

Carolina Mattsson, PhD

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AFFILIATION	Leiden University Leiden Institute for Advanced Computer Science Niels Bohrweg 1, 2333 CA Leiden The Netherlands	2020-present
EDUCATION	Northeastern University Ph.D. Network Science	March 23, 2020
	Lehigh University B.S. Physics B.A. International Relations Eckardt Scholar Program	May, 2014
JOURNAL ARTICLES	Functional structure in production networks Carolina E.S. Mattsson, Frank W. Takes, Eelke M. Heemskerk, Cees Diks, Gert Buiten, Albert Faber, Peter M.A. Sloot <i>Frontiers in Big Data</i> 4:666712 doi.org/10.3389/fdata.2021.666712	2021
	Trajectories through temporal networks Carolina E.S. Mattsson, Frank W. Takes <i>Applied Network Science</i> 6(1), 1-31 doi.org/10.1007/s41109-021-00374-7	2021
PREPRINTS	Networks of monetary flow at native resolution Carolina E.S. Mattsson Preprint: https://arxiv.org/abs/1910.05596	2019
	Context-specific hybrid data collection for social ties in action Carolina E.S. Mattsson, Drew Margolin, Stefan Wojcik, David Lazer <i>Submitted</i>	
REPORTS	Complexity economics and the energy transition in Zeeland Carolina Mattsson, Frank W. Takes, Eelke M. Heemskerk, Cees Diks, Gert Buiten, Peter M.A. Sloot. <i>Dutch Ministry of Economic Affairs and Climate Policy</i>	2021
	Understanding Key Mobile Money Users Carolina Mattsson, Guy Stuart. <i>International Finance Corporation</i> .	2018
	Combating fake news: An agenda for research and action David Lazer, Matthew Baum, Nir Grinberg, Lisa Friedland, Kenneth Joseph, Will Hobbs, Carolina Mattsson. <i>Harvard Kennedy School, Shorenstein Center on Media, Politics and Public Policy</i> .	2017
PATENTS	Method and Apparatus for Tracking Data in an Entry-Exit Network U.S. Provisional Patent Application No.: 62/809,359	2019

THESES	Financial Transaction Networks <i>Network Science Institute, Northeastern University.</i>	2020
	Abrupt Changes in Nuclear Power Development <i>Department of International Relations, Lehigh University.</i>	2014
COMMENTS	Why is inequality bad? <i>Social Science Space Blog</i>	11/2019
	Theory and tools in the age of big data <i>NULab for Text, Maps, and Networks Blog</i>	03/2019
	Expert Commentary: The Digital Currency Problem <i>Undergraduate Mathematics and Its Applications Vol 40.2-3</i>	2019
HONORS & AWARDS	• NSF INTERN	2019
	• 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
	• Rhodes Scholarship and Marshall Scholarship Finalist	2014
	• National Undergraduate Fellowship	2013
	• Malcolm J. Gordon, Jr. Physics Prize	2011
	• Lehigh University Academic Merit Award	2010
	• National Merit Scholar	2009
GRANTS & FELLOWSHIPS	Open Competition Domain Science XS Dutch Research Council (NWO)	<i>in preparation</i>
	INTERN Supplemental Funding Opportunity National Science Foundation	2019
	Understanding Advanced Users of Mobile Money <i>with Guy Stuart, Executive Director, Microfinance Opportunities</i> Bill & Melinda Gates Foundation	2016
	Graduate Research Fellowship Program National Science Foundation	2015
	NULab for Text, Maps, and Networks Fellowship NULab for Text, Maps, and Networks, Northeastern University	2014
	National Undergraduate Fellowship Program U.S. Department of Energy	2013
	Network and temporal structure of monetary flow ANET Lab Seminar Series, ANET Lab	06/2021
INVITED TALKS	Tracing the movement of money with transaction data Eurasian Summit for Models of Society, Tokyo Institute of Technology	03/2021

Trajectories through temporal networks
 Leiden Complex Networks Network Seminar, Leiden University 10/2020

Networks of money flow at high resolution
 Dutch Network Economics Day, Tinbergen Institute 10/2020

Money flow networks from mobile money transaction data
 Economics Department Seminar, St. Olaf College 10/2020

Follow the money: making sense of financial transaction networks
 B.E.S.T. Workshop on “Complex Systems in Finance and Economics”, Kyoto University 01/2020

Follow the money: making sense of digital payment systems
 Center for International Development, Harvard Kennedy School 03/2019

PRESENTATIONS

Functional structure in production networks
 with Frank Takes, Eelke Heemskerk, Cees Diks, Gert Buiten, Peter Sloot
 Young Academics Network Conference, Cambridge, UK 06/2021
 North American Social Networks Conference, Virtual 01/2021

Networks of money flow at high resolution
 Southern Economics Association Annual Meeting, New Orleans, LA 11/2020

Follow the money: making sense of financial transaction data
demo at BigSurv20 Big Data Meets Survey Science, Utrecht, NL 11/2020

Someone to call on: studying social ties in action
 with Drew Margolin, Stefan Wojcik, David Lazer
 BigSurv20 Big Data Meets Survey Science, Utrecht, NL 11/2020
 INSNA Conference Sunbelt XL, Paris, FR 07/2020

Quantifying the circulation of money through payment systems
 International Conference on Network Science X, Tokyo, Japan 01/2020

Monitoring Mobile Money Use
poster with Shafique Jamal, Soren Heitmann, Guy Stuart
 NetMob Conference, Mathematical Institute, University of Oxford 07/2019

Follow the money: making sense of payment systems
 International Conference on Network Science, Burlington, VT 05/2019 North America Convening of INET YSI, Los Angeles 02/2019

Quantifying economic activity on financial transaction networks
poster at International Conference on Complex Systems, Cambridge, MA 07/2018

Follow the money: Defining node sequences on weighted and directed temporal networks
 Statistical Physics for Financial and Economic Networks, NetSci Paris 06/2018
 International Conference on Complex Networks 2018, Boston 03/2018

Disambiguating the Federal Election Commission Campaign Contribution Database

with Navid Dianati, Derek Ruths, David Lazer

Politics & Computational Social Science, Northeastern University 08/2018

What does mobile metadata measure? Insights from a pilot study during a sudden emergency

with Drew Margolin, Stefan Wojcik, David Lazer

NetMob Conference 2017, Vodafone Village, Milan, Italy 04/2017

Interpersonal network dynamics in an emerging crisis

with Drew Margolin, David Lazer

INSNA Conference Sunbelt XXXVI, Newport Beach, CA 04/2016

On social ties and stability: an agent-based model of informal economies

poster with Eloy Fisher, Sharon Greenblum, Jakub Rojcek

Workshop on Information in Networks Conference, New York, NY 10/2015

Boron Carbide Materials for Inertial Confinement Fusion

poster with G.C. Randall, H. Xu, H. Streckert, C. Hill, A. Nikroo (General Atomics)

APS Division of Plasma Physics Conference, Denver, CO 11/2013

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TEACHING	LISS238: Social Network Analysis 2020 London Interdisciplinary Social Science Doctoral Training Partnership Kings College London Instructor: <i>planned and gave all lectures, facilitated programming exercises, adapted syllabus, adapted lecture materials.</i>
	DS2001: Programming with Data Social Science Practicum 2019 Khoury College of Computer Sciences, Northeastern University Instructor: <i>wrote in-class programming exercises, wrote final project assignment, adapted syllabus, planned readings and facilitated discussion, held office hours, graded work and assigned final grades.</i>
SUPERVISION	Jingsen Chen 04-2021 M.Sc. Computer Science, Leiden University The Impact of Financial Activity On Trajectory Heuristics Leiden, NL
	Martijn Vlak 03-2021 M.Sc. ICT in Business, Leiden University Impact of the intelligent lockdown on the Dutch inter-industry transaction network Leiden, NL
	Niek Buwalda 08-2020 M.Sc. Computer Science, Leiden University Obtaining a network-driven understanding of the differences in user-level interaction within topical online communities Leiden, NL
	Roshni Padhi 07-2018 Research Science Institute Summer Program, MIT Following the Money: Analyzing and Modeling Mobile Money Networks in Developing Countries Boston, USA
SEMINARS	Complexity Economics Introductory Reading Group 2019 Young Scholar Initiative, Institute for New Economic Thinking Organizer: <i>prepared reading list, facilitated discussion.</i>
	Network Science PhD Bootcamp 2018 & 2019 Network Science Institute, Northeastern University Organizer: <i>taught modules, facilitated discussion.</i>
MENTORING	COMAP Interdisciplinary Contest in Modeling Final Grader, ICM Problem D (networks) 2021 Final Grader, ICM Problem F (policy) 2019
	MIT Research Sciences Institute Summer Program Project mentor 2018

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EDUCATION	Northeastern University Ph.D. Network Science	March 23, 2020
	Lehigh University B.S. Physics B.A. International Relations Eckardt Scholar Program	May, 2014
GRADUATE COURSES	<ul style="list-style-type: none">• Complex Networks• Dynamic Processes on Networks• Data Mining Techniques• Bayesian & Network Statistics• Algorithms• Social Networks• Social Capital & Resilience• International Economic Development• Economics of Money and Banking (Coursera)	
WORKSHOPS	Social Science Foo Camp Facebook Headquarters, Menlo Park, CA	2019
	Summer School in Economic Networks Mathematical Institute, University of Oxford	2018
	Complex Systems Summer School Santa Fe Institute, Santa Fe, NM	2015
TECHNICAL SKILLS	Programming & Statistics: Python, R, Gephi, QGIS, SPSS, Stata, Fortran Research Computing: Unix, Git, SLURM, AWS Command Line Interface Languages: Native fluency in English & Swedish. Fluent in Spanish.	

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PROFESSIONAL AFFILIATIONS • Network Science Society • American Economic Association
• Society for Young Network Scientists • INET Young Scholar Initiative
• International Network of Social Network Analysis

REVIEWING • EPJ Data Science • Applied Network Science
• Frontiers in Big Data • Japanese Economic Review

LEADERSHIP & SERVICE **Southern Economics Association Annual Meeting**
Discussant, New Orleans, LA 2020

International Conference on Network Science
Program Committee Member, NetSci Rome 2020
Program Committee Member, NetSci-X Tokyo 2020
School, Satellite, and Poster Committee Member, NetSci Burlington 2019

Workshop on Economic and Financial Networks
Organizer, NetSci-X Tokyo 2020
Organizer, NetSci Burlington 2019

International Conference on Computational Social Science
Program Committee Member, IC2S2 Zurich 2021
Program Committee Member, IC2S2 Cambridge, MA 2020
Program Committee Member, IC2S2 Amsterdam 2019

INET Young Scholar Initiative
Organizer, Complexity Economics Working Group 2019

International Conference on Complex Networks
Invited Speaker Liaison, CompleNet Boston 2018

Society for Young Network Scientists
Mentor, NetSci Satellite Workshop 2020
Founding Member 2018

Network Science Institute Graduate Student Association
Founding President 2016-17

Northeastern College of Science Graduate Student Council
Representative, Network Science Program 2015-17

Lehigh University Council of Student Presidents
Representative, Global Union 2015-17

Lehigh University Global Union
President 2014

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RESEARCH POSITIONS

Postdoctoral Researcher in Network Science 2020-2021
Leiden Institute of Advanced Computer Science Leiden, Netherlands
Advance projects on the structure of production networks, real-world transaction data from payment systems, and temporal network representations. Co-supervise MSc students in the Computational Network Science Lab.

NSF Graduate Research Fellow 2014-2020
Network Science Institute, Northeastern University Boston, MA
Developed network science for financial transaction data as applied to real-world payment systems. Furthered projects in the Lazer Lab on methods in computational social science integrating digital trace, administrative, and survey data.

National Undergraduate Fellow 2013
General Atomics San Diego, CA
Participated in an intensive short course on plasma physics; studied the material properties of boron-carbide, an ultra-hard ceramic.

CONSULTING EXPERIENCE

Business for Social Responsibility Project 2019
with Microfinance Opportunities, Cambridge, MA
Analyst. The objective of this work was to quantify and understand the impact of wage digitization (HerProject) on the lives of garment workers in Bangladesh, and their use of financial services. Responsible for technical analysis of financial transaction data, quantifying the behavior of individual mobile money users from empirical cash flow patterns. The resulting behavioral measures are integrated with rich survey data to better understand the use of financial services among the poor.

Digital Money Network Analysis
with Microfinance Opportunities, Cambridge, MA.
International Finance Corporation 2017
Researcher. The objective of this project was to quantify the maturity of mobile money services from providers' own transaction records. Responsible for technical analysis of financial transaction data, developing and implementing measures, and drafting reports. The measures developed under the course of this project are suitable for comparison across providers and countries, which will contribute to identifying and sharing best practices for mobile money providers. This project also uncovered commission manipulation, a form of systematic fraud, by a subset of mobile money agents.

Understanding Key Mobile Money Users
with Microfinance Opportunities, Cambridge, MA.
Bill & Melinda Gates Foundation 2016
Researcher. The objective of this project was to identify and profile key users of mobile money services in Uganda, Kenya, and Tanzania. Responsible for data cleaning, data analysis, interpretation of results, and drafting reports.

Integrated three waves of Financial Inclusion Insights surveys of mobile money use; conducted big data analysis of mobile money transactions.

Mobile Money Study

with Cignifi Inc., Cambridge, MA.

International Finance Corporation

2015

Analyst. The objective of this work was to identify and target potential mobile money users using Call Detail Records. Responsible for providing subject-area expertise and conducting network analysis on mobile money transaction data.