

1 Current Preprints

1. Franka Bause*, Fabian Jogl*, Patrick Indri, Tamara Drucks, David Penz, Nils Morten Kriege, Thomas Gärtner, Pascal Welke, Maximilian Thiessen (2025):
[Maximally Expressive GNNs for Outerplanar Graphs](#)
European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD) Nectar Track
[\[pdf\]](#)[\[code\]](#)[\[conference\]](#)
2. Maria Bresich, Günther Raidl, Caspian Coleman, Pascal Welke, Steffen Limmer (2025):
[Search Space Reduction Through Machine Learning for the Electric Autonomous Dial-A-Ride Problem](#)
International Conference on Machine Learning, Optimization, and Data Science (LOD)
(accepted for presentation)
[\[pdf\]](#)[\[conference\]](#)
3. Fouad Alkhoury, Sebastian Buschjäger, Pascal Welke (2025):
[Splitting Stump Forests: Tree Ensemble Compression for Edge Devices \(Extended Version\)](#)
Machine Learning
(accepted w/ minor revision in a special issue on Discovery Science)
[\[pdf\]](#)[\[code\]](#)[\[journal\]](#)
4. Masahiro Negishi, Thomas Gärtner, Pascal Welke (2025):
[WILTing Trees: Interpreting the Distance Between MPNN Embeddings](#)
International Conference on Machine Learning (ICML)
(accepted as a poster presentation)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[arxiv\]](#)[\[conference\]](#)

2 Publications

5. Veronica Lachi*, Alice Moallem-Oureh*, Andreas Roth*, Pascal Welke* (2025):
[Expressive Pooling for Graph Neural Networks](#)
Transactions on Machine Learning Research (TMLR)
[\[pdf\]](#)[\[video\]](#)[\[code\]](#)[\[reviews\]](#)[\[journal\]](#)
6. Dario Antweiler, Jan Pablo Burgard, Marc Harmening, Nicole Marheineke, Andre Schmeißer, Raimund Wegener, Pascal Welke (2025):
[A Regression-Based Predictive Model Hierarchy for Nonwoven Tensile Strength Inference](#)
Informed Machine Learning
[\[pdf\]](#)[\[code\]](#)[\[doi\]](#)[\[book\]](#)
7. Franka Bause*, Fabian Jogl*, Patrick Indri, Tamara Drucks, David Penz, Nils Morten Kriege, Thomas Gärtner, Pascal Welke, Maximilian Thiessen (2025):

- [Maximally Expressive GNNs for Outerplanar Graphs](#)
Transactions on Machine Learning Research (TMLR)
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[reviews\]](#)[\[journal\]](#)
8. Raffaele Paolino*, Sohir Maskey*, Pascal Welke, Gitta Kutyniok (2024):
[Weisfeiler and Leman Go Loopy: A New Hierarchy for Graph Representational Learning](#)
Advances in Neural Information Processing Systems (NeurIPS)
(accepted as oral presentation)
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[reviews\]](#)[\[arxiv\]](#)[\[conference\]](#)
 9. Alexander Pluska, Pascal Welke, Thomas Gärtner, Sagar Malhotra (2024):
[Logical Distillation of Graph Neural Networks](#)
International Conference on Knowledge Representation and Reasoning (KR)
(honorable mention award at the Special Track on Reasoning, Learning, and Decision Making)
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[conference\]](#)
 10. Fouad Alkhoury, Pascal Welke (2024):
[Splitting Stump Forests: Tree Ensemble Compression for Edge Devices](#)
International Conference on Discovery Science (DS)
(Best Student Paper Award)
[\[pdf\]](#)[\[slides\]](#)[\[code\]](#)[\[doi\]](#)[\[conference\]](#)
 11. Sebastian Müller, Vanessa Toborek, Katharina Beckh, Matthias Jakobs, Christian Bauckhage, Pascal Welke (2023):
[An Empirical Evaluation of the Rashomon Effect in Explainable Machine Learning](#)
European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECMLPKDD)
[\[pdf\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[conference\]](#)
 12. Pascal Welke*, Maximilian Thiessen*, Fabian Jögl, Thomas Gärtner (2023):
[Expectation-Complete Graph Representations with Homomorphisms](#)
International Conference on Machine Learning (ICML)
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[reviews\]](#)[\[arxiv\]](#)[\[conference\]](#)
 13. Ramsés J. Sánchez, Lukas Conrads, Pascal Welke, Kostadin Cvejovski, César Ojeda (2023):
[Hidden Schema Networks](#)
Annual Meeting of the Association for Computational Linguistics (ACL)
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[conference\]](#)
 14. Vanessa Toborek, Moritz Busch, Malte Boßert, Christian Bauckhage, Pascal Welke (2023):
[A New Aligned Simple German Corpus](#)
Annual Meeting of the Association for Computational Linguistics (ACL)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[conference\]](#)
 15. Karishma Mohiuddin, Mirza Ariful Alam, Mirza Mohtashim Alam, Pascal Welke, Michael Martin, Jens Lehmann, Sahar Vahdati (2023):

- [Retention Is All You Need](#)
International Conference on Information and Knowledge Management (CIKM)
[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[conference\]](#)
16. Katharina Beckh, Sebastian Müller, Matthias Jakobs, Vanessa Toborek, Hanxiao Tan, Raphael Fischer, Pascal Welke, Sebastian Houben, Laura von Rüden (2023):
[Harnessing Prior Knowledge for Explainable Machine Learning: An Overview](#)
IEEE Conference on Secure and Trustworthy Machine Learning (SatML)
[\[pdf\]](#)[\[video\]](#)[\[doi\]](#)[\[reviews\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[conference\]](#)
17. Till Hendrik Schulz, Tamás Horváth, Pascal Welke, Stefan Wrobel (2022):
[A generalized Weisfeiler-Lehman graph kernel](#)
Machine Learning (111)
[\[pdf\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[journal\]](#)
18. Dario Antweiler, Marc Harmening, Nicole Marheineke, Andre Schmeißer, Raimund Wegener, Pascal Welke (2022):
[Machine learning framework to predict nonwoven material properties from fiber graph representations](#)
Software Impacts (14)
[\[pdf\]](#)[\[code\]](#)[\[reproducible run\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[journal\]](#)
19. Dario Antweiler, Marc Harmening, Nicole Marheineke, Andre Schmeißer, Raimund Wegener, Pascal Welke (2022):
[Graph-Based Tensile Strength Approximation of Random Nonwoven Materials by Interpretable Regression](#)
Machine Learning with Applications (8)
[\[pdf\]](#)[\[code\]](#)[\[reproducible run\]](#)[\[doi\]](#)[\[journal\]](#)
20. Till Hendrik Schulz, Pascal Welke, Stefan Wrobel (2022):
[Graph Filtration Kernels](#)
AAAI Conference on Artificial Intelligence (AAAI)
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[conference\]](#)
21. Richard Palme, Pascal Welke (2022):
[Frequent Generalized Subgraph Mining via Graph Edit Distances](#)
IoT Streams for Predictive Maintenance (IoTStreams@ECMLPKDD)
[\[pdf\]](#)[\[slides\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[workshop\]](#)
22. Janis Kalofolias, Pascal Welke, Jilles Vreeken (2021):
[SUSAN: The Structural Similarity Random Walk Kernel](#)
SIAM International Conference on Data Mining (SDM)
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
23. Pascal Welke (2020):
[Efficient Frequent Subgraph Mining in Transactional Databases](#)
International Conference on Data Science and Advanced Analytics (DSAA)
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
24. Pascal Welke, Fouad Alkhoury, Christian Bauckhage, Stefan Wrobel (2020):
[Decision Snippet Features](#)

- International Conference on Pattern Recognition (ICPR)
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
25. Pascal Welke, Florian Seiffarth, Michael Kamp, Stefan Wrobel (2020):
[HOPS: Probabilistic Subtree Mining for Small and Large Graphs](#)
SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
26. Alexander Mehler, Wahed Hemati, Pascal Welke, Maxim Konca, Tolga Uslu (2020):
[Multiple Texts as a Limiting Factor in Online Learning: Quantifying \(Dis-\)similarities of Knowledge Networks across Languages](#)
Frontiers in Education | Digital Education
[\[pdf\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[journal\]](#)
27. Pascal Welke, Tamás Horváth, Stefan Wrobel (2019):
[Probabilistic and Exact Frequent Subtree Mining in Graphs Beyond Forests](#)
Machine Learning (108)
[\[pdf\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[journal\]](#)
28. Pascal Welke, Tamás Horváth, Stefan Wrobel (2018):
[Probabilistic Frequent Subtrees for Efficient Graph Classification and retrieval](#)
Machine Learning (107)
[\[pdf\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[journal\]](#)
29. Till Hendrik Schulz, Tamás Horváth, Pascal Welke, Stefan Wrobel (2018):
[Mining Tree Patterns with Partially Injective Homomorphisms](#)
European Conference on Machine Learning and Knowledge Discovery in Databases (ECMLPKDD)
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
30. Pascal Welke, Alexander Markowetz, Torsten Suel, Maria Christoforaki (2016):
[Three-hop Distance Estimation in Social Graphs](#)
IEEE International Conference on Big Data (BigData)
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
31. Pascal Welke, Tamás Horváth, Stefan Wrobel (2016):
[Min-Hashing for Probabilistic Frequent Subtree Feature Spaces](#)
International Conference on Discovery Science (DS)
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
32. Katrin Ullrich, Jennifer Mack, Pascal Welke (2016):
[Ligand Affinity Prediction with Multi-pattern Kernels](#)
International Conference on Discovery Science (DS)
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
33. Pascal Welke, Ionut Andone, Konrad Blaszkiewicz, Alexander Markowetz (2016):
[Differentiating Smartphone Users by App Usage](#)
International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
34. Pascal Welke, Tamás Horváth, Stefan Wrobel (2015):

[Probabilistic Frequent Subtree Kernels](#)

New Frontiers in Mining Complex Patterns (NFMCP@ECMLPKDD)

[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[workshop\]](#)

35. Pascal Welke, Tamás Horváth, Stefan Wrobel (2014):

[On the Complexity of Frequent Subtree Mining in Very Simple Structures](#)

International Conference on Inductive Logic Programming (ILP)

[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)

36. Anne-Kathrin Mahlein, Till Rumpf, Pascal Welke, Heinz-Wilhelm Dehne, Ulrike Steiner, Erich-Christian Oerke (2013):

[Development of Spectral Indices for Detecting and Identifying Plant Diseases](#)

Remote Sensing of Environment (128)

[\[doi\]](#)[\[journal\]](#)

3 Books

37. Michael Kamp et al. (2021):

[Machine Learning and Principles and Practice of Knowledge Discovery in Databases - International Workshops of ECML PKDD 2021, Virtual Event, September 13-17, 2021, Proceedings, Part I](#)[\[doi\]](#)[\[bibtex\]](#)[\[workshop proceedings\]](#)

38. Michael Kamp et al. (2021):

[Machine Learning and Principles and Practice of Knowledge Discovery in Databases - International Workshops of ECML PKDD 2021, Virtual Event, September 13-17, 2021, Proceedings, Part II](#)[\[doi\]](#)[\[bibtex\]](#)[\[workshop proceedings\]](#)

39. Daniel Trabold, Pascal Welke, Nico Piatkowski (2020):

[Proceedings of the Conference "Lernen, Wissen, Daten, Analysen", Online, September 9-11, 2020](#)[\[bibtex\]](#)[\[proceedings\]](#)

40. Pascal Welke (2019):

[Efficient Frequent Subtree Mining Beyond Forests](#)

Dissertations in Artificial Intelligence (348)

[\[pdf\]](#)[\[slides\]](#)[\[code\]](#)[\[bibtex\]](#)[\[book\]](#)

4 Nonarchival Peer Reviewed Venues

41. Masahiro Negishi, Thomas Gärtner, Pascal Welke (2025):

[WILTING Trees: Interpreting the Distance Between MPNN Embeddings](#)

International School and Conference on Network Science (NetSci)

(extended abstract)

[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[conference\]](#)

42. Fabian Jögl, Pascal Welke, Thomas Gärtner (2024):
[Is Expressivity Essential for the Predictive Performance of Graph Neural Networks?](#)
Workshop on Scientific Methods for Understanding Deep Learning (SciForDL@NeurIPS)
(accepted as poster presentation)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[workshop\]](#)
43. Raffaele Paolino*, Sohir Maskey*, Pascal Welke, Gitta Kutyniok (2024):
[Weisfeiler and Leman Go Loopy: A New Hierarchy for Graph Representational Learning](#)
Bridging the Gap Between Practice and Theory in Deep Learning (BGPT@ICLR)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[arxiv\]](#)[\[workshop\]](#)
44. Alexander Pluska, Pascal Welke, Thomas Gärtner, Sagar Malhotra (2024):
[Logical Distillation of Graph Neural Networks](#)
Mechanistic Interpretability Workshop (MI@ICML)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[arxiv\]](#)[\[workshop\]](#)
45. Veronica Lachi*, Alice Moallemy-Oureh*, Andreas Roth*, Pascal Welke* (2023):
[Graph Pooling Provably Improves Expressivity](#)
New Frontiers in Graph Learning (GLFrontiers@NeurIPS)
[\[pdf\]](#)[\[poster\]](#)[\[reviews\]](#)[\[workshop\]](#)
46. Franka Bause*, Fabian Jögl*, Patrick Indri, Tamara Drucks, David Penz, Nils Morten Kriege, Thomas Gärtner, Pascal Welke, Maximilian Thiessen (2023):
[Maximally Expressive GNNs for Outerplanar Graphs](#)
New Frontiers in Graph Learning (GLFrontiers@NeurIPS)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[workshop\]](#)
47. Franka Bause*, Fabian Jögl*, Pascal Welke, Maximilian Thiessen (2023):
[Maximally Expressive GNNs for Outerplanar Graphs](#)
Learning on Graphs Conference (LoG)
(Extended Abstract)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[conference\]](#)
48. Andrei Dragos Brasoveanu, Fabian Jögl, Pascal Welke, Maximilian Thiessen (2023):
[Extending Graph Neural Networks with Global Features](#)
Learning on Graphs Conference (LoG)
(Extended Abstract)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[conference\]](#)
49. Maximilian Thiessen*, Pascal Welke*, Thomas Gärtner (2022):
[Expectation Complete Graph Representations using Graph Homomorphisms](#)
New Frontiers in Graph Learning Workshop (GLFrontiers@NeurIPS)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[workshop\]](#)
50. Pascal Welke*, Maximilian Thiessen*, Thomas Gärtner (2022):
[Expectation Complete Graph Representations using Graph Homomorphisms](#)
Learning on Graphs Conference (LoG)
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[conference\]](#)
51. Dario Antweiler, Pascal Welke (2020):

[Temporal Graph Analysis for Outbreak Pattern Detection in COVID-19 Contact Tracing Networks](#)

Machine Learning in Public Health Workshop (MLPH@NeurIPS)

[\[pdf\]](#)[\[slides\]](#)[\[workshop\]](#)

52. Till Hendrik Schulz, Pascal Welke (2018):

[On the Necessity of Graph Kernel Baselines](#)

Graph Embedding and Mining Workshop, (GEM@ECMLPKDD)

[\[pdf\]](#)[\[poster\]](#)[\[workshop\]](#)

53. Pascal Welke (2017):

[Simple Necessary Conditions for the Existence of a Hamiltonian Path with Applications to Cactus Graphs](#)

Computer Science Conference for University of Bonn Students (CSCUBS)

[\[pdf\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[workshop\]](#)