

## 1 Current Preprints

1. 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)  
[\[pdf\]](#)[\[conference\]](#)

## 2 Publications

2. Masahiro Negishi, Thomas Gärtner, Pascal Welke (2025):  
[WILTING Trees: Interpreting the Distance Between MPNN Embeddings](#)  
International Conference on Machine Learning (ICML)  
[\[pdf\]](#)[\[poster\]](#)[\[code\]](#)[\[reviews\]](#)[\[arxiv\]](#)[\[conference\]](#)
3. Fouad Alkhoury, Sebastian Buschjäger, Pascal Welke (2025):  
[Splitting Stump Forests: Tree Ensemble Compression for Edge Devices \(Extended Version\)](#)  
Machine Learning (114)  
[\[pdf\]](#)[\[code\]](#)[\[doi\]](#)[\[official free version\]](#)[\[journal\]](#)
4. Veronica Lachi\*, Alice Moallem-Oureh\*, Andreas Roth\*, Pascal Welke\* (2025):  
[Expressive Pooling for Graph Neural Networks](#)  
Transactions on Machine Learning Research (TMLR)  
[\[pdf\]](#)[\[video\]](#)[\[code\]](#)[\[reviews\]](#)[\[journal\]](#)
5. 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  
[\[pdf\]](#)[\[code\]](#)[\[doi\]](#)[\[book\]](#)
6. Franka Bause\*, Fabian Jögl\*, 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)  
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[reviews\]](#)[\[journal\]](#)
7. 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]
8. 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]
  9. 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]
  10. 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]
  11. 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]
  12. Ramsés J. Sánchez, Lukas Conrads, Pascal Welke, Kostadin Cvejoski, César Ojeda (2023):  
[Hidden Schema Networks](#)  
Annual Meeting of the Association for Computational Linguistics (ACL)  
[pdf][poster][slides][code][doi][arXiv][bibtex][conference]
  13. 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]
  14. 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]
  15. Katharina Beckh, Sebastian Müller, Matthias Jakobs, Vanessa Toborek, Hanxiao Tan, Raphael Fischer, Pascal Welke, Sebastian Houben, Laura von Rügen (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]

16. Till Hendrik Schulz, Tamás Horváth, Pascal Welke, Stefan Wrobel (2022):  
[A generalized Weisfeiler-Lehman graph kernel](#)  
Machine Learning (111)  
[\[pdf\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[journal\]](#)
17. 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)  
[\[pdf\]](#)[\[code\]](#)[\[reproducible run\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[journal\]](#)
18. 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)  
[\[pdf\]](#)[\[code\]](#)[\[reproducible run\]](#)[\[doi\]](#)[\[journal\]](#)
19. Till Hendrik Schulz, Pascal Welke, Stefan Wrobel (2022):  
[Graph Filtration Kernels](#)  
AAAI Conference on Artificial Intelligence (AAAI)  
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[code\]](#)[\[doi\]](#)[\[arxiv\]](#)[\[bibtex\]](#)[\[conference\]](#)
20. Richard Palme, Pascal Welke (2022):  
[Frequent Generalized Subgraph Mining via Graph Edit Distances](#)  
IoT Streams for Predictive Maintenance (IoTStreams@ECMLPKDD)  
[\[pdf\]](#)[\[slides\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[workshop\]](#)
21. Janis Kalofolias, Pascal Welke, Jilles Vreeken (2021):  
[SUSAN: The Structural Similarity Random Walk Kernel](#)  
SIAM International Conference on Data Mining (SDM)  
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
22. Pascal Welke (2020):  
[Efficient Frequent Subgraph Mining in Transactional Databases](#)  
International Conference on Data Science and Advanced Analytics (DSAA)  
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
23. Pascal Welke, Fouad Alkhoury, Christian Bauckhage, Stefan Wrobel (2020):  
[Decision Snippet Features](#)  
International Conference on Pattern Recognition (ICPR)  
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
24. 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)  
[\[pdf\]](#)[\[slides\]](#)[\[video\]](#)[\[code\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
25. 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  
[\[pdf\]](#)[\[doi\]](#)[\[arXiv\]](#)[\[bibtex\]](#)[\[journal\]](#)
26. Pascal Welke, Tamás Horváth, Stefan Wrobel (2019):  
[Probabilistic and Exact Frequent Subtree Mining in Graphs Beyond Forests](#)  
Machine Learning (108)  
[\[pdf\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[journal\]](#)
27. Pascal Welke, Tamás Horváth, Stefan Wrobel (2018):  
[Probabilistic Frequent Subtrees for Efficient Graph Classification and retrieval](#)  
Machine Learning (107)  
[\[pdf\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[journal\]](#)
28. 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)  
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
29. Pascal Welke, Alexander Markowetz, Torsten Suel, Maria Christoforaki (2016):  
[Three-hop Distance Estimation in Social Graphs](#)  
IEEE International Conference on Big Data (BigData)  
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
30. Pascal Welke, Tamás Horváth, Stefan Wrobel (2016):  
[Min-Hashing for Probabilistic Frequent Subtree Feature Spaces](#)  
International Conference on Discovery Science (DS)  
[\[pdf\]](#)[\[poster\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
31. Katrin Ullrich, Jennifer Mack, Pascal Welke (2016):  
[Ligand Affinity Prediction with Multi-pattern Kernels](#)  
International Conference on Discovery Science (DS)  
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
32. Pascal Welke, Ionut Andone, Konrad Blaszkiewicz, Alexander Markowetz (2016):  
[Differentiating Smartphone Users by App Usage](#)  
International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)  
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
33. Pascal Welke, Tamás Horváth, Stefan Wrobel (2015):  
[Probabilistic Frequent Subtree Kernels](#)  
New Frontiers in Mining Complex Patterns (NFMCP@ECMLPKDD)  
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[workshop\]](#)
34. 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)  
[\[pdf\]](#)[\[slides\]](#)[\[doi\]](#)[\[bibtex\]](#)[\[conference\]](#)
35. 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

36. 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](#)  
[\[doi\]](#)[\[bibtex\]](#)[\[workshop proceedings\]](#)
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 II](#)  
[\[doi\]](#)[\[bibtex\]](#)[\[workshop proceedings\]](#)
38. Daniel Trabold, Pascal Welke, Nico Piatkowski (2020):  
[Proceedings of the Conference "Lernen, Wissen, Daten, Analysen", Online, September 9-11, 2020](#)  
[\[bibtex\]](#)[\[proceedings\]](#)
39. Pascal Welke (2019):  
[Efficient Frequent Subtree Mining Beyond Forests](#)  
Dissertations in Artificial Intelligence (348)  
[\[pdf\]](#)[\[slides\]](#)[\[code\]](#)[\[bibtex\]](#)[\[book\]](#)

### 4 Nonarchival Peer Reviewed Venues

40. Franka Bause\*, Fabian Jögl\*, 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  
[\[pdf\]](#)[\[code\]](#)[\[conference\]](#)
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 Moallem-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)  
[\[pdf\]](#)[\[arXiv\]](#)[\[bibtex\]](#)[\[workshop\]](#)