

# Lutz Oettershagen

## Curriculum Vitae

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### 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
- Machine Learning
- Algorithm Engineering
- Dynamic Networks

My primary areas of research are algorithmic data analysis and machine learning on graphs. My research puts a strong focus on mathematical and computational foundations as well as the engineering and application of efficient algorithmic data analysis on dynamic graphs for solving real-world problems.

### Research and Work Experience

- 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 Implementation

### Scientific Activities

#### Program Committees

2023 AAAI

Reviewing

- Journals 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), ALENEX (2020), WG (2018)

#### Talks and Posters

- 2022 I presented paper [3] and a corresponding poster at the European Conference on Machine Learning and Data Mining 2022 (ECMLPKDD).
- 2022 I presented paper [4] 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 I 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 I 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 [5] at the ACM The WebConf 2022
- 2021 Presented paper [6] at the IEEE International Conference on Data Mining 2021
- 2021 Presented paper [7] at the SIAM International Conference on Data Mining 2021
- 2019 Presented paper [8] at the Theory and Applications of Models of Computation
- 2019 Presented paper [9] at the International Workshop on Combinatorial Algorithms

#### Open-Source Software

- 2022 I am developing and maintaining the **open-source library TGLib** for analyzing and processing temporal graphs (see also [3]). TGLib is written in C++ and Python. It is available at <https://gitlab.com/tgpublic/tglib>.

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#### Awards

- 2022 **Paper [4] was awarded with the best paper award at the 18th International Workshop on Mining and Learning with Graphs.**

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#### Publications

##### Journal Articles

- [1] **Lutz Oettershagen and Petra Mutzel**, Computing Top-k Temporal Closeness in Temporal Networks. Knowledge and Information Systems 64.2 (2022): 507-535.
- [2] **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 and Workshop Publications

- [3] **Lutz Oettershagen and Petra**, TGLib: An Open-Source Library for Temporal Graph Analysis. Accepted at the Open-Source Forum 2022 jointly held with the IEEE International Conference on Data Mining, 2022.

- [4] **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.
- [5] **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.
- [6] **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.
- [7] **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.
- [8] **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.
- [9] **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.
- [10] **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.

## Teaching and Supervision

### Classes, Labs, and Seminars

Winter term 2022–2023	<b>Algorithms for Data Analysis.</b> Exercises for computer science and mathematics master class
Summer term 2022	<b>Lab Computational Analytics, Temporal Graphs for Functional Brain Network Analysis.</b> Lab for computer science and mathematics master students
Winter term 2021–2022	<b>Algorithms for Data Analysis.</b> Exercises for computer science and mathematics master class
Summer term 2021	<b>Graphenalgorithmen, (Graph algorithms).</b> Exercises for computer science and mathematics bachelor class
Winter term 2020–2021	<b>Advanced Algorithms.</b> Exercises for computer science and mathematics master class
Summer term 2020	<b>Lab Computational Analytics, Algorithms for Learning on Temporal Graphs.</b> Lab for computer science and mathematics master students
Winter term 2019–2020	<b>Algorithmen und Berechnungskomplexität I, (Algorithms and Complexity I).</b> Exercises for computer science and mathematics bachelor class

- Summer term **Softwaretechnik**, (*Software Technology*).  
2021 Exercises for computer science bachelor class
- Summer term **Proseminar Graphalgorithmen**, (*Seminar Graph Algorithms*).  
2021 Seminar for computer science bachelor class
- Winter term **Einführung in die Programmierung**, (*Introduction into Programming*).  
2019–2020 Exercises for computer science and mathematics bachelor class
- Summer term **Grundbegriffe der Theoretischen Informatik**, (*Theoretical Computer Science Basics*).  
2018 Exercises for computer science bachelor class
- Summer term **Seminar Algorithm Engineering**.  
2018 Seminar for computer science master class
- Winter term **Einführung in die Programmierung**, (*Introduction into Programming*).  
2017–2018 Lab for computer science and mathematics bachelor class
- Summer term **Effiziente Algorithmen**, (*Efficient Algorithms*).  
2017 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 für Temporale 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*.