



## Research & Studies

**Postdoctoral research fellow, Universidad Carlos III de Madrid** Mar 2024 - PRESENT

UC3M-Santander Big Data Institute (IBiDat)

Postdoctoral Researcher in machine learning, artificial intelligence, and computational social science, with extensive experience in **industry collaboration**. I have led and contributed to university-enterprise consultancy projects (Art. 60) with high-profile clients including *Santander Bank*, *El Corte Inglés*, *Catenon Talent Hackers*, and *Newry Global Media*. These projects involved developing data-driven solutions using AI, ML, and network science, addressing objectives such as cost optimization, deployment and design of fair and interpretable algorithms, and network-diffusion agent-based modeling.

**Postdoctoral research fellow, IMDEA Networks**

Nov 2022 - Mar 2024

Working mainly for UC3M-Santander Big Data Institute (IBiDat)

**DPhil in Mathematics, University of Oxford**

Sep 2018 - Oct 2022

*Mathematical Institute. Oxford, UK*

Complexity Economics at the Institute for New Economic Thinking of the Oxford Martin School

Thesis: *Data-driven methods for complex social systems: social media, data connect* (2022) under supervision of Prof. Doyne Farmer and Prof. Cameron Hepburn

Available [here](#).

**BSC Physics, Universidad Nacional Autónoma de México**

Aug 2011 - Apr 2018

*Faculty of Sciences. Mexico City, Mexico*

GPA: 9.25/10, First Class

Thesis: *Transporte de Jets: Aplicación al sistema restringido de tres cuerpos* (2018) under supervision of Prof. Luis Benet.

Available [here](#).

## Blas Kolic

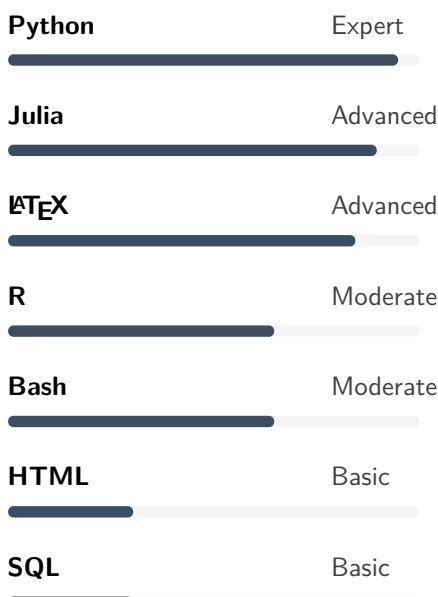
Postdoc (Maths, Networks, ML)

- ▶ Current: Universidad Carlos III de Madrid, Spain
- ▶ PhD: University of Oxford, UK
- ▶ BsC: UNAM, México

## Contact

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- 🌐 [IMDEA Networks website](#)
- 💻 [github.com/blas-ko](https://github.com/blas-ko)
- 🐦 [Blas\\_Ko](#)

## Programming Skills



## Professional experience

**Data Analytics and Tools.**

Apr 2022 - Dec 2025

The World Bank Group (WBG), USA

Short-term consultant for 3+ years. Big data analysis of social networks, focusing on clustering social networks to run randomized controlled trials to reduce hate speech online.

**Data Analyst**

Jul 2016 - Sep 2017

Pondera Lab, Mexico

Machine learning, econometric and statistical modeling, geospatial data analysis, web-scraping, portfolio theory, basic web design (HTML) and model integration (Django + Python)

## Languages

Spanish	Native
English	Expert

## Software

- ⌚ TaylorSeries.jl (contributor)
- ⌚ MexiCovid19 (website & project)
- ⌚ LatentStateInitialization (paper code)
- ⌚ Twitter chambers (paper code)
- ⌚ Music recommendation system (Machine learning Kaggle project)

## Interests

- ▶ Networks
- ▶ Dynamical systems
- ▶ Complex systems
- ▶ Agent-based modelling
- ▶ Big data & statistics
- ▶ Social & behavioural science
- ▶ Statistical physics
- ▶ Music

## Publications & preprints

- Jahani, E., **Kolic, B.**, Tonneau, M., Lin, H., Barkoczi, D., Ikhoria E., Orozco V. & Fraiberger, S. (2026). Celebrity messages reduce online hate and limit its spread. arXiv preprint arXiv:2601.04134. ([link](#))
- **Kolic B.**, Cebrian M., Ukar I. & Lillo R.E. (2025). Incentivized network dynamics in digital job recruitment. *Journal of Complex Networks*, 13(6), cnaf047 ([link](#), [arxiv](#))
- **Kolic, B.**, Monti, C., Morales, G. D. F., & Pangallo, M. (2025). Comparing Data Assimilation and Likelihood-Based Inference on Latent State Estimation in Agent-Based Models. *arXiv preprint arXiv:2509.17625*. (under review) ([link](#))
- **Kolic B.**, Aguirre-López F., et al. (2025). From chambers to echo chambers: quantifying polarization with a second-neighbor approach applied to Twitter's climate discussion. *Journal of Complex Networks*, 13(4), cnaf020. ([link](#), [arxiv](#))
- **Kolic, B.**, Sabuco, J. & Farmer, J.D. (2022). Estimating initial conditions for dynamical systems with incomplete information. *Nonlinear Dynamics*. ([link](#))
- **Kolic B.**, Rodríguez-Cervantes M.T., Padilla P. & Knights F. (2022). Rhythm and form in music: a complex systems approach. *arXiv preprint: 2207.03602*. ([link](#))
- Dyer, J., & **Kolic, B.** (2020). Public risk perception and emotion on Twitter during the Covid-19 pandemic. *Applied Network Science*, 5(1), 1-32. ([link](#))

## Ongoing research

- Pérez-Peralta A., **Kolic B.**, Benítez-Peña S., & Lillo R.E (2026) Algorithmic fairness in neural sheaf diffusion via geometrical Laplacian modifications (*in preparation*)
- Benítez-Peña S., **Kolic B.**, Menéndez V., & Pulido B. (2026). Trade-offs between individual and group fairness in machine learning: a comprehensive review. (*in preparation*).
- **Kolic B.** & Farmer J.D. (2026). Dynamic latent states estimation in agent-based models with network interactions using data assimilation. (*in preparation*).
- Méndez-Civieta A., **Kolic B.**, Ucar I., & Lillo R.E (2026) A new monitoring framework for machine learning models in credit scoring (*in preparation*)

## Selected conferences & schools

- **International Conference on Complex Networks and their Applications (CNA24, Turkey)** (November, 2024) Oral presentation: *Incentivized network dynamics in digital job recruitment*
- **International Conference on Complex Networks and their Applications (CNA23, France)** (November, 2023) Oral presentation: *Incentivized network dynamics in digital job recruitment*
- **International Conference on Computational Social Science (IC2S2, Denmark)** (July, 2023) Oral presentation: *Network interventions to reduce hate speech on Nigerian Twitter*
- **Conference for Complex Systems (CCS22, Spain)** (October, 2022) Oral presentation: *Structure of polarized discussions with unsupervised methods: the Twitter climate change conversation*
- **ICML workshop: Artificial intelligence for agent-based models (AI4ABM, USA)** (July, 2022) Keynote speaker: *Latent states estimation for agent-based models using data assimilation*

- **Workshop for economic heterogenous interacting agents (WEHIA22, Italy)** (June, 2022) Oral presentation: *Latent states estimation for models with network topologies using data assimilation*
- **Conference for Complex Networks & their Applications (CCN21, Spain)** (November, 2021) Poster presentation: *The complexity of the Twitter conversation on climate change*
- **Conference for Complex Systems (CCS21, France)** (October, 2021) Oral Presentations: 1) *Latent state estimation using localised ensemble Kalman filters.* 2) *Rhythm and form in music: A complex systems approach*
- **Machine Learning and Data Assimilation for Dynamical Systems (MLDADS2021, Online).** (June, 2021). Oral Presentation: *Macro to micro & back: Microstates initialization from chaotic aggregate time series.* Available at <https://www.youtube.com/watch?v=7YXn01pYsGM>
- **Conference for Complex Systems (CCS20, Online).** (December, 2020) Oral Presentation: *Public risk perception and emotion on Twitter during the Covid-19 pandemic.* Available at <https://youtu.be/juRUmZaIAkM?t=3082>

## **Research internships**

- **Summer research Intern, Institute National de la Recherche Scientifique.** Montreal, Canada. (May 2015 - August 2015). Project: *Development of a Smartphone-Based Acoustic Environment Tracker for Speech Enhancement Applications* under supervision of Prof. Thiago Falk. Fully funded.
- **Summer research Intern, Centro de Nanociencias y Nanotecnologías.** Baja California, Mexico. (June 2014 - July 2014). Project: *Superficial composition of materials under the XPS method* under supervision of Prof. Leonel Cota Araiza. Fully funded.

## **Teaching experience**

- **PhD in Social Science, Universidad Carlos III de Madrid**
  - **Methods Workshop: Network analysis in Python.** 4Q, 2025. Main teacher
- **Masters in Computational Social Science, Universidad Carlos III de Madrid**
  - **Social Network Analysis.** 2Q, 2025. Main Teacher
  - **Social Network Analysis.** 2Q, 2024. Main Teacher
- **Mathematical Institute, University of Oxford.**
  - **Information Theory.** Hilary term, 2022. Teaching Assistant
  - **Information Theory.** Hilary term, 2021. Teaching Assistant
  - **Networks.** Hilary term, 2021. Tutor
  - **Networks.** Hilary term, 2020. Teaching Assistant
- **Oxford Royale Academy.** Physics teacher. Summer, 2019
- **Private tutoring. Physics & Mathematics.** 2011 - 2018

## **Awards and Funding**

- **Catedra Alimpulsa.** Post-doctoral funding. 2024-2026

- **ECMI 2021 Students Competition.** First place. September 2021.  
Covid-19 data-driven epidemic modelling to test policies and vaccination campaigns in different countries ([announcement here](#).)
- **Smith Award.** Doctoral Scholarship. 2021-2022
- **CONACyT-SENER.** Doctoral Scholarship. 2018-2021
- **Mitacs Globalink.** Summer Scholarship. Summer 2015

Curriculum Vitae, 22nd January 2026

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Blas Kolic