Dr. rer. nat. Lutz Oettershagen

Curriculum Vitae

University of Liverpool
Liverpool, UK
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lutzoe.github.io

Current Position

2024–Present **Lecturer**, *Department Of Computer Science, University of Liverpool*, Liverpool, United Kingdom

Previous Positions

2023–2024 **Postdoctoral Researcher**, *Division of Theoretical Computer Science, School of Electrical Engineering and Computer Science, KTH Royal Institute of Technology*, Stockholm, Sweden
Hosted by Prof. Dr. Aristides Gionis

2022–2023 **Postdoctoral Researcher**, *LAMARR Institute for Machine Learning and Artificial Intelligence/University of Bonn*, Bonn, Germany
Hosted by Prof. Dr. Petra Mutzel

2019–2022 **Scientific Staff**, *University of Bonn*, Bonn, Germany

2018–2019 **Scientific Staff**, *TU Dortmund University*, Dortmund, Germany

2014–2017 **Research Assistant**, *TU Dortmund University*, Dortmund, Germany

2009–2014 **Research Assistant**, *Fraunhofer Institut für Software und Systemtechnik*, Dortmund, Germany

Education

2018–2022 **Ph.D. in Computer Science**, *University of Bonn*, Bonn, Germany
Summa Cum Laude (highest possible grade)
- **Adviser:** Prof. Dr. Petra Mutzel
- **Thesis:** Temporal Graph Algorithms
- **Committee:** Prof. Dr. Petra Mutzel (University of Bonn), Prof. Dr. Giuseppe F. Italiano (LUISS University), Prof. Dr. Anne Driemel (University of Bonn), Prof. Dr. Jürgen Kusche (University of Bonn)

2014–2017 **M.Sc. in Computer Science**, *TU Dortmund University*, Germany
Graduated with Honors (highest possible grade)

2008–2014 **B.Sc. in Computer Science**, *TU Dortmund University*, Germany

Research Interests

- **Algorithmic Data Analysis**
- **Algorithm Engineering**
- **Graph Data Mining**
- **Machine Learning**

My primary research areas are algorithmic data analysis, data mining, and machine learning on graphs. My research focuses strongly on mathematical and computational foundations and the engineering and application of efficient algorithmic data analysis on dynamic graphs for solving real-world problems.

Awards and Honors

2024 **Invited** to the Dagstuhl seminar Statistical and Probabilistic Methods in Algorithmic Data Analysis

2024 **Invited** to the Algorithmic Aspects of Temporal Graphs VII, Satellite Workshop of ICALP (one of 11 invited talks)

2022 Paper [W1] was awarded with the **best paper award** at the 18th International Workshop on Mining and Learning with Graphs

2022 **Invited** to the 1st SIAM Applied and Computational Discrete Algorithms Workshop (ACDA) (one of 53 invited participants)

2022 Ph.D. thesis awarded the highest possible grade **Summa Cum Laude**

2020 **Invited article** to the special issue of Knowledge and Information Systems for the **best papers of IEEE ICDM 2020**

2020 **Invited article** to the special issue of BigData for the **best papers of SIAM SDM 2020**

2017 Graduated as best M.Sc. student **with Honors and highest possible number of points**

Scientific Activities

Program Committees

2025 SIGKDD, AAAI, Webconf, SDM, SEA

2024 SIGKDD, AAAI, Webconf, SDM

2023 SIGKDD, AAAI

2022 ECMLPKDD

Reviewing

Journals Knowledge-Based Systems (2024), Journal of Artificial Intelligence Research (2024), Information Processing and Management (2024), Software Testing, Verification and Reliability (2024), Data Mining and Knowledge Discovery (2023), Journal of Supercomputing (2023), Transactions on the Web (2023), Cybernetics and Systems (2023), Network Science (2022), Theoretical Computer Science (2022), Transactions on the Web (2022), Information Processing Letters (2022), Geo-spatial Information Science (2022), Journal of Experimental Algorithmics (2021)

Conferences WebConf (2022), Similarity Search and Applications - SISAP (2021), ALENEX (2020), WG (2018)

Talks and Posters

2024 Presented [C9] at the Dagstuhl seminar Statistical and Probabilistic Methods in Algorithmic Data Analysis.

2024 Presented [C9] at Algorithmic Aspects of Temporal Graphs VII, Satellite Workshop of ICALP.

2024 Presented paper and poster [C10] at the ACM WebConf.

2023 Presented paper and poster [C9] at the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD).

2023 Presented poster of [C7] at Digital Futures' Machine Learning Day 2023.

2023 Presented papers and posters [C7, C8] at the SIAM International Conference on Data Mining (SDM).

2022 Presented paper and poster [C6] at the European Conference on Machine Learning and Data Mining (ECMLPKDD).

2022 Presented paper and poster [W1] at the 18th International Workshop on Mining and Learning with Graphs.

2022 Presented paper [C6] at the 1st SIAM Applied and Computational Discrete Algorithms Workshop (ACDA).

2022 Presented a poster at the European Space Agency's Living Planet Symposium with the title "*mSTAR: Multicriteria Spatio Temporal Altimetry Retracking*".

2022 Presented paper [C5] at the ACM WebConf.

2021 Presented paper [C4] at the 21th IEEE Intl Conference on Data Mining (ICDM).

2021 Presented paper [C3] at the SIAM Intl Conference on Data Mining (SDM).

2019 Presented paper [C2] at the 15th Theory and Applications of Models of Computation (TAMC).

2019 Presented paper [C1] at the 29th International Workshop on Combinatorial Algorithms (IWOCA).

Tutorials

2024 Tutorial *Mining Temporal Networks* at the ACM WebConf.
Website: `https://miningtemporalnetworks.github.io/`

Teaching and Supervision

Supervised Master's Theses

2024 *M. Neidhardt.* Analysis of fMRI data using temporal graphs.

2023 *R. Restetzki.* Similar moments in temporal graphs: Isomorphy of subintervals, a similarity measure and a use case in chemistry.

2022 *Y. Shoeb.* Link Prediction in Dynamic Communication Networks Using Graph Neural Networks

2021 *N. Schwab.* Similarity Measures for Temporal Graphs based on the k-dimensional Weisfeiler-Leman Refinement

Supervised Bachelor's Theses

2024 *V. Berrozpe Maldonado.* Data Pipelines: Integrating open source tools and microservices.

2023 *N. Oberender.* Empirical analysis of a model for the synthesis of temporal graphs.

2022 *D. Degenstein.* Centrality measures for temporal graphs based on mutual reachability.

2022 *C. Rossmaier.* Comparison of centrality measures on static graphs to identify superspreaders.

2022 *T. Schätz.* BOBA* for marine data.

2021 *C. Jordan.* Classification of temporal graphs with graph kernels.

2021 *V. Miletic.* Maximal-flow graph kernel.

2021 *M. Marx.* Development and evaluation of synthesis approaches for temporal graphs with generative adversarial networks.

2021 *M. Neidhardt.* Synthesis of realistic temporal graphs.

2019 *M. Yalciner.* Route planning for two vehicles in graphs with time-exclusive edges.

2019 *M. Bang Vu.* Determination of separations in drawings of complete graphs.

Labs and Seminars

Summer term 2022 **Lab Computational Analytics: Temporal Graphs for Functional Brain Network Analysis**
M.Sc. level lab for computer science and mathematics students

Summer term 2020 **Lab Computational Analytics: Algorithms for Learning on Temporal Graphs**
M.Sc. level lab for computer science and mathematics students

Summer term 2019 **Graph Algorithms**
B.Sc. level seminar for computer science students

Summer term 2018 **Algorithm Engineering**
M.Sc. Level seminar for computer science students

Winter term 2017–2018 **Introduction into Programming**
B.Sc. level lab for introducing C++ to physics students

Teaching Assistance

Winter term 2022–2023 **Algorithms for Data Analysis**
M.Sc. Level Class

Winter term 2021–2022 **Algorithms for Data Analysis**
M.Sc. Level Class

Summer term 2021 **Graph algorithms**
B.Sc. Level Class

Winter term 2020–2021 **Advanced Algorithms**
M.Sc. Level Class

Winter term 2019–2020 **Algorithms and Complexity**
B.Sc. Level Class

Summer term 2021 **Software Technology**
B.Sc. Level Class

Winter term 2019–2020 **Introduction into Programming**
B.Sc. Level Class

Summer term 2018 **Theoretical Computer Science**
B.Sc. Level Class

Summer term 2017 **Efficient Algorithms**
B.Sc. Level Class

Publications

Peer Reviewed Journal Articles

[J3] **Lutz Oettershagen**, Athanasios L Konstantinidis, and Giuseppe F Italiano.
Inferring Tie Strength in Temporal Networks.
Data Mining and Knowledge Discovery (Under review)

[J2] **Lutz Oettershagen** and Petra Mutzel.
Computing Top-k Temporal Closeness in Temporal Networks.
Knowledge and Information Systems 64.2 (2022): 507-535 **(Invited article)**

[J1] **Lutz Oettershagen**, Nils M Kriege, Christopher Morris, and Petra Mutzel.
Classifying Dissemination Processes in Temporal Graphs.
Big Data 8.5 (2020): 363-378 **(Invited article)**

Peer Reviewed Conference Publications

[C10] **Lutz Oettershagen**, Honglian Wang, Aristides Gionis.
Finding Densest Subgraphs with Edge-Color Constraints.
In Proceedings of the ACM Web Conference, 2024

[C9] **Lutz Oettershagen**, Nils M Kriege, Petra Mutzel.
A Higher-Order Temporal H-Index for Evolving Networks.
In Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2023

[C8] **Lutz Oettershagen** and Petra Mutzel.
An Index For Temporal Closeness Computation in Evolving Graphs.
In Proceedings of the SIAM International Conference on Data Mining, pages 280-288, 2023

[C7] **Lutz Oettershagen**, Nils M Kriege, Claude Jordan, Petra Mutzel.
A Temporal Graphlet Kernel For Classifying Dissemination in Evolving Networks.
In Proceedings of the SIAM International Conference on Data Mining, pages 19-27, 2023

[C6] **Lutz Oettershagen**, Athanasios L Konstantinidis, and Giuseppe F Italiano.
Inferring Tie Strength in Temporal Networks.
In Proceedings of the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, pages 69-85, 2022

[C5] **Lutz Oettershagen**, Petra Mutzel, and Nils M Kriege.
Temporal Walk Centrality: Ranking Nodes in Evolving Networks.
In Proceedings of the ACM Web Conference, pages 1640–1650, 2022

[C4] **Lutz Oettershagen** and Petra Mutzel.
Efficient Top-k Temporal Closeness Calculation in Temporal Networks.
In Proceedings of the IEEE International Conference on Data Mining, pages 402–411, 2020

[C3] **Lutz Oettershagen**, Nils M Kriege, Christopher Morris, and Petra Mutzel.
Temporal Graph Kernels for Classifying Dissemination Processes.
In Proceedings of the SIAM International Conference on Data Mining, pages 496–504, 2020

[C2] Petra Mutzel and **Lutz Oettershagen**.
On the Enumeration of Bicriteria Temporal Paths.
In Proceedings of the International Conference on Theory and Applications of Models of Computation, pages 518–535, 2019

[C1] Petra Mutzel and **Lutz Oettershagen**.
The Crossing Number of Seq-Shellable Drawings of Complete Graphs.
In Proceedings of International Workshop on Combinatorial Algorithms, pages 273–284, 2018

Peer Reviewed Workshop Papers

[W2] **Lutz Oettershagen** and Petra Mutzel.
TGLib: An Open-Source Library for Temporal Graph Analysis.
In Proceedings of the IEEE International Conference on Data Mining Workshops, 2022

[W1] **Lutz Oettershagen**, Nils M Kriege, Claude Jordan, Petra Mutzel.
A Temporal Graphlet Kernel For Classifying Dissemination in Evolving Networks.
18th International Workshop on Mining and Learning with Graphs, 2022

Open-Source Library

TGLib: An open-source library for analyzing and processing temporal graphs

- See [W2] for the corresponding publication
- Website: `https://gitlab.com/tgpublic/tglib`