Lutz Oettershagen

Curriculum Vitae

✉ *lutz.oettershagen@cs.uni-bonn.de*
lutzoe.github.io

Education

2018–2022 **PhD in Computer Science**, *University of Bonn*, Bonn, Germany.
Summa Cum Laude
- **Advisor:** Prof. Dr. Petra Mutzel
- **Thesis:** Temporal Graph Algorithms
- **Committee:** Prof. Dr. Petra Mutzel, Prof. Dr. Giuseppe F. Italiano, Prof. Dr. Anne Driemel, Prof. Dr. Jürgen Kusche

2014–2017 **MSc in Computer Science**, *TU Dortmund University*, Germany.
Graduated with Honors

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

Research Interests

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

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 and Software Implementation

Scientific Activities

Program Committees

2023 ACM SIGKDD Conference on Knowledge Discovery and Data Mining

2023 AAAI Conference on Artificial Intelligence

Reviewing

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

Talks and Posters

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

2022 Presented paper [W1] and a corresponding poster at the 18th International Workshop on Mining and Learning with Graphs 2022 which is co-hosted at the European Conference on Machine Learning and Data Mining 2022 (ECMLPKDD).

2022 Was invited as one of 53 participants to the 1st SIAM Applied and Computational Discrete Algorithms (ACDA) Workshop 2022, and gave a talk with the title "*Inferring Tie Strength in Temporal Networks*".

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

2022 Presented paper [C5] at the ACM The WebConf 2022

2021 Presented paper [C4] at the IEEE International Conference on Data Mining 2021

2021 Presented paper [C3] at the SIAM International Conference on Data Mining 2021

2019 Presented paper [C2] at the Theory and Applications of Models of Computation

2019 Presented paper [C1] at the International Workshop on Combinatorial Algorithms

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

[C8] **Lutz Oettershagen and Petra**, An Index For Temporal Closeness Computation in Evolving Graphs. Accepted at SIAM International Conference on Data Mining, 2023.

[C7] **Lutz Oettershagen, Nils M Kriege, Claude Jordan, Petra Mutzel**, A Temporal Graphlet Kernel For Classifying Dissemination in Evolving Networks. Accepted at SIAM International Conference on Data Mining, 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, 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 2020 IEEE International Conference on Data Mining, pages 402–411. IEEE, 2020.

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

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

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

Peer Reviewed Workshop Publications

[W2] **Lutz Oettershagen and Petra**, TGLib: An Open-Source Library for Temporal Graph Analysis. 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

I am developing and maintaining the **open-source library TGLib** for analyzing and processing temporal graphs (see [W2] for the corresponding publication). TGLib is written in C++ and Python, and is publicly available at
`https://gitlab.com/tgpublic/tglib`.

Teaching and Supervision

Classes, Labs, and Seminars

Winter term 2022–2023 — **Algorithms for Data Analysis**.
Exercises for computer science and mathematics master class

Summer term 2022 — **Lab Computational Analytics**, *Temporal Graphs for Functional Brain Network Analysis*.
Lab for computer science and mathematics master students

Winter term 2021–2022 — **Algorithms for Data Analysis**.
Exercises for computer science and mathematics master class

Summer term 2021 — **Graphenalgorithmen**, *(Graph algorithms)*.
Exercises for computer science and mathematics bachelor class

Winter term 2020–2021 — **Advanced Algorithms**.
Exercises for computer science and mathematics master class

Summer term 2020 — **Lab Computational Analytics**, *Algorithms for Learning on Temporal Graphs*.
Lab for computer science and mathematics master students

Winter term 2019–2020 — **Algorithmen und Berechnungskomplexität**, *(Algorithms and Complexity)*.
Exercises for computer science and mathematics bachelor class

Summer term 2021 — **Softwaretechnik**, *(Software Technology)*.
Exercises for computer science bachelor class

Summer term 2021 — **Proseminar Graphalgorithmen**, *(Seminar Graph Algorithms)*.
Seminar for computer science bachelor class

Winter term 2019–2020 — **Einführung in die Programmierung**, *(Introduction into Programming)*.
Exercises for computer science and mathematics bachelor class

Summer term 2018 — **Grundbegriffe der Theoretischen Informatik**, *(Theoretical Computer Science Basics)*.
Exercises for computer science bachelor class

Summer term 2018 — **Seminar Algorithm Engineering**.
Seminar for computer science master class

Winter term 2017–2018 **Einführung in die Programmierung**, *(Introduction into Programming)*.
Lab for computer science and mathematics bachelor class

Summer term 2017 **Effiziente Algorithmen**, *(Efficient Algorithms)*.
Exercises for computer science bachelor class

Supervised Theses

2022 **Zentralitätsmaße für temporale Graphen basierend auf gegenseitiger Erreichbarkeit**, *Bachelor thesis*.

2022 **Link Prediction in Dynamic Communication Networks Using Graph Neural Networks**, *Master thesis*.

2022 **Vergleich von Zentralitätsmaßen auf statischen Graphen zur Identifikation von Superspreadern**, *Bachelor thesis*.

2022 **BOBA* für Meeresdaten**, *Bachelor thesis*.

2021 **Klassifikation temporaler Graphen mit Graphkernen**, *Bachelor thesis*.

2021 **Maximal-flow graph kernel**, *Bachelor thesis*.

2021 **Similarity Measures for Temporal Graphs based on the k-dimensional Weisfeiler-Leman Refinement**, *Master thesis*.

2021 **Entwicklung und Evaluation von Syntheseansätzen fürTemporale Graphen mit Generative Adversarial Networks**, *Bachelor thesis*.

2021 **Synthese Realistischer Temporaler Graphen**, *Bachelor thesis*.

2019 **Routenplanung für zwei Fahrzeuge in Graphen mit zeitexklusiver Kantennutzung**, *Bachelor thesis*.

2019 **Bestimmung der Separationen in Zeichnungen vollständiger Graphen**, *Bachelor thesis*.