

Lutz Oettershagen

Curriculum Vitae

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Education

- 2018–2022 **Ph.D. in Computer Science**, *University of Bonn*, Bonn, Germany.
Summa Cum Laude
- **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
- 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.

Research and Work Experience

- 2023–Present **Postdoctoral Researcher**, *School of Electrical Engineering and Computer Science, KTH Royal Institute of Technology*, Stockholm, Sweden. Research.
- 2022–2023 **Postdoctoral Researcher**, *LAMARR Institute for Machine Learning and Artificial Intelligence/University of Bonn*, Bonn, Germany. Research and Teaching.
- 2019–2022 **Scientific Staff**, *University of Bonn*, Bonn, Germany. Research and Teaching.
- 2018–2019 **Scientific Staff**, *TU Dortmund University*, Dortmund, Germany. Research and Teaching.
- 2014–2017 **Research Assistant**, *TU Dortmund University*, Dortmund, Germany. Research.
- 2009–2014 **Research Assistant**, *Fraunhofer Institut für Software und Systemtechnik*, Dortmund, Germany. Research.

Scientific Activities

Program Committees

- 2023 ACM SIGKDD Conference on Knowledge Discovery and Data Mining
- 2023 AAAI Conference on Artificial Intelligence
- 2022 European Conference on Machine Learning and Knowledge Discovery in Databases (ECMLPKDD)

Reviewing

- Journals 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 The Web Conf (2022),
Similarity Search and Applications - SISAP (2021),
ALENEX (2020),
WG (2018)

Talks and Posters

- 2023 Presented poster of [C7] at Digital Futures' Machine Learning Day 2023.
- 2023 Presented papers [C7] and [C8] and corresponding posters at the SIAM International Conference on Data Mining (SDM).
- 2022 Presented paper [C6] and a corresponding poster at the European Conference on Machine Learning and Data Mining (ECMLPKDD).
- 2022 Presented paper [W1] and a corresponding poster at the 18th International Workshop on Mining and Learning with Graphs.
- 2022 Invited participant (of 53) to the 1st SIAM Applied and Computational Discrete Algorithms (ACDA) Workshop, giving a talk on "*Inferring Tie Strength in Temporal Networks*".
- 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 The 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 (IWOC).

Awards

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

Publications

Peer Reviewed Journal Articles

- [J2] **Lutz Oettershagen** and Petra Mutzel.
Computing Top-k Temporal Closeness in Temporal Networks.
Knowledge and Information Systems 64.2 (2022): 507-535
- [J1] **Lutz Oettershagen**, Nils M Kriege, Christopher Morris, and Petra Mutzel.
Classifying Dissemination Processes in Temporal Graphs.
Big Data 8.5 (2020): 363-378

Peer Reviewed Conference Publications

- [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 2022, pages 1640–1650, 2022
- [C4] **Lutz Oettershagen** and Petra Mutzel.
Efficient Top-k Temporal Closeness Calculation in Temporal Networks.
In Proceedings of the 20th 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 15th 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 the 29th 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.
To appear in Proceedings of the IEEE ICDM 2022 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 Software

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

- See [W2] for the corresponding publication
- Available at <https://gitlab.com/tgpublic/tglib>

Supervised Theses

Master's Theses

- 2022 Link Prediction in Dynamic Communication Networks Using Graph Neural Networks
- 2021 Similarity Measures for Temporal Graphs based on the k-dimensional Weisfeiler-Leman Refinement

Bachelor's Theses

- 2022 Centrality measures for temporal graphs based on mutual reachability
- 2022 Comparison of centrality measures on static graphs to identify superspreaders
- 2022 BOBA* for marine data
- 2021 Classification of temporal graphs with graph kernels
- 2021 Maximal-flow graph kernel
- 2021 Development and Evaluation of Synthesis Approaches for Temporal Graphs with Generative Adversarial Networks
- 2021 Synthesis of Realistic Temporal Graphs
- 2019 Route planning for two vehicles in graphs with time-exclusive edges
- 2019 Determination of separations in drawings of complete graphs

Teaching

Labs and Seminars

- Summer term 2022 **Lab Computational Analytics: Temporal Graphs for Functional Brain Network Analysis**
M.Sc. Level Lab
- Summer term 2020 **Lab Computational Analytics: Algorithms for Learning on Temporal Graphs**
M.Sc. Level Lab
- Summer term 2019 **Graph Algorithms**
B.Sc. Level Seminar
- Summer term 2018 **Algorithm Engineering**
M.Sc. Level Seminar
- Winter term 2017–2018 **Introduction into Programming**
B.Sc. Level Lab

Tutoring

- 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	Introduction into Programming
2019–2020	B.Sc. Level Class
Summer term	Theoretical Computer Science
2018	B.Sc. Level Class
Summer term	Efficient Algorithms
2017	B.Sc. Level Class