Clara Granell Martorell

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Complex Systems Researcher @ Universitat Rovira i Virgili

Current position.

Profesor Titular de Universidad
May 2024— Present
Department of Computer Engineering and Mathematics.
Universitat Rovira i Virgili, Tarragona, Spain.

Previous positions.

Beatriz de Galindo Researcher
May 2020— 2024
Department of Computer Engineering and Mathematics.
Universitat Rovira i Virgili, Tarragona, Spain.

Juan de la Cierva Postdoctoral Researcher
July 2019 — May 2020
Department of Condensed Matter & BIFI.
Universidad de Zaragoza, Zaragoza, Spain.

Visiting Assistant Professor
September 2018 — July 2019
Department of Computer Engineering and Mathematics.
Universitat Rovira i Virgili, Tarragona, Spain.

Postdoctoral Research Scholar
April 2017 — August 2018
Department of Condensed Matter Physics, Universitat de Barcelona & UBICS (UB Institute of Complex Systems).

Postdoctoral Research Scholar
March 2016 — March 2017
Department of Mathematics, University of North Carolina at Chapel Hill.

Education.

Doctor of Philosophy in Computer Science
2012 — 2016
PhD Advisors: Prof. Alex Arenas & Prof. Sergio Gómez Universitat Rovira i Virgili, Tarragona, Catalunya.

Master of Science in Artificial Intelligence
2010 — 2012
Universitat Politècnica de Catalunya, Barcelona, Catalunya.

Bachelor on Computer Engineering
2006 — 2010
Universitat Rovira i Virgili, Tarragona, Catalunya.

Honors and awards.

Beatriz de Galindo Junior Fellowship (2019)
Competitive call for a four-year fellowship for doing research and teaching at a Spanish University.
Awarded by: Ministerio de Ciencia, Innovación y Universidades.

Juan de la Cierva-Formación Postdoctoral Fellowship (2017)
Competitive call for a two-year fellowship for postdoctoral training in Spain.
Awarded by: Ministerio de Ciencia, Innovación y Universidades.

DonaTIC Revelació 2016
Acknowledging women's pivotal role in tech professions, businesses, and academia.
Awarded by: Generalitat de Catalunya

JSMF Postdoctoral Fellowship Award for Studying Complex Systems (2015)
Awarded by: James S. McDonnell Foundation.

Best Master Thesis (2012)
Title: Exploratory Data Analysis Using Network-Based Techniques.
Awarded by: Universitat Rovira i Virgili, Tarragona, Catalunya.

Best Computer Engineering Student (2010)
Awarded by: Universitat Rovira i Virgili, Tarragona, Catalunya.

Award for Best Graduation Project (2010)
Title: Data Clustering Based on Community Detection in Complex Networks. Awarded by: Universitat Rovira i Virgili, Tarragona, Catalunya.

Caixa Manresa University Grant (2006)
Grant for students with the best grades in the Undergraduate Admission Test in Catalonia.
Awarded by: Caixa Manresa.

Scientific publications.

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)

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-Paños, J. Gómez-Gardeñes, A. Arenas.
JMIR Public Health and Surveill, 9, e40514 (2023)

Behavioural 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-Gardeñes, A. Arenas.
Phil. Trans. Royal Society A, 380, 2214, 202110119 (2022).

Virus spread versus contact tracing: Two competing contagion processes.
A. Reyna-Lara, D. Soriano-Paños, S. Gómez, C. Granell, J. T. Matamalas, B. Steinegger, A. Arenas, J. Gómez-Gardeñes.
Phys. Rev. Research, 3, 1, 013163 (2021).

Modeling the Spatiotemporal Epidemic Spreading of COVID-19 and the Impact of Mobility and Social Distancing Interventions.
A. Arenas, W. Cota, J. Gómez-Gardeñes, S. Gómez, C. Granell, J. T. Matamalas, D. Soriano-Paños, B. Steinegger.
Phys. Rev. X 10, 041055 (2020).

Epidemic Spreading: Tailored models for COVID-19.
A. Arenas, J. Gómez-Gardeñes, C. Granell, D. Soriano-Paños.
Europhysics News (2020).

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).

Case studies in network community detection.
S. Shai, N. Stanley, C. Granell, D. Taylor and P. J. Mucha.
The Oxford Handbook of Social Networks (2020).

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

Spontaneous functional recovery after focal damage in neuronal cultures.
S. Teller, E. Estévez-Priego, C. Granell, D. Tornero, J. Andilla, O. Olarte, P. Loza-Alvarez, A. Arenas, and J. Soriano.
eNeuro, 7 (1) (2019).

Epidemic Spreading in Localized Environments with Recurrent Mobility Patterns.
C. Granell and P. J. Mucha.
Phys. Rev. E 97, 052302 (2018).

Detection of timescales in evolving complex systems.
R. K. Darst, C. Granell, A. Arenas, S. Gómez, J. Saramäki, and S. Fortunato.
Scientific Reports, 6, art. no. 39713 (2016).

The physics of spreading processes in multilayer networks.
M. De Domenico, C. Granell, M. A. Porter and A. Arenas.
Nature Physics 12, 901–906 (2016).

Information transfer in community structured multiplex networks.
A. Solé-Ribalta, C. Granell, S. Gómez and A. Arenas.
Frontiers in Physics, 3:61 (2015)

A benchmark model to assess community structure in evolving networks.
C. Granell, R. K. Darst, A. Arenas, S. Fortunato and S. Gómez.
Physical Review E, 92, 012805 (2015)

Emergence of assortative mixing between clusters of cultured neurons.
S. Teller, C. Granell, M. De Domenico, J. Soriano, S. Gómez and A. Arenas.
PLOS Computational Biology 10(9): e1003796 (2014)

Competing spreading processes on multiplex networks: awareness and epidemics.
C. Granell, S. Gómez and A. Arenas.
Physical Review E, 90, 012808 (2014)

Dynamical interplay between awareness and epidemic spreading in multiplex networks.
C. Granell, S. Gómez and A. Arenas.
Physical Review Letters, 111, 128701 (2013).

Structural patterns in complex systems using multidendrograms.
S. Gómez, A. Fernandez, C. Granell and A. Arenas.
Entropy, 15, 5464-5474 (2013)

Hierarchical multiresolution method to overcome the resolution limit in complex networks.
C. Granell, S. Gómez and A. Arenas.

International Journal of Bifurcation and Chaos, 22, 1250171 (2012)

Unsupervised clustering analysis: A multiscale complex networks approach.
C. Granell, S. Gómez and A. Arenas.
International Journal of Bifurcation and Chaos, 22, 1230023 (2012)

Mesoscopic analysis of networks: applications to exploratory analysis and data clustering.
C. Granell, S. Gómez and A. Arenas.
Chaos: An Interdisciplinary Journal of Nonlinear Science, 21, 016102 (2011)

Data clustering using community detection.
C. Granell, S. Gómez and A. Arenas.
International Journal of complex systems in Science, 1, 21-24 (2011)

Teaching.

CURRENT ACADEMIC YEAR (24-25)

Scientific Programming (#17274004)
Bachelor in Mathematics and Physics Engineering

Programming Fundamentals II (#17234131)
Bachelor in Computer Engineering

Data Visualization (#17685206)
Master in Security and Artificial Intelligence

Research and Professional workshops (#12244117)
Bachelor in Journalism

OTHER COURSES PREVIOUSLY TAUGHT

Estructura de dades (Data structures) (URV #17234115)
Bachelor in Computer Engineering

Metodologies de la programació (Programming methods) (URV #17234116)
Bachelor in Computer Engineering

Complex Networks (URV #17685208)
Master in Security and Artificial Intelligence

Dissemination and outreach.

Girl's Day 2023 Lecturer and workshop organizer for the Internation Day of Women in Science.
Girl's Day is an one-day workshop organized by Universitat Rovira i Virgili in which high-school girls attend lectures about STEM disciplines.
Tarragona, Catalonia (February 2023)

Invited Lecture for the International Day of Women in Science.
Organized by Universitat de Barcelona.
Barcelona, Catalonia (Virtual) (February 2021)

Lecture about COVID-19 for primary school students.
Tarragona (Virtual) (June 2020)

Participant in Girl's Day 2019 at the Technical School of Engineering, Universitat Rovira i Virgili.
Tarragona (January 2019)

Invited Lecture at the Closing Ceremony of the URV Talent Jove 2016-2017 program.
Tarragona (July 2017)

Outreach article: "Transiciones de fase en epidemias"
C. Granell, S. Gómez and A. Arenas
Revista Española de Física, 28 (3), 49-52 (2014)

MASS MEDIA

Radio interviews about the spread of COVID-19
El Suplement de Catalunya Radio, 21-03-2020, 29-03-2020, 05-04-2022, 03-05-2022.

Radio interview about work entitled "Spontaneous functional recovery after focal damage in neuronal cultures"
Radio Aragón, 03-03-2020.

Oral contributions.

Lecture at the IX Mediterranean School of Complex Networks 2024.
Title: Modeling Epidemics..
Grado, Italy (July 2024).
This lecture won the Best Lecturer Award, as awarded by the students.

Lecture at the VIII Mediterranean School of Complex Networks 2023.
Title: Community detection: A primer.
Catania, Italy (June 2023).
This lecture won the Best Lecturer Award, as awarded by the students.

Invited Plenary Speaker at Complenet 2023
Title: Modeling COVID-19 Transmission: From Toy Models to Real-World Applications.
Aveiro, Portugal (25-28 April 2023)

Invited Plenary Speaker at MDAI 2022: Modeling Decisions for Artificial Intelligence
Title: Mathematical Modeling of COVID-19 from a Complex Systems Perspective.
Sant Cugat, Catalonia (September 2022)

Lecture at the VII Mediterranean School of Complex Networks 2022.
Title: Community detection: A primer.
Catania, Italy (June 2022).
This lecture won the Best Lecturer Award, as awarded by the students.

Invited Speaker at the Multilayer and Beyond Satellite of NetSci 2020.
Title: Human response to epidemics: how selective prophylaxis can induce oscillations and how pulsating campaigns can palliate them.
Rome, Italy (Virtual) (Sept 2020)

Invited Speaker at the 2nd Edition of the Latin American Conference on Complex Networks (LANET).
Title: Epidemic Spreading modeling on multiplex and bipartite networks.
Cartagena de Indias, Colombia (Ago 2019)

Invited Speaker at the Critical and Collective Effects on Graphs and Networks (CCEGN 2019)
Workshop at Les Houches School of Physics.
Title: Microscopic Markov Chain model for epidemics on networks: from multiplex networks to bipartite metapopulations.
Les Houches, France (May 2019)

Lecture at the V Mediterranean School of Complex Networks.
Title: Community detection: a primer
Salina, Italy (September 2018)

Invited Oral Presentation at the NetSci 2017 Satellite ISODS III.
Satellite name: Information, Self-Organizing Dynamics and Synchronization in Networks.
Indianapolis, IN, USA (June 2017)

Contributed Oral Presentation at NetSciX 2017 conference.
Parallel session: Epidemics and spreading processes.
Tel Aviv, Israel (January 2017)

Lecture at the III Mediterranean School of Complex Networks.
Title: Epidemics on Networks
Salina, Italy (August 2016)

Contributed Oral Presentation at SIAM Network Science Workshop.
Boston, USA (July 2016)

Contributed Oral Presentation at NetSci 2016.
Parallel session: multiplex.
Seoul, Korea (June 2016)

Lecture at the II Mediterranean School of Complex Networks.
Title: Introduction to Community Detection in Complex Networks.
Salina, Italy (June 2015)

Contributed Oral Presentation at Complenet 2015.
Queens, NY, USA (March 2015)

Contributed Oral Presentation at the European Conference on Complex Systems (ECCS) 2014
Lucca, Italy (September 2014)

Lecture at the I Mediterranean School of Complex Networks.
Title: Introduction to Community Detection in Complex Networks.
Salina, Italy (June 2014)

Contributed Oral Presentation at NetSci 2014
Satellite: Physics of multilayered interconnected networks
Berkeley, CA, USA (May 2014)

Oral Presentation at the School on Biological Complex Networks
Natal, Brazil (July 2013)

Seminar at the Oxford Center for Industrial and Applied Mathematics
Oxford, United Kingdom (July 2012)

Contributed Oral Presentation at the conference Net-Works 2010: From theory to Applications of Complex Networked Systems.
Zaragoza, Spain (June 2010)

Posters.

Poster at the III Conference of Complexitat.cat
Barcelona, Catalunya (2014)

Poster at the Network Frontier Workshop
Evanston, IL, USA (2013)

Poster at CompleNet 2013
Berlin, Germany (2013)

Poster at FISES 2012: XVIII Conference on Statistical Physics
Palma de Mallorca, Spain (2012)

Poster at the II Conference of Complexitat.cat
Barcelona, Catalunya (2012)

Poster at the European Conference on Complex Systems (ECCS) 2011
Vienna, Austria (2011)

Accreditations.

Professor Lector
Accrediting entity: AQU Catalunya
Year of accreditation: 2017

Acreditació de Recerca (Professor Agregat)
Accrediting entity: AQU Catalunya
Year of accreditation: 2021

Acreditación para el Cuerpo de Profesor Titular de Universidad
Accrediting entity: ANECA
Year of accreditation: 2023

Boards and committees.

Board member of Complexitat.CAT
Complexitat.CAT is the Catalan association of science in Complex Systems.
Years: 2022 – present

Member of the scientific committee of:	Complenet 2016 Complenet 2018 Netsci 2019 NetsciX 2019 Complenet 2019 IC2S2 2019 Complenet 2020

Editorial activity.

Regular referee of:	Physical Review E Physical Review Letters New Journal of Physics PLOS One Physical D: Nonlinear Phenomena Journal of Statistical Mechanics Science Advances