significant contribution to the development of science and technology in Catalonia.

- 2022- **ICREA Academia** award for outstanding contribution to the analysis of complex networks.
 - 2024- **Web Science Trust Test of Time Award** awarded annually to the author or authors of a paper presented at a previous Web Science Conference that has stood the test of time through continued relevance and impact.
 - 2024- **Complex Systems Society Senior Scientific Award**, the most prestigious award granted by the society to recognize society members who have advanced the field of complexity science by achieving truly exceptional scientific results.
 - 2024- **Award Highly Cited Researcher in Physics**, in recognition of exceptional research performance, demonstrating significant and broad influence in the field of Physics (Clarivate).
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FUNDED PROJECTS LAST 5 YEARS

- Title of the project: **Critical Action Planning over Extreme Scale Data**
Body where project took place: Universitat Rovira i Virgili
Head(s) researcher(s) node URV: Alex Arenas
Number of participating researchers: 35
Funding body or bodies: **European Commission**
Code according to the funding body: CREXDATA. 101092749 HORIZON RIA.
Start date: 2022
Total amount: 8.698.106,00 Eur
- Title of the project: **Interconnection of complex systems: dynamics of discrete states.**
Body where project took place: Universitat Rovira i Virgili
Head(s) researcher(s): Alex Arenas
Number of participating researchers: 8
Funding body or bodies: **Ministerio de Ciencia y Tecnología**
Code according to the funding body: PID2021-128005NB-C21
Start date: 2022
Total amount: 211.750,00 Eur
- Title of the project: **Modelització probabilística per a predir l'evolució de la COVID-19: parametrització i correcció automàtica**
Body where project took place: Universitat Rovira i Virgili
Head(s) researcher(s): Alex Arenas
Number of participating researchers: 8
Funding body or bodies: **AGAUR. Generalitat de Catalunya**
Code according to the funding body: 2020PANDE00098
Start date: 2021
Total amount: 298.350,00 Eur
- Title of the project: **Non-linear dynamics in multilayer complex networks under structural uncertainty**
Body where project took place: Universitat Rovira i Virgili
Head(s) researcher(s): Alex Arenas Moreno
Number of participating researchers: 3
Funding body or bodies: **Ministerio de Ciencia y Tecnología**

Code according to the funding body: PGC2018-094754-B-C21
Start date: 2018
Total amount: 104.665,00 Eur

MOST RELEVANT LEADED PROJECTS

- Title of the project: **Modelització probabilística per a predir l'evolució de la COVID-19: parametrització i correcció automàtica**
Funding body: AGAUR. Generalitat de Catalunya
Total amount: 298.350 Eur
 - Title of the project: **Interconnection of complex systems: dynamics of discrete states**
Funding body: Ministerio de Ciencia y Tecnología
Total amount: 211.750 Eur
 - Title of the project: **Non-linear dynamics in multilayer complex networks under structural uncertainty**
Funding body: Ministerio de Ciencia y Tecnología
Total amount: 104.665 Eur
 - Title of the project: **Multilevel analysis of complex networked systems**
Funding body: James S. McDonnell Foundation
Total amount: 367.092 Eur
 - Title of the project: **Mathematical framework for multiplex networks (PLEXMATH)**
Funding body: European Commission 7PM
Total amount: 1.550.000 Eur
-

COMPLETE LIST OF REFERRED PUBLICATIONS

1. **Rebound in epidemic control: How misaligned vaccination timing amplifies infection peaks**, P. Castioni, S. Gómez, C. Granell and A. Arenas, *npj Complexity* 1 (1), 20 (2024)
2. **Probabilistic Discrete - Time Models for Spreading Processes in Complex Networks: A Review**, C. Granell, S. Gómez, J. Gómez-Gardeñes, A. Arenas, *Annalen der Physik*, 2400078 (2024)
3. **Exploring spatial segregation induced by competition avoidance as driving mechanism for emergent coexistence in microbial communities**, M. Mattei and A. Arenas, *Physical Review E* 110 (1), 014404 (2024)
4. **Triadic approximation reveals the role of interaction overlap on the spread of complex contagions on higher-order networks**, G. Burgio, S. Gómez and A. Arenas, *Physical Review Letters*, 132, 077401 (2024)
5. **On the number of stable solutions in the Kuramoto model**, A. Arenas, A. Garijo, S. Gómez and J. Villadelprat, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 33, 093127 (2023)
6. **Joint Analysis of the Epidemic Evolution and Human Mobility During the First Wave of COVID-19 in Spain: Retrospective Study**, B. Steinegger, C. Granell, G. Rapisardi, S. Gómez, J.T. Matamalas, D. Soriano-Panos, J.

Gómez-Gardenes and A. Arenas, *JMIR Public Health and Surveillance*, 9, e40514 (2023)

7. **Analysis of SARS-CoV-2 in wastewater for prevalence estimation and investigating clinical diagnostic test biases**, M. Mattei, R.M. Pinto, S. Guix, A. Bosch and A. Arenas, *Water Research*, 242, 120223 (2023)

8. **Pattern formation and bifurcation analysis of delay induced fractional-order epidemic spreading on networks**, J. Zhou, Y. Ye, A. Arenas, S. Gómez, Y. Zhao. *Chaos, Solitons & Fractals*, 174, 113805 (2023)

9. **Complex systems in the spotlight: next steps after the 2021 Nobel Prize in Physics**, G. Bianconi, A. Arenas et al., *Journal of Physics: Complexity* (4) 1 (2023)

10. **Spreading dynamics in networks under context-dependent behavior**, G. Burgio, S. Gómez and A. Arenas, *Physical Review E*, 107, 064304 (2023)

11. **The Resilience of the Multirelational Structure of Geopolitical Treaties is Critically Linked to Past Colonial World Order and Offshore Fiscal Havens**, P.L. Sacco, A. Arenas and M. De Domenico, *Complexity*, 5280604 (2023)

12. **The political economy of big data leaks: Uncovering the skeleton of tax evasion**, P.L. Sacco, A. Arenas and M. De Domenico, *Chaos, Solitons and Fractals*, (168) 113182 (2023)

13. **Characterization of interactions' persistence in time-varying networks**, F. Bauza, M. Floria, J. Gómez-Gardenes, A. Arenas and A. Cardillo, *Scientific Reports* (13) 765 (2023)

14. **Bifurcation analysis of the Microscopic Markov Chain Approach to contact-based epidemic spreading in networks**, A. Arenas, A. Garijo, S. Gómez and J. Villadelprat, *Chaos, Solitons and Fractals*, (166) 112921 (2023)

15. **Dual control of coupled oscillator networks**, P.S. Skardal and A. Arenas, *IEEE Open Journal of Control Systems*, 2, 146-154 (2023)

16. **A link model approach to identify congestion hotspots**, A. Bassolas, S. Gómez and A. Arenas, *Royal Society Open Science*, (9) 220894 (2022)

17. **Self-organized explosive synchronization in complex networks: Emergence of synchronization bombs**, L. Arola-Fernández, S. Faci-Lázaro, P.S. Skardal, E. Boghiu, J. Gómez-Gardeñes, and A. Arenas, *Communication Physics*, (5) 264 (2022)

18. **Connecting inter-city mobility with urban welfare**, S. Mimar, D. Soriano-Paños, A. Kirkley, H. Barbosa, A. Sadilek, A. Arenas, J. Gómez-Gardeñes and G. Ghoshal, *PNAS Nexus*, 1(4) 178 (2022)

19. **Modeling communicable diseases, human mobility and epidemics: a review**, D. Soriano-Paños, W. Cota, S.C. Ferreira, G. Ghoshal, A. Arenas and J. Gómez-Gardeñes, *Annalen der Physik*, 2100482 (2022)

20. **Explosive Synchronization and Multistability in Large Systems of Kuramoto Oscillators with Higher-Order Interactions**, P.S. Skardal and A. Arenas, In: Battiston, F., Petri, G. (eds) *Higher-Order Systems. Understanding Complex Systems*. Springer, Cham. https://doi.org/10.1007/978-3-030-91374-8_8 (2022)

21. **Contagion-diffusion processes with recurrent mobility patterns of distinguishable agents**, P. Valgañón, D. Soriano-Paños, A. Arenas and J. Gómez-Gardeñes, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 32, 043102 (2022)

22. **The interconnection between independent reactive control policies drives the stringency of local containment**, A. Reyna-Lara, D. Soriano-Paños,

- A. Arenas and J. Gómez-Gardeñes, *Chaos, Solitons & Fractals*, 158, 112012 (2022)
23. **Percolation in networks with local homeostatic plasticity**, G. Rapisardi, I. Kryven, and A. Arenas, *Nature Communications*, 13 (1), 1-9 (2022)
24. **Homophily impacts the success of vaccine roll-outs**, G. Burgio, B. Steinegger, and A. Arenas, *Communications Physics*, 5, 70 (2022)
25. **Diffusion and Synchronization Dynamics Reveal the Multi-Scale Patterns of Spatial Segregation**, A. Bassolas, S. Gómez and A. Arenas, *Frontiers in Physics*, 10 (2022)
26. **Symmetry-breaking mechanism for the formation of cluster chimera patterns**, M. Asllani, B.A. Siebert, A. Arenas, and J. Gleeson *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 31, 013107 (2022)
27. **Behavioral response to heterogeneous severity of COVID-19 explains temporal variation of cases among different age groups**, B. Steinegger, L. Arola-Fernández, C. Granell, J. Gómez-Gardenes, A. Arenas, *Phil. Trans. Royal Society A*. 380:20210119 (2022)
28. **Emergence of protective behaviour under different risk perceptions to disease spreading**, M. Khanjani-pak¹, N. Azimi-Tafreshi, A. Arenas, J. Gómez-Gardenes, *Proceedings of the Royal Society A*, 380: 20200412 (2022)
29. **Insight on how to assess and improve the response to the COVID-19 pandemic**, J. M. Martín-Moreno, A. Arenas, R. Bengoa, C. Borrell, M. Franco, A.L. García-Basteiro, J. Gestal, B. González López-Valcárcel, I. Hernández-Aguado, H. Legido-Quigley, J. C. March, S. Minué, C. Muntaner, C. Vives-Cases, *Gaceta Sanitaria*, 36(1), 32-36 (2022)
30. **Homophily in the adoption of digital proximity tracing apps shapes the evolution of epidemics**, G. Burgio, B. Steinegger, G. Rapisardi, A. Arenas, *Phys. Rev. Research* 3, 033128 (2021)
31. **Infectious disease dynamics in metapopulations with heterogeneous transmission and recurrent mobility**, W. Cota, D. Soriano-Paños, A. Arenas, S.C. Ferreira, J. Gómez-Gardeñes, *New Journal of Physics*, 23, 073019 (2021)
32. **Interplay between intra-urban population density and mobility in determining the spread of epidemics**, S. Hazarie, D. Soriano-Paños, A. Arenas, J. Gómez-Gardeñes and G. Ghoshal, *Communication Physics* 4, 191 (2021)
33. **Higher-order interactions can better optimize network synchronization**, P.S. Skardal, L. Arola-Fernández, D. Taylor, and A. Arenas, *Phys. Rev. Research*, 3, 043193 (2021)
34. **Geometric unfolding of synchronization dynamics on networks**, L. Arola-Fernández, P.S. Skardal, A. Arenas, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 31, 061105 (2021)
35. **Matemáticas contra el coronavirus**, A. Arenas, *Investigación y ciencia* 53 (2021)
36. **Network clique cover approximation to analyze complex contagions through group interactions**, G. Burgio, A. Arenas, S. Gómez, J.T. Matamalas, *Communication Physics* 4, 111 (2021)
37. **Modeling financial distress propagation on customer-supplier networks**, J. Nin, B. Salbanya, P. Fleurquin, E. Tomás, A. Arenas, J.J. Ramasco, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 31, 053119 (2021)
38. **A population-based controlled experiment assessing the epidemiological impact of digital contact tracing**, P. Rodríguez, S. Graña, E.E. Alvarez-León, M. Battaglini, F.J. Darias, M. Hernan, R. Lopez, P. Llana, M.C.

Martin, O. Ramirez-Rubio, A. Romaní, B. Suárez-Rodríguez, J. Sánchez-Monedero, A. Arenas, and L. Lacasa, *Nature Communications*, 12, 587 (2021)

39. **A message-passing approach to epidemic tracing and mitigation with apps**, G. Bianconi, H. Sun, G. Rapisardi and A. Arenas, *Phys. Rev. Research*, 3, L012014 (2021)

40. **Virus spread versus contact tracing: Two competing contagion processes**, A. Reyna-Lara, D. Soriano-Panos, S. Gómez, C. Granell, J.T. Matamalas, B. Steinegger, A. Arenas, and J. Gómez-Gardenes, *Phys. Rev. Research*, 3, L013163 (2021)

41. **Explainable, automated urban interventions to improve pedestrian and vehicle safety**, C. Bustos, D. Rhoads, A. Solé-Ribalta, D. Masip, A. Arenas, A. Lapedriza, J. Borge-Holthoefer, *Transportation Research Part C: Emerging Technologies*, 125, 103018, (2021)

42. **Modeling the spatiotemporal epidemic spreading of COVID-19 and the impact of mobility and social distancing interventions**, A. Arenas, W. Cota, J. Gómez-Gardenes, S. Gómez, C. Granell, J.T. Matamalas, D. Soriano-Panos, and B. Steinegger, *Phys. Rev. X*, 10, 041055 (2020)

43. **Epidemic spreading: Tailored models for COVID-19**, A. Arenas, J. Gómez-Gardenes, C. Granell, and D. Soriano-Panos, *Europhysics News* 51/5, 38-40 (2020)

44. **Pulsating campaigns of human prophylaxis driven by risk perception palliate oscillations of direct contact transmitted diseases**, B. Steinegger, A. Arenas, J. Gómez-Gardenes, and C. Granell, *Phys. Rev. Research*, 2, 023181 (2020)

45. **Abrupt phase transition of epidemic spreading in simplicial complexes**, J.T. Matamalas, S. Gómez and A. Arenas, *Phys. Rev. Research*, 2, 012049(R) (2020)

46. **Impact of temporal scales and recurrent mobility patterns on the unfolding of epidemics**, D. Soriano-Panos, G. Ghoshal, A. Arenas and J. Gómez-Gardenes, *Journal of Statistical Mechanics: Theory and Experiment*, 2, 024006 (2020)

47. **Evaluation of the COVID-19 response in Spain: principles and requirements**, A. García-Basteiro, et al., *The Lancet Public Health*, doi:10.1016/S2468-2667(20)30208-5 (2020)

48. **The need for an independent evaluation of the COVID-19 response in Spain**, A. García-Basteiro, et al., *The Lancet*, doi:10.1016/S0140-6736(20)30753-4 (2020)

49. **Functional strengthening through synaptic scaling upon connectivity disruption in neuronal cultures**, E. Estévez-Priego, S. Teller, C. Granell, A. Arenas and J. Soriano, *Network Neuroscience*, 1-21 (2020)

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ORGANIZATION OF CONFERENCES, WORKSHOPS AND SCHOOLS

- **Director of school:** Mediterranean School of Complex Networks 7th Edition, September 2022, Catania, Sicily
- **Director of school:** Mediterranean School of Complex Networks 6th Edition, September 2019, Salina, Sicily
- **Director of school:** Mediterranean School of Complex Networks 5th Edition, September 2018, Salina, Sicily
- **Director of school:** Mediterranean School of Complex Networks 4th Edition, September 2017, Salina, Sicily
- **Director of school:** Mediterranean School of Complex Networks 3rd Edition, September 2016, Salina, Sicily
- **Director of school:** Mediterranean School of Complex Networks 2nd Edition, September 2015, Salina, Sicily
- **Founder and Director of school:** Mediterranean School of Complex Networks 1st Edition, June 2014, Salina, Sicily
- **Director of school:** NETSCI'16 International School and Conference on Network Science, June 2016, Korea
- **Program chair:** ECCS' 13 European Conference of Complex systems, September 2013, Barcelona, Spain
- **Organizer:** V Workshop de Econosociofísica, January 2014, Tarragona, Spain
- **Satellite organizer:** Physics of multilayered interconnected networks, NETSCI'14 International School and Conference on Network Science, Berkeley, USA

- **Satellite organizer:** Physics of Multilayered Interconnected Networks II, NETSCI'15 International School and Conference on Network Science, Zaragoza, Spain
- **Main organizer** Meeting Socioeconophysics 2015, Tarragona, Spain
- **Main organizer** Meeting Ibersinc 2016, Tarragona, Spain
- **Main organizer** School of synchronization and neurosciences, Ibersinc 2017, Barcelona, Spain
- **Main organizer** International conference COMPLENET, 2019, Tarragona, Spain

KEYNOTE AND INVITED SPEAKER AT CONFERENCES AND UNIVERSITIES (more relevant last 5 years)

- **Keynote** TU Berlin 2018, Berlin, Germany
- **Keynote** STATPHYS'19, Buenos Aires, Argentina
- **Keynote** Vascular Biology Seminar Series at Harvard Medical School, 2020, Boston, USA
- **Keynote** 8th IISPV scientific session 2021
- **Keynote** Pacific Northwest National Laboratory 2021, Washington, USA
- **Keynote** 30/50 years of Science URV 2022, URV, Tarragona
- **Invited** 22ND International Vascular Biology Meeting IVNM 2022, San Francisco, USA
- **Keynote** International Conference on Complex Systems CCS2024, Exeter, UK
- **Keynote** Hypergraphs: Theory and Applications, Alan Turing Institute, London, UK
- **Keynote** Theoretical Challenges in Network Science, KIAS-KU, Seoul, Korea

SPECIAL ACTIVITIES

- Mathematical modeling assessment on the evolution of COVID-19 for the Government of Spain
- Mathematical modeling assessment on the evolution of COVID-19 for the Government of Generalitat de Catalunya
- Assessment of COVID-19 restrictions at Universitat Rovira i Virgili
- Member of the Working group of ventilation (EBCN-Cluster IAQ)
- Member of the Commission for the Scientific Follow-up of Vaccination in Catalunya, Government of Generalitat de Catalunya
- Member of the Interdisciplinary Group of Professionals linked to Health (GIPS), Consell de Col.legis de Metges de Barcelona
- Member of the project Big Data for Epidemic Preparedness (Catalunya)

- Member of the CACC (Committee for the scientific Assessment of COVID-19 in Catalonia) Government of Generalitat de Catalunya.
- Member of the Network of Epidemiological Intelligence, Government of Generalitat de Catalunya.
- Member of the “Grup Horitzó” for the assessment of the future of science in Catalonia, Government of Generalitat de Catalunya.

MEDIA OUTREACH

- National TV News: TV1 (Spanish), Antena 3 (Spanish), La Sexta (Spanish), Telecinco (Spanish), Cuatro (Spanish), TV3 (Catalan), canal 324 (Catalan), IB3 (Catalan), Beteve (Catalan)
- International TV News: NtN24 (USA), RTL Nord (Germany), Romania TV,
- Radio: Catalunya Radio, RAC1, Onda Cero, Cadena SER, Cadena COPE, Tarragona ràdio, Altafulla ràdio, Calafell ràdio, Agència Catalana de Notícies
- National Newspapers: La Vanguardia, El País, El Periódico, El Punt Avui, La Razón, ABC, Ara.cat, El nacional.cat, El diario.es, VilaWeb, National Geographic Spain, Diari de Tarragona, El Mon, El Mundo, Enredando, AndreuBuenafuente.com, Microsiervos, Heraldo, Diari de Girona, La República, Nació digital, Diari de Tarragona, Lleida.com, InnovaSpain, Diario Tecnologia, Biotech, Cronica Global, Meneame, El blog de ceses, Noticiero Universal, Tu Cambiaras el Mundo, Digital de León, Indicador d’Economía, OkDiario.com, Diari Més, AS, NIUS, EFE Servicios, Vozpópuli, Zonamovilidad, Diari La República Checa, Economía de hoy, Diario Siglo XXI
- International Newspapers: Financial Times (UK), The Huffington Post (UK)
- Website: <https://deim.urv.cat/~alexandre.arenas/>;