ELISENDA ORTIZ

Recently graduated PhD in physics of complex networks with a strong background in data analytics and computational modeling. A creative problem solver, excited about generating powerful insight through global data and statistics.

CONTACT

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in Elisenda Ortiz

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EDUCATION

Ph.D.
Physics
University of Barcelona
Jan 2022 - May 2017
Barcelona, Spain

SKILLS

Programming

Fortran, C++, Bash,
Python (NumPy, Pandas, SciPy, SymPy, Scikit-learn, Networkx, Matplotlib)

Software & Tools

Linux, Git, LaTeX, Parallel & cluster computing.

LANGUAGES

English ●●●●●
Spanish ●●●●●
Japanese ●●●○○

SELECTED PROJECTS

Opinion formation

📅 2022-2021   ⊙ Philippines

- Feat: new tools to visualize and model polarization in social networks
- Method: Agent-based simulations and probabilisitc modeling
- Publication: arXiv:2107.06656v2

Hierarchies in real networks

📅 2020   ⊙ Spain

- Feat: discovered key functional sub-graphs inside larger datasets
- Method: Statistical inference and data embedding (ML)
- Publication: Phys. Rev. Research 2, 033519 (2020)

Topic Modeling

📅 2018   ⊙ New Zealand

- Feat: quantified debate and political discourse trends of NZ Parliament.
- Method: Topic modelling (NPL) applied to public data of political speeches, network reconstruction, and time series analysis.
- Publication: PLOS One 13 (6), e0199072 (2018)

See my personal website or my google scholar for a complete list of published projects.

RELEVANT WORK EXPERIENCE

- **Course designer - STEM**

  📅 current - May 2021   ⊙ Gauss Online, (remote) Spain

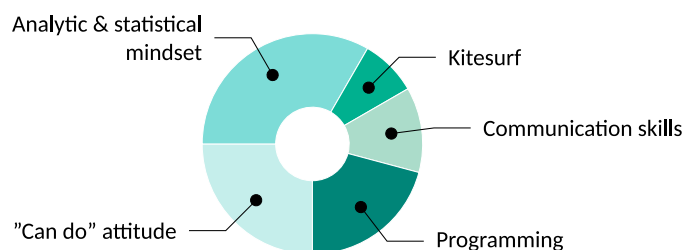 In charge of the physics division content at an online academy delivering premium STEM video-lessons.

- **Assistant teacher - Computational Physics**

  📅 2019 - 2018   ⊙ University of Barcelona, Spain

  Teaching 3rd year undergraduates to code in Fortran through practical assignments and project supervision.

HONOURS & AWARDS

- PhD Thesis Excellent *Cum Laude*
- Fundación BBVA Big Data Grant.

ABOUT

- Analytic & statistical mindset
- Kitesurf
- Communication skills
- Programming
- "Can do" attitude

Elisenda Ortiz Castillo

PhD in Physics of Complex Networks
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Career objective

To apply quantitative and predictive methods to creatively address societal challenges and generate powerful insight through data and statistics.

Key Competencies

o Proficient programming skills
o Strong analytical skills

o Proficient in English
o Great experience working with real data

Education

Jan 2022 – May 2017 **PhD in Physics**, *University of Barcelona*, Spain.
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 — Grade: Excellent *Cum Laude*

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.
	Responsabilities included the organization of workshops and talks for PhD students.

Professional

Present – 2021	**Physics course designer**, *Gauss Online academy*, Spain.
	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 manteinance, 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	Pyhton, 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.