

# Elisenda Ortiz Castillo

---

PhD in Physics of Complex Networks  
Department of Condensed Matter Physics &  
UB Institute of Complex Systems,  
University of Barcelona, C/Martí i Franquès 1  
08028, Barcelona, Spain

✉ [elisendaortiz@gmail.com](mailto:elisendaortiz@gmail.com)  
🔗 [Elisenda Ortiz](#)  
🔗 <https://elisendaortiz.github.io>  
in [Elisenda Ortiz](#)

---

## 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.