Timothy LaRock

Mathematical Institute, University of Oxford - Oxford, UK → +44 7483 251816 •
 ⊨ larock@maths.ox.ac.uk •
 [™] tlarock.github.io

Academic Appointments

Mathematical Institute, University of Oxford Postdoctoral Research Associate

Education

Northeastern University Network Science Institute PhD in Network Science	Boston, MA December 2021
Dissertation: Representing and Analyzing Pathway Data Through Networks	
Committee : Prof. Tina Eliassi-Rad (Advisor), Prof. Samuel V. Scarpino (Northeastern), P (Northeastern), Prof. Ingo Scholtes (University of Würzburg)	rof. Hongyang Zhang
The Honors College, University at Albany, State University of New York Bachelor of Science in Computer Science and Applied Mathematics Minor: Philosophy	Albany, NY May 2016
Advisors: Prof. Petko Bogdanov & Prof. Mariya Zheleva Honors Thesis: Wireless Frequency Spectrum Characterization and Transmitter Detect	tion Using Wavelets

Research Experience

Mathematical Institute, University of Oxford	Oxford, UK
Postdoctoral Research Associate	April 2022 - Present
Network Science Institute, Northeastern University	Boston, MA
Research Assistant, Bad Lab	August 2016 - December 2021
ETH Zürich/University of Zürich	Zürich, Switzerland
Visiting Researcher - Chair of Systems Design/Data Analytics Group	Summer 2018
Computer Science Department, University at Albany, SUNY	Albany, NY
Research Assistant, Data Management and Mining Lab	Fall 2014 - Summer 2016
NSF Research Experience for Undergraduates	Siena College, Loudonville, NY

Research Assistant

Teaching Experience

Oxford Summer School in Economic Networks	Oxord, UK
Tutorial Instructor	June 2023
Khoury College of Computer Sciences, Northeastern University	Boston, MA
Instructor - CS 3000 - Algorithms & Data	Summer 2020
Course Website: https://tlarock.github.io/teaching/cs3000/syllabus.html	
Computer Science Department, University at Albany, SUNY	Albany, NY
Teaching Assistant - ICSI 201 - Introduction to Computer Science	Fall 2014

Peer-Reviewed Journal Papers

- Timothy LaRock, I. Scholtes, T. Eliassi-Rad, "Sequential Motifs in Observed Walks", Journal of Complex Networks, 10:5, October 2022 https://doi.org/10.1093/comnet/cnac036
- Timothy LaRock, M. Xu, T. Eliassi-Rad, "A Path-based Approach to Analyzing the Global Liner Shipping Network", EPJ Data Science, 11:1, March 2022. https://doi.org/10.1140/epjds/s13688-022-00331-z
- Timothy LaRock, T. Sakharov, S. Bhadra, T. Eliassi-Rad, "Understanding the Limitations of Network Online Learning", Applied Network Science, 5:60, September 2020. https://doi.org/10.1007/s41109-020-00296-w

Oxford, UK April 2022 - Present

Summer 2014

Peer-Reviewed Conference Papers

- Timothy LaRock, V. Nanumyan, I. Scholtes, G. Casiraghi, T. Eliassi-Rad, F. Schweitzer, "HYPA: Efficient Detection of Path Anomalies in Time Series Data on Networks", Proceedings of the 2020 SIAM International Conference on Data Mining (SDM). May 2020. https://epubs.siam.org/doi/abs/10.1137/1. 9781611976236.52
- M. Zheleva, **Timothy LaRock**, P. Schmitt, P. Bogdanov, "Efficient spectrum summarization using compressed spectrum scans", 2018 IEEE Conference on Computer Communications Poster and Demo (INFOCOM), April 2018. Poster.
- M. Zheleva, P. Bogdanov, **Timothy LaRock**, P. Schmitt, "AirVIEW: Unsupervised transmitter detection for next generation spectrum sensing", IEEE International Conference on Computer Communications (INFOCOM2018), April 2018.
- **Timothy LaRock**, P. Schmitt, P. Bogdanov, E. Belding, M. Zheleva, "AirPress: Towards Scalable Spectrum Inventory", 13th USENIX Symposium on Networked Systems Design and Implementation, March 2016. Poster.
- **Timothy LaRock**, L. Mathews, M. Roberts, D. Lim, S. Small, "Siena's Twitter Information Retrieval System: The 2014 Microblog Track", In Proceedings of the Twenty-Third Text REtrieval Conference (TREC), November 2014. Poster.

Peer-Reviewed Workshop Papers

• **Timothy LaRock**, T. Sakharov, S. Bhadra, T. Eliassi-Rad, "Reducing Network Incompleteness Through Online Learning: A Feasibility Study", 14th International Workshop on Mining and Learning with Graphs (MLG, co-located with The 24th ACM SIGKDD Conference on Knowledge Discovery and Data Mining), August 2018.

Conference Presentations

- International Conference on Network Science (NetSci'18, '19, '20, & '23), June 2018, May 2019, September 2020, July 2023. Video link from 2020.
- Complex Networks and Their Applications, November 2022.
- Conference on Complex Systems, October 2022.
- IMA Conference on Mathematical challenges of Big Data, September 2022.
- American Physical Society March Meeting, March 2022.
- Networks 2021: A Joint Sunbelt and NetSci Conference, June 2021.
- 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD'19), August 4th, 2019. Peer-reviewed Tutorial.
- 9th International Conference on Complex Networks (CompleNet'18), March 2018.

Invited Talks

- "Sequential Motifs in Observed Walks", Queen Mary University of London Complex Systems Seminar, November 2022.
- "Sequential Motifs in Observed Walks", Oxford Networks Seminar, June 2022.
- "Detecting Path Anomalies in Time Series Data on Networks", Higher Order Models in Network Science Satellite (HONS), May 2019.

Preprints

- **Timothy LaRock**, Lambiotte, R., "Encapsulation Structure and Dynamics in Hypergraphs", arXiv, July 2023. https://arxiv.org/abs/2307.04613.
- S. McCabe, L. Torres, **Timothy LaRock**, et al., "netrd: A library for network reconstruction and graph distances", arXiv, October 2020. https://arxiv.org/abs/2010.16019.
- B. Klein, **Timothy LaRock**, S. McCabe, L. Torres, et al., "Reshaping a nation: Mobility, commuting, and contact patterns during the COVID-19 outbreak", MOBS Lab (self-published), May 2020. https://www.mobs-lab.org/uploads/6/7/8/7/6787877/covid19mobility_report2.pdf
- B. Klein, **Timothy LaRock**, S. McCabe, L. Torres, et al., "Assessing changes in commuting and individual mobility in major metropolitan areas in the United States during the COVID-19 outbreak", MOBS Lab (self-published), March 2020. https://www.mobs-lab.org/uploads/6/7/8/7/6787877/assessing_mobility_changes_in_the_united_states_during_the_covid_19_outbreak.pdf
- Timothy LaRock, V. Nanumyan, I. Scholtes, G. Casiraghi, T. Eliassi-Rad, F. Schweitzer, "Detecting Path

Anomalies in Time Series Data on Networks", arXiv, May 2019. https://arxiv.org/abs/1905.10580.

Professional Activities & Service

- Workshop/Satellite Organizer
- Networks 2021 Satellite on Dynamics and Motifs in Networks (DynaMo), June 2021 Journal Referee
- Science Advances
- EPJ Data Science
- Transactions on Knowledge and Data Engineering
- Program Committees
- Complex Networks and Their Applications 2022
- Departmental Service
- Mathematical Institute Representative to the University of Oxford Research Staff Forum
- Oxford Mathematical Institute Happy Hour Committee

Awards & Honors

Student-led Research on New Opportunities for Dynamic Spectrum Acces With Prof. Mariya Zheleva, Awarded by Dynamic Spectrum Alliance	s Award Spring 2019
Excellence in Undergraduate Research in Computer Science Award Awarded to graduating students for research contributions.	Spring 2016
University at Albany Presidential Undergraduate Award For Research Project: Adaptive Power Load Balancing in Cellular Networks	Spring 2015
Computer Sciences Corporation Scholarship Award Chosen by UAlbany Computer Science Faculty - 2 students per year	Fall 2015
University at Albany Presidential Honors Society Invited after earning GPA above 3.8	Spring 2015 - Spring 2016
University at Albany Dean's List Maintained GPA above 3.5 through all semesters	Fall 2012 - Spring 2016

Skills

- Technical writing
- Research communication, including articles, lectures, and presentations

- Awk

- Java

- Network & Data analysis
- Programming Languages:
 - Python

- Unix/Linux scripting
- Basic HTML/CSS/Javascript
- Julia

- R - C/C++

Interests

- Science Communication
- Network and Data Science
- Algorithm Design
- Science and Technology Studies

- Human Mobility and Disease Modeling
- Ecological and Geospatial Networks
- Climate Modeling and Intervention
- Philosophy and Sociology of Science