Timothy LaRock

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Academic Appointments

Mathematical Institute, University of Oxford **Oxford, UK**
Postdoctoral Research Associate *April 2022 - Present*

Education

Northeastern University Network Science Institute **Boston, MA**
PhD in Network Science *December 2021*

Dissertation: Representing and Analyzing Pathway Data Through Networks

Committee: Prof. Tina Eliassi-Rad (Advisor), Prof. Samuel V. Scarpino (Northeastern), Prof. Hongyang Zhang (Northeastern), Prof. Ingo Scholtes (University of Würzburg)

The Honors College, University at Albany, State University of New York **Albany, NY**
Bachelor of Science in Computer Science and Applied Mathematics *May 2016*
Minor: Philosophy

Advisors: Prof. Petko Bogdanov & Prof. Mariya Zheleva

Honors Thesis: *Wireless Frequency Spectrum Characterization and Transmitter Detection 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, Rad Lab *August 2016 - December 2021*

ETH Zürich/University of Zürich **Zürich, Switzerland**
Visiting Researcher - Chair of Systems Design/Data Analytics Group *Summer 2018*
Supervisor: Prof. Ingo Scholtes

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 *Summer 2014*

Teaching Experience

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`

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

- 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.
- International Conference on Network Science (NetSci'18, '19, & '20), June 2018, May 2019, September 2020. Video link from 2020.
- 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

- 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

Workshop/Satellite Organizer

- Networks 2021 Satellite on Dynamics and Motifs in Networks (DynaMo), June 2021

Journal Referee

- EPJ Data Science
- Transactions on Knowledge and Data Engineering

Program Committees

- Complex Networks and Their Applications 2022

Awards & Honors

Student-led Research on New Opportunities for Dynamic Spectrum Access Award
With Prof. Mariya Zheleva, Awarded by Dynamic Spectrum Alliance *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
- Network & Data analysis
- Programming Languages:
  - Python
  - R
  - C/C++
  - Unix/Linux scripting
  - Awk
  - Java
  - Basic HTML/CSS/Javascript
  - Julia

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