

E.S. Carolina Mattsson

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PERSONAL DETAILS

Name: Elna Sofia Carolina Mattsson
Nationality: Sweden & United States
Place of birth: Göteborg, Sweden
Date of birth: 1992-08-02

EDUCATION

Ph.D. **Northeastern University**, Network Science Institute 2020
B.A. **Lehigh University**, Department of International Relations 2014
B.S. **Lehigh University**, Department of Physics 2014

RESEARCH POSITIONS

Data & AI Researcher 2026-present
Innovation & BSR, Intesa Sanpaolo Turin, Italy
Specialist on Digital Assets. Lead projects on the physics of financial transactions and study the propagation of inflationary shocks over inter-firm transaction networks.

Researcher 2023-2026
CENTAI Turin, Italy
Develop computational methods for marcoeconomic measurement from digital transaction records, such as from CBDCs. Further collaborative projects involving inter-firm transaction networks, digital payment systems, and synthetic data generation for anti-financial crime initiatives. Supervise M.Sc. students at University of Turin.

Postdoctoral Researcher 2020-2022
Leiden Institute of Advanced Computer Science Leiden, Netherlands
Completed projects mapping real-world payment systems from digital transaction records, the graph structure of production networks, and temporal networks. Drove a research collaboration involving multiple universities and government departments. Supervised and co-supervised M.Sc. students in the Computational Network Science Lab.

Graduate Research Fellow 2014-2020
Network Science Institute, Northeastern University Boston, MA
Developed theoretical and computational frameworks for analyzing financial networks using transaction-level data. Furthered methodological innovations in computational social science through integration of digital trace, administrative, and survey data (Lazer Lab). Funded by National Science Foundation Graduate Research Fellowship.

National Undergraduate Fellow 2013
General Atomics San Diego, CA
Participated in an intensive short course at the Princeton Plasma Physics Laboratory; studied the material properties of boron-carbide, an ultra-hard ceramic.

POLICY & INDUSTRY

Central Bank of Brazil, Dutch Ministry of Economic Affairs and Climate, Statistics Netherlands, Grassroots Economics, ING Bank, International Finance Corporation (World Bank Group), Microfinance Opportunities, Cignifi Inc., Telenor Research.

WORKING PAPERS	Modeling financial transactions via random walks on temporal networks <i>Preprint</i>	
	Carolina Mattsson, Claudio Cellnerini, Jaume Ojer, Michele Starnini	
	Holding periods: Inverse estimation of money velocity	<i>Preprint</i>
	Carolina Mattsson, Allison Luedtke, Frank Takes	
	Networks of monetary flow at native resolution	<i>Preprint</i>
	Carolina Mattsson	
JOURNAL ARTICLES	Network growth under opportunistic attachment	2025
	Carolina Mattsson. <i>Applied Network Science</i> 10:21. DOI: 10.1007/s41109-025-00706-x	
	Identifying successful teams in the European player transfer network	2024
	Tristan J. Dieles, Carolina Mattsson, Frank Takes. <i>Applied Network Science</i> 9:65. DOI: 10.1007/s41109-024-00675-7	
	Circulation of a digital community currency	2023
	Carolina Mattsson, Teodoro Criscione, Frank Takes. <i>Scientific Reports</i> 13:5864. DOI: 10.1038/s41598-023-33184-1	
	Sarafu Community Inclusion Currency 2020-2021	2022
Carolina Mattsson, Teodoro Criscione, William Ruddick. <i>Scientific Data</i> 9:426. DOI: 10.1038/s41597-022-01539-4		
	Functional structure in production networks	2021
Carolina Mattsson, Frank Takes, Eelke Heemskerk, Cees Diks, Gert Buiten, Albert Faber, Peter Sloot. <i>Frontiers in Big Data</i> 4:666712. DOI: 10.3389/fdata.2021.666712		
	Trajectories through temporal networks	2021
Carolina Mattsson & Frank Takes. <i>Applied Network Science</i> 6(1), 1-31. DOI: 10.1007/s41109-021-00374-7		
	Context-specific hybrid data collection for social ties in action	<i>prep</i>
Carolina E.S. Mattsson, Drew Margolin, Stefan Wojcik, David Lazer		
CONFERENCE PROCEEDINGS	Multi-Class and Multi-Task Strategies for Neural Directed Link Prediction	2025
	Claudio Moroni, Claudio Borile, Carolina Mattsson, Michele Starnini, Andre Panisson <i>Machine Learning and Knowledge Discovery in Databases, European Conference.</i> DOI: 10.48550/arXiv.2412.10895	
	CADENCE: Community-Aware Detection of Dynamic Network States	2023
Maxwell McNeil, Carolina Mattsson, Frank Takes, Petko Bogdanov. In <i>Proceedings of the 2023 SIAM International Conference on Data Mining (SDM)</i> 1-9. DOI: 10.1137/1.9781611977653.ch1		
POLICY ARTICLES	Network analysis insights for cluster-oriented energy policy	2022
Gert Buiten, Cees Diks, Albert Faber, Eelke Heemskerk, Carolina Mattsson, Frank Takes, Peter Sloot. <i>Economisch Statistische Berichten</i> 106(4804).		

PUBLIC REPORTS	Understanding Key Mobile Money Users	2018
	Carolina Mattsson & Guy Stuart. <i>International Finance Corporation</i>	
	Combating fake news: An agenda for research and action	2017
	David Lazer, Matthew Baum, Nir Grinberg, Lisa Friedland, Kenneth Joseph, Will Hobbs, Carolina Mattsson. <i>Shorenstein Center, Harvard Kennedy School</i>	
COMMENTS	Computational social science with confidence	2024
	Carolina Mattsson. <i>EPJ Data Science</i> 13:3. DOI: 10.1140/epjds/s13688-023-00435-0	
	Why is inequality bad?	
	<i>Social Science Space Blog</i> . SAGE Publishing	2019
	Theory and tools in the age of big data	
	<i>SAGE Ocean Blog</i> . SAGE Publishing	2019
	Expert Commentary: The Digital Currency Problem	
	<i>Undergraduate Mathematics and Its Applications Vol 40.2-3</i> . COMAP	2019

**SEMINARS &
INVITED TALKS**

- 2026 An afternoon of socioeconomic data science, Aalto University
- 2025 Complexity in Economics & Finance, Conference on Complex Systems, Siena
- 2025 Leiden Complex Networks Network Seminar, Leiden University
- 2025 Complexity Economics Seminar, Torino, Italy
- 2025 Santa Fe Institute, Santa Fe, NM
- 2024 ComplexTime Satellite, Conference on Complex Systems, Exeter, UK
- 2024 Bank Indonesia Institute, Jakarta, Indonesia
- 2024 Hypergraphs: Theory and Applications, Isaac Newton Institute, London, UK
- 2024 Complexity Economics Seminar, Torino, Italy
- 2024 Network Science Institute, Northeastern University, Boston, MA
- 2024 Center for Collective Learning, Corvinus University, Budapest, Hungary
- 2023 Computational Network Science Group, Leiden University, NL
- 2023 Oxford Network Seminar, Oxford University, UK
- 2023 Institute for Analytical Sociology Seminar, Linköping University, Sweden
- 2022 1st Interdisciplinary Workshop on Firm-Level Supply Networks, Complexity Science Hub, Vienna, Austria
- 2022 NETWORKS Unit, Scuola IMT Alti Studi Lucca, Italy
- 2022 Socioeconomic Networks Workshop, Waseda University, Tokyo, Japan
- 2022 Informatics Institute & ILLC, University of Amsterdam, Amsterdam, NL
- 2022 Physics of Information and Quantum Technologies Group, Instituto de Telecomunicações, Instituto Superior Técnico, Universidade de Lisboa, Portugal
- 2022 Networks Webinar Series, Janeway Institute Cambridge, UK
- 2021 Network Science Institute, Northeastern University, Boston, MA
- 2021 CID Growth Lab, Harvard Kennedy School, Cambridge, MA
- 2021 ANET Lab, ELKH Centre for Economic and Regional Studies, Hungary
- 2021 Eurasian Summit for Models of Society, Tokyo Institute of Technology, Japan
- 2020 Leiden Complex Networks Network Seminar, Leiden University, NL
- 2020 Dutch Network Economics Day, Tinbergen Institute, Amsterdam, NL
- 2020 Economics Department Seminar, St. Olaf College, St. Olaf, MN
- 2020 The B.E.S.T. Workshop and Satellite of NetSci-X Tokyo on “Complex Systems in Finance and Economics”, Kyoto University, Japan
- 2019 CID Growth Lab, Harvard Kennedy School, Cambridge, MA
- 2018 Telenor Research, Telenor

**AWARDED
GRANTS**

- \$46,000 **National Science Foundation** 2019
INTERN Supplemental Funding Opportunity
- \$100,000 **Bill & Melinda Gates Foundation** 2016
with Guy Stuart, Executive Director, Microfinance Opportunities
- \$138,000 **National Science Foundation** 2015
Graduate Research Fellowship Program

**HONORS &
AWARDS**

- Networks 2021 Best Pitch Talk Award 2021
- NSF Graduate Research Fellowship 2015
- NULab for Text, Maps, and Networks Fellowship 2014
- Oles M. Smolansky Award for Academic Excellence in IR 2014
- Donald T. Campbell Social Science Research Prize 2014
- Lemmon Prize 2014
- National Undergraduate Fellowship 2013
- Malcolm J. Gordon, Jr. Physics Prize 2011
- Lehigh University Academic Merit Award 2010
- National Merit Scholar 2009

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LEADERSHIP	Workshop on Economic and Financial Networks		
	Organizer, StatPhys Florence	2025	
	Lead organizer, NetSci Maastricht	2025	
	Lead organizer, NetSci Québec City	2024	
	Lead organizer, CCS Salvador da Bahia	2023	
	Organizer, NetSci Vienna	2023	
	Organizer, CCS Mallorca	2022	
	Lead organizer, NetSci-X Tokyo	2020	
	Organizer, NetSci Burlington	2019	
		Dutch Network Science Society Symposium	
	Lead organizer, Leiden University	2022	
REVIEWING	• Nature Communications	• Scientific Reports	
	• EPJ Data Science	• Royal Society Open Science	
	• Applied Network Science	• Social Networks	
	• Japanese Economic Review	• Frontiers in Big Data	
	• Entropy	• PLOS ONE	
	SERVICE	Conferences in Complex Systems	
		Program Committee Member, CCS Siena	2025
		Program Committee Member, FRCCS Bordeaux	2025
		Program Committee Member, CCS Exeter	2024
		Conferences in Network Science	
Program Committee Member, NetSci Maastricht		2025	
Program Committee Member, ComplexNetworks Binghamton NY		2025	
Program Committee Member & Session Chair, NetSci Québec City		2024	
Program Committee Member, ComplexNetworks Istanbul		2024	
Program Committee Member & Session Chair, NetSci-X Venice		2024	
Program Committee Member, NetSci Vienna		2023	
Program Committee Member, ComplexNetworks Menton		2023	
Program Committee Member, NetSci Shanghai		2022	
Program Committee Member, NetSci-X Porto		2022	
Program Committee Member, Networks		2021	
Program Committee Member, NetSci Rome		2020	
Program Committee Member, NetSci-X Tokyo		2020	
School, Satellite, and Poster Committee Member, NetSci Burlington		2019	
Invited Speaker Liaison, CompleNet Boston		2018	
Conference in Computational Social Science			
Program Committee Member, IC2S2 Copenhagen		2023	
Program Committee Member, IC2S2 Chicago		2022	
Program Committee Member & Session Chair, IC2S2 Zurich		2021	
Program Committee Member, IC2S2 Cambridge, MA		2020	
Program Committee Member, IC2S2 Amsterdam		2019	
Southern Economics Association Annual Meeting			
Discussant, Houston, TX & New Orleans, LA		2020-21	

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TEACHING	FIS0186: Complexity Economics	2025
	Guest lecturer for Lecture 7: Financial Networks	University of Torino
	LISS238: Social Network Analysis	2020-2026
	London Interdisciplinary Social Science Doctoral Training Partnership	King's College London
	DS2001: Programming with Data Social Science Practicum	2019
	Khoury College of Computer Sciences	Northeastern University
SUPERVISION	Luca Bonanno* M.Sc. Complex Systems, University of Torino	<i>ongoing</i>
	<i>Matching in credit markets for economic ABMs (with Bank of Brasil)</i>	
	Enrico Fracasso* M.Sc. Complex Systems, University of Torino	10-2025
	<i>Structural Stability in Soccer: A Dynamic Graph Approach with a Large Events Model</i>	
	Sadaf Ismaeli Rad B.Sc. Computer Science, Leiden University	08-2025
	<i>From Global Network Attributes to Temporal Motifs: Predicting User Retention in the Sarafu Network</i>	
	Claudio Cellerini* M.Sc. Complex Systems, University of Torino	04-2025
	<i>Activity-Driven Modeling of Financial Transactions Networks</i>	
	Alireza Samiei* M.Sc. Media Technology, Leiden University	04-2023
	<i>The Co-investment Network of the Dutch Entrepreneurial Ecosystem</i>	
Tristan Dielles B.Sc. Computer Science, Leiden University	08-2022	
<i>Description of transfer networks in football</i>		
Philippe Bors* M.Sc. Computer Science, Leiden University	08-2022	
<i>Local network connectivity structure and link prediction</i>		
Jingsen Chen M.Sc. Computer Science, Leiden University	04-2021	
<i>Impact of Financial Activity On Trajectory Heuristics</i>		
Martijn Vlak M.Sc. ICT in Business, Leiden University	03-2021	
<i>Impact of the intelligent lockdown on the Dutch inter-industry transaction network</i>		
Niek Buwalda M.Sc. Computer Science, Leiden University	08-2020	
<i>Obtaining a network-driven understanding of the differences in user-level interaction within topical online communities</i>		
Roshni Padhi* Research Science Institute Summer Program, MIT	07-2018	
<i>Following the Money: Analyzing Mobile Money Networks in Developing Countries</i>		

* served as primary thesis advisor