

Elisenda Ortiz Castillo

Curriculum Vitae

Career objective

To develop novel quantitative and predictive methods for complex systems that address creatively present and future societal challenges.

Key Competencies

- Proficient programming skills
- Strong analytical skills
- Proficient in English
- Great experience working with real data

Education

Jan 2022 – **PhD in Physics**, *University of Barcelona*, Spain.

May 2017 Geometric maps of complex networks are used to investigate the structure and dynamics of real-world complex systems.

Thesis: *Mapping complexity through network geometry: from structure to dynamics of real-world networks.*

Supervisor: Prof. M. Ángeles Serrano

2016–2017 **PhD candidate in Computer Science**, *Victoria University of Wellington*, New Zealand.

*Voluntary withdrawal.

This proposal explored the emergent behaviour of bartering economies described as self-organized dynamical systems.

Thesis: *The emergence of barter: a complex systems study.*

Supervisors: Dr. Marcus Frean and Prof. Stephen Marsland

2014–2016 **Master in Advanced Physics**, *University of Barcelona*, Spain.

Master program focused on theoretical physics with an emphasis on Statistical Mechanics, Computational Physics and Complexity.

Thesis: *Navigability of the Internet as a time-varying complex network.*

Supervisor: Prof. M. Ángeles Serrano – GPA 8.7 of 10

2009–2014 **Bachelor of Physics**, *University of Barcelona*, Spain.

A four-year bachelor in Physics focused on the theoretical track.

Thesis: *Disorder-induced critical phenomena in the 2-D Random Field Ising Model.*

Supervisor: Prof. Carmen Miguel – GPA 10 of 10.

Experience

Research.....

2018–2019 **Research collaboration: Complexity 72h**, International.

A team of PhD students developed a preprint on epidemic spreading using hospital contact networks at a 3-day workshop.

2016–2018 **Research collaboration: Bipartite networks & Topic modeling**, New Zealand.
A collaboration among PhD students during a 5-day retreat that culminated in a peer-reviewed publication.

2016 **Research assistant, Department of Fundamental Physics UB**, Spain.
A grant provided by the University of Barcelona to conduct further research on the main topic of my master thesis.

Teaching.....

2018–2019 **Assistant teacher in Computational Physics**, *University of Barcelona*, Spain.
The role involved teaching 3rd year undergraduates of the Physics bachelor to code in Fortran through practical assignments. Also in charge of marking and occasional theory lessons.

Organizing activities.....

Nov 2017 **Committee member of Macfang2017**, Barcelona, Spain.
Contributed to the organization of the conference Macfang: Mapping Complexity Foundations and Applications of Network Geometry.

2016–2017 **Committee member of Te Pūnaha Matatini Whānau**, *Victoria University*, NZ.
Responsibilities included the organization of workshops and talks for PhD students.

Professional.....

Present – **Physics course designer**, *Gauss Online academy*, Spain.
2021 The position involves the creation of syllabus and content of university physics subjects offered at a private online academy.

2014–2016 **Secretary, Institute of Cosmos Sciences (ICCUB)**, Barcelona, Spain.
Scholarship at the secretary of the ICCUB. Main tasks included data base maintenance, web design, seminar's organization and contribution to science outreach programmes.

Awards and Honors

2020 **Ajuts de mobilitat a la formació per a professorat i personal investigador UB** — Mobility grant from University of Barcelona to conduct an international research stay in the US.

2019 **Ajuts de personal investigador predoctoral en formació (APIF)** — Pre-doctoral scholarship from University of Barcelona.

2018 **Fundación BBVA Big Data Grant**. Mapping Big Data Systems: embedding large complex networks in low-dimensional hidden metric spaces — Pre-doctoral coinvestigator.

2016 **Te Pūnaha Matatini Scholarship in Complex Data Analytics**. — Pre-doctoral scholarship from the New Zealand Centre of Research Excellence for Complex Systems.

2014 **Honors – Graduate thesis**, University of Barcelona

Computer skills

Languages Python, Fortran, C++, R (learning).

Data Vis. Matplotlib, Gnuplot, Xmgrace, Gephi, GeoGebra.

Languages

English Proficient

Spanish Native Speaker
Catalan Native Speaker
Japanese Basic

List of Publications

Publications

- ◇ **Multiscale opinion dynamics on real networks**, E. Ortiz, M.Á. Serrano, *arXiv:2107.06656v2 [physics.soc-ph]* (2021).
- ◇ **Geometric detection of hierarchical backbones in real networks**, E. Ortiz, G. García-Pérez, M.Á. Serrano, *Physical Review Research*, **2**, 033519 (2020).
- ◇ **Geometric randomization of real networks with prescribed degree sequence**, M. Starnini, E. Ortiz, M.A. Serrano, *New Journal of Physics*, **21**, 053039 (2019).
- ◇ **Look who's talking: bipartite networks as representations of a topic model of New Zealand parliamentary speeches**, B. Curran, K. Higham, E. Ortiz, D. Vasques, *PLOS ONE*, *doi.10.1371* (2018).
- ◇ **Dynamics of new strain emergence on a temporal network**, S. Chakraborty, X.R. Hoffmann, M.G. Leguia, F. Nolet, E. Ortiz, O. Prunas, L. Zavojanni, E. Valdano, C. Poletto, *arXiv:1805.04343 [physics.soc-ph]* (2018).
- ◇ **Navigability of temporal networks in hyperbolic space**, E. Ortiz, M. Starnini, M.A. Serrano, *Scientific Reports*, **7**, 15054 (2017).

Theses

- ◇ **Mapping complexity through Network Geometry: from structure to dynamics of real-world networks**, *PhD thesis*, E. Ortiz.
- ◇ **Navigability of the Internet as a time-varying complex network**, *Master thesis*, E. Ortiz.
- ◇ **Disorder-Induced Critical Phenomena in the 2-D Random Field Ising Model**, *Bachelor's thesis*, E. Ortiz, available at *diposit.ub.edu*.

Courses and Schools

- Feb 2021 **Minicurs d'Introducció a la intel·ligència artificial**, *UBICS (online)*, Barcelona.
Introductory course to machine learning.
- Dec 2019 **Tutorial: Wikimedia public (Research) Resources**, *Lisbon*, Portugal.
Hands on tutorial on how to exploit the data resources of Wikipedia website.
- Jan 2019 **Fractals and Scaling**, *Santa Fe Institute (online)*, USA.
- Oct 2018 **Entrepreneurship course**, *Institute for professional development (ICE)*, Barcelona.
A three week program about current skills and resources for entrepreneurs.
- May 2018 **Workshop Complexity72h**, *Lucca*, Italy.
Fast-paced collaboration among PhDs on a project about epidemic spreading in contact networks.
- April 2018 **Membrane Computing**, *University of Barcelona*, Barcelona.
Introductory course to membrane computing technology and its applications.

- Dec 2016 **Workshop: Computation skills with Python**, *Te Pūnaha Matatini Hui*, Wellington, New Zealand.
- Aug 2016 **Te Pūnaha Matatini Boot Camp**, *Leigh*, New Zealand.
A 5 days intense-working retreat focused in the development of data analysis solutions.

Talks and conferences

- Dec 2021 **Complex Networks 2021**, (online), Madrid.
◊ Talk: Multiscale opinion dynamics on real networks.
- Oct 2021 **SICC Talks on Complexity**, 16th SICC International Tutorial Workshop: Topics in nonlinear dynamics (online), Italy.
- Jun 2021 **Opinion Dynamics on Sheaves**, BGSMath Colloquium (online), Barcelona.
- Dec 2019 **Complex Networks and their Applications**, Lisbon, Portugal.
◊ Talk: Geometric randomization of real-world networks.
- Sep 2019 **Physics Challenges for Machine Learning and Network Science**, Queen Mary University of London, UK.
◊ Contribution: Poster.
- Mar 2019 **CompleNet 2019**, Tarragona, Spain.
◊ Talk: Geometric randomization of real networks with prescribed degree sequence.
- Jun 2018 **UBICS day**, Barcelona, Spain.
- Jun 2018 **NetSci 2018**, Paris, France.
◊ Talk: The navigability of temporal networks in hyperbolic space.
- May 2018 **Jornades Complexitat**, Barcelona, Spain.
◊ Contribution: Poster
- Nov 2017 **Macfang: Mapping Complexity Foundations and Applications of Network Geometry**, Barcelona, Spain.
◊ Talk: Navigating temporal networks in hyperbolic space.
- Jun 2017 **UBICS Founding Symposium**, Barcelona, Spain.
◊ Contribution: Poster
- May 2017 **Jornades Complexitat**, Castelldefels, Spain.
◊ Contribution: Poster
- Dec 2016 **Te Pūnaha Matatini Hui**, Wellington, New Zealand.
◊ Talk: Decentralised bilateral exchange in economic complex networks
- Nov 2016 **Complex Economic & Social Systems Theme meeting**, Auckland, New Zealand.