# Blas Kolic

DPhil in Mathematics

▸ Universidad Carlos III de Madrid, Spain

▸ University of Oxford, UK

▸ UNAM, México

## Contact

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🌐 IMDEA Networks website

⌽ github.com/blas-ko

🐦 Blas_Ko

## Programming Skills

**Python** — Advanced
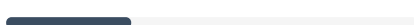
**Julia** — Advanced

**LaTeX** — Advanced

**R** — Moderate

**Bash** — Moderate

**HTML** — Basic

**SQL** — Basic

# Research & Studies

**Postdoctoral research fellow, Universidad Carlos III de Madrid**
UC3M-Santander Big Data Institute (IBiDat)

*Nov 2022 - PRESENT*

**DPhil in Mathematics, University of Oxford**
*Mathematical Institute. Oxford, UK*
Complexity Economics at the Institute for New Economic Thinking of the Oxford Martin School

*Sep 2018 - Oct 2022*

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**
*Faculty of Sciences. Mexico City, Mexico*
GPA: 9.25/10, First Class

*Aug 2011 - Apr 2018*

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

# Professional experience

**Data Analytics and Tools**
The World Bank Group (WBG), USA

*Apr 2022 - Dec 2022*

Big data analysis of social networks focusing on clustering social networks to run randomized controlled trials to reduce hate speech behavior.

**Data Analyst**
Pondera Lab, Mexico

*Jul 2016 - Sep 2017*

- Econometric and statistical modeling

- Geospatial data analysis

- Web-scrapping

- Portfolio theory

- Basic web design (HTML) and model integration (Django + Python)

## Languagues

**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

- **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.**, Cebrian M., Ukar I. & Lillo R.E. (2024). Incentivized network dynamics in digital job recruitment. *arXiv preprint: 2410.09698*. (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)

- **Kolic, B.**, Sabuco, J. & Farmer, J.D. (2022). Estimating initial conditions for dynamical systems with incomplete information. *Nonlinear Dynamics*. (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

- **Kolic B.**, Monti C., Pangallo M., & De Francisci-Morales G (2025). Comparing Data Assimilation and Likelihood-Based Inference on Latent State Inference in Agent-Based Models. (*in preparation*).

- **Kolic B.** & Farmer J.D. (2025). Dynamic latent states estimation in agent-based models with network interactions using data assimilation. (*in preparation*).

- Jahani E., **Kolic B.**, Tonneau M., Barkoczi D., Malhotra N., Orozco V., & Fraiberger S (2025). As Pro-social Messaging Reduces Engagement, the Platform Substitutes the Downstream Effects. (*in preparation*).

- Benítez-Peña S, **Kolic B.**, Menéndez V., & Pulido Belén (2025). Trade-offs Between Individual and Group Fairness in Machine Learning: A Comprehensive Review. (*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 inteligence 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

- **Masters in Computational Social Science, Universidad Carlos III de Madrid**
  - **Social Network Analysis.** 2nd quarter, 2025. Main Teacher
  - **Social Network Analysis.** 2nd quarter, 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

- **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 Gloabalink.** Summer Scholarship. Summer 2015

Curriculum Vitae, 4th September 2025

Blas Kolic