

Laura Alessandretti

Associate Professor

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EMPLOYMENT

Technical University of Denmark, DTU Compute, Sec. Cognitive Systems <i>Associate Professor in Modelling Human Dynamics</i>	København, Denmark <i>Since Feb 2024</i>
Technical University of Denmark, DTU Compute, Sec. Cognitive Systems <i>Tenure Track Assistant Professor in Modelling Human Dynamics</i>	København, Denmark <i>Apr 2020 - Jan 2024</i>
University of Copenhagen, Copenhagen Center for Social Data Science <i>Postdoc, Modelling human behaviour using complex systems and data science.</i>	København, Denmark <i>2018 - 2020</i>
Technical University of Denmark, DTU Compute <i>Postdoc, Modelling human behaviour using complex systems and data science.</i>	København, Denmark <i>Mar-Dec 2018</i>
Information Sciences Institute, University of Southern California <i>Data Science Researcher, Developing spatial stochastic block models for Call Detail Records.</i>	Marina del Rey, California <i>Jun-Aug 2016</i>

EDUCATION

City, University of London · London, UK	(2015 – 2018) <i>PhD in Applied Mathematics (degree: June 14th, 2018)</i>
École Normale Supérieure de Lyon · Lyon, France	(2012 – 2014) <i>MSc in Physics (degree: September 24th, 2014)</i>
Università degli Studi di Torino · Torino, Italy	(2009 – 2012) <i>BSc in Physics (degree: October 9th, 2012)</i>

ADVISORY AND SECONDARY EMPLOYMENTS

European Commission <i>External expert, assisting in the evaluation of grant applications on data and computing technology</i>	Online <i>July 2022</i>
Statistics Denmark <i>Guest Scientist, Analyzing telecommunication data for the official Danish COVID-19 response</i>	København, Denmark <i>Apr 2020 - Dec 2021</i>
IT University of Copenhagen <i>External censor for curricular BSc courses, MSc and BSc theses</i>	København, Denmark <i>Apr 2020 - Present</i>
UNICEF Office of Innovation <i>Researcher, Assisting the data science team to respond to the COVID-19 outbreak</i>	Remote <i>Mar-Sep 2020</i>
Sony Mobile Communications <i>Researcher, Processing large-scale (+20TB) mobility and app usage data in a distributed environment.</i>	Lund, Sweden <i>2018-2019</i>

ACADEMIC AWARDS AND HONORS

Danish Young Academy's Research Environment of the Year <i>Awarded to the Social Complexity lab co-led by me and Prof. Sune Lehmann (10,000 kr.)</i>	Det Unge Akademi <i>May 2023</i>
Best Italian Researcher in Denmark <i>Awarded for my research contributions.</i>	The Italian Embassy <i>June 2022</i>
Tietgenprisen by the Danish Society of Education and Business <i>Based on publications, importance of research for Danish society, and dissemination (250,000 kr.)</i>	DSEB <i>November 2021</i>

RESEARCH GRANTS

HORIZON-CL5-2022-D6-02-04 · Horizon Europe ·	2023-2026 · ~ 1.5 million DKK
Inge Lehmann Grant · Danish Independent Research Fund ·	2022-2025 · ~ 2.8 million DKK

SCIENTIFIC FOCUS AREAS

My work focuses on the study Human Behaviour using large-scale data, and methods borrowed from Network Science, Complex Systems and Computer Science. My research led to discoveries on fundamental aspects of Human Mobility, such as the trade-off between exploration and exploitation in visiting patterns, the interplay between social and mobility behaviors, and the effects of cognitive constraints on movements. I work on topics of societal interest, including gender-gaps in mobility, and the spread of epidemics. A second line of my research focuses on the emergent properties of socio-technical systems, in particular digital markets.

SUPERVISION

Silvia De Sojo Caso

The gender gap in Human Mobility ·

PhD student

Apr 2022-Apr 2025

Federico Delussu

The interplay between air pollution and physical activity

PhD student

Jan 2023-Jan 2025

Lasse Pelle Skytte Hansen

Understanding walkability from street-image data.

Research Assistant

Sep 2023-Nov 2023

Antonio Desiderio (University of Rome Tor Vergata)

The causal impact of WallStreetBets Activity on Financial Markets.

Postdoctoral Researcher

Jan 2024 - Jan 2026

Yuan Liao (Chalmers University)

The Relationship between Income Segregation, Mobility, and Built Environment

Visiting Postdoc

Mar 2024-Mar 2026

· Since 2020, I have advised over 30 MSc and BSc students

INTERNATIONAL RELATIONS

International collaborators include: · Giulio Cimini (University of Rome Tor Vergata) · Yuan Liao (Chalmers University of Technology) · Silvia Bartolucci (University College London) · Oren Frokosh (University of Jerusalem) · Mikko Kivela (Aalto University) · Andrea Baronchelli (City, University of London) · Luca Aiello (IT University of Copenhagen) · Mauro Martino (IBM) · Vedran Sekara (IT University of Copenhagen) · Margaret Crofoot (Max Planck Institute of Animal Behavior)

MANAGEMENT AND LEADERSHIP

General Chair for the IC2S2 conference

Organizing the flagship conference on Computational Social Science (~ 800 attendees).

København, Denmark

2022-2023

Mobility data leader for the NordicMathCovid project

The project gathers Nordic researchers on pandemic preparedness using mathematical modelling.

København, Denmark

Mar 2022 - Present

Lead organizer of the Workshop in Ethics, Just and Secure AI

The workshop is organized at the Opening of the Danish AI Pioneer Center

København, Denmark

Mar 2022

OTHER SCIENTIFIC QUALIFICATIONS

Reviewer for journals including: · Nature Communications · Nature Computational Science · Science Advances · Physical Review Letters · Nature Human Behaviour · Nature Communications

Conference PC Member for international conferences including: · SocInfo · CompleNet · IC2S2 · NetSci-X · NetSci · ICWSM · KDD · Complex Networks · Conference on Complex Systems · ICCS

SELECTED PUBLICATIONS

1. Sapienza, A., Lítla, M., Lehmann, S., and **Alessandretti, L.** (2023). *Exposure to urban and rural contexts shapes smartphone usage behavior.* **PNAS nexus**, 2(11), pgad357.
2. Pappalardo, L., Manley E., Sekara V., and **Alessandretti, L.** (2023). *Future Directions in Human Mobility Science.* **Nature Computational Science**, 3.7, 588-600.
3. **Alessandretti, L.**, Aslak, U., and Lehmann, S. (2020). *The scales of human mobility.* **Nature**, 587(7834), 402-407.

1. Mungo, L., Bartolucci, S., and **Alessandretti, L.** (2024). *Cryptocurrency co-investment network: token returns reflect investment patterns*. **EPJ Data Science**, 13(1), 11.
2. Sapienza, A., Lítla, M., Lehmann, S., and **Alessandretti, L.** (2023). *Exposure to urban and rural contexts shapes smartphone usage behavior*. **PNAS nexus**, 2(11), pgad357.
3. **Alessandretti, L.**, Natera Orozco, L. G., Saberi, M., Szell, M., and Battiston, F. (2023). *Multimodal urban mobility and multilayer transport networks*. **Environment and Planning B: Urban Analytics and City Science**, 50(8), 2038-2070.
4. Pappalardo, L., Manley E., Sekara V., and **Alessandretti, L.** (2023). *Future Directions in Human Mobility Science*. **Nature Computational Science**, 3.7, 588-600.
5. Juul, J. L., **Alessandretti, L.**, Dammeyer, J., Zettler, I., Lehmann, S., and Mathiesen, J. (2023). *Group-specific behavior change following terror attacks*. **Journal of Computational Social Science**, 6(1), 1-18.
6. Andriollo, T., Kouznetsova, V., and **Alessandretti, L.** (2022). *Network approach for the analysis of the irreversible deformation of solids with soft heterogeneities*. **Physical Review Materials**, 6(11), L110601.
7. Mekacher, A., Bracci, A., Nadini, M., Martino, M., **Alessandretti, L.**, Aiello, L. M., and Baronchelli, A. (2022). *Heterogeneous rarity patterns drive price dynamics in NFT collections*. **Scientific reports** 12(1), 1-9.
8. **Alessandretti, L.**, Natera Orozco, L. G., Saberi, M., Szell, M., and Battiston, F. (2022). *Multimodal urban mobility and multilayer transport networks*. **Environment and Planning B: Urban Analytics and City Science**, 23998083221108190.
9. Lucchini, L., Aiello, L. M., **Alessandretti, L.**, De Francisci Morales, G., Starnini, M., and Baronchelli, A. (2022). *From Reddit to Wall Street: the role of committed minorities in financial collective action*. **Royal Society Open Science**, 9(4), 211488.
10. Edsberg Møllgaard, P., Lehmann, S., and **Alessandretti, L.** (2022). *Understanding components of mobility during the COVID-19 pandemic*. **Philosophical Transactions of the Royal Society A**, 380(2214), 20210118.
11. Nadini, M., **Alessandretti, L.**, Di Giacinto, F., Martino, M., Aiello, L. M., and Baronchelli, A. (2021). *Mapping the NFT revolution: market trends, trade networks, and visual features*. **Scientific reports**, 11(1), 20902.
12. Sekara, V., **Alessandretti, L.**, Mones, E., and Jonsson, H. (2021). *Temporal and cultural limits of privacy in smartphone app usage*. **Scientific reports**, 11(1), 1-9.
13. Lucchini, L., **Alessandretti, L.**, Lepri, B., Gallo, A., and Baronchelli, A. (2020). *From code to market: Network of developers and correlated returns of cryptocurrencies*. **Science Advances**, 6(51), eabd2204.
14. **Alessandretti, L.**, Aslak, U., and Lehmann, S. (2020). *The scales of human mobility*. **Nature**, 587(7834), 402-407.
15. ElBahrawy, A., **Alessandretti, L.**, Rusnac, L., Goldsmith, D., Teytelboym, A., and Baronchelli, A. (2020). *Collective dynamics of dark web marketplaces*. **Scientific reports**, 10(1), 1-8.
16. ElBahrawy, A., **Alessandretti, L.**, and Baronchelli, A. (2019). *Wikipedia and cryptocurrencies: interplay between collective attention and market performance*. **Frontiers in Blockchain**, 2, 12.
17. **Alessandretti, L.**, Lehmann, S., and Baronchelli, A. (2018). *Understanding the interplay between social and spatial behaviour*. **EPJ Data Science**, 7(1), 36.

18. **Alessandretti, L.**, ElBahrawy, A., Aiello, L. M., and Baronchelli, A. (2018). *Anticipating cryptocurrency prices using machine learning*. **Complexity**, 2018, 1-16.
19. **Alessandretti, L.**, Sapiezynski, P., Sekara, V., Lehmann, S., and Baronchelli, A. (2018). *Evidence for a conserved quantity in human mobility*. **Nature human behaviour**, 2(7), 485-491.
20. ElBahrawy, A., **Alessandretti, L.**, Kandler, A., Pastor-Satorras, R., and Baronchelli, A. (2017). *Evolutionary dynamics of the cryptocurrency market*. **Royal Society open science**, 4(11), 170623.
21. **Alessandretti, L.**, Sun, K., Baronchelli, A., and Perra, N. (2017). *Random walks on activity-driven networks with attractiveness*. **Physical Review E**, 95(5), 052318.
22. **Alessandretti, L.**, Sapiezynski, P., Lehmann, S., and Baronchelli, A. (2017). Multi-scale spatio-temporal analysis of human mobility. **PloS one**, 12(2), e0171686.
23. **Alessandretti, L.**, Karsai, M., and Gauvin, L. (2016). *User-based representation of time-resolved multimodal public transportation networks*. **Royal Society open science**, 3(7), 160156.

NON PEER REVIEWED PUBLICATIONS

1. Liao, Y., Gil, J., Yeh, S., Pereira, R. H., and **Alessandretti, L.** (2024). *Socio-spatial segregation and human mobility: A review of empirical evidence*. **arXiv preprint** arXiv:2403.06641.
2. Desiderio, A., Aiello, L. M., Cimini, G., and **Alessandretti, L.** (2024). *The causal role of the Reddit collective action on the GameStop short squeeze*. **arXiv preprint** arXiv:2401.14999.
3. **Alessandretti, L.**, and Szell, M. (2022). *Urban Mobility*. **arXiv preprint** arXiv:2211.00355.
4. Alessandretti, L. (2022). *What human mobility data tell us about COVID-19 spread*. **Nature Reviews Physics**, 4(1), 12-13.
5. Alessandretti, L. (2021). *A new computational model for human navigation*. **Nature Computational Science**, 1(10), 642-643.
6. Sahasrabuddhe, R., Lambiotte, R., and Alessandretti, L. (2021). *From centre to centres: polycentric structures in individual mobility*. **arXiv preprint** arXiv:2108.08113.
7. Alessandretti, L., and Lehmann, S. (2021). *Trip frequency is key ingredient in new law of human travel*. **Nature**, 593 (7860), 515-516.
8. Aslak, U., and Alessandretti, L. (2020). *Infostop: scalable stop-location detection in multi-user mobility data*. **arXiv preprint** arXiv:2003.14370.
9. Alessandretti, L., Baronchelli, A., and He, Y. H. (2019). *Machine learning meets number theory: The data science of Birch-Swinnerton-Dyer*. **arXiv preprint** arXiv:1911.02008.