Christopher Morris

Address

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Areas of Specialization

Graph embeddings (graph kernels, graph neural networks, invariant neural networks) from a theoretical as well as applied viewpoint, and their application in combinatorial optimization.

Education

2015–2019	PhD in Computer Science, TU Dortmund University, Germany, final grade: 1.0 with highest distinction (best possible grade)
01/2018–04/2018	Research stay at Stanford, Infolab (Jure Leskovec)
2012–2015	MSc in Computer Science, TU Dortmund University, Germany, final grade: 1.0 (best possible grade)
2008–2012	BSc in Computer Science, TU Dortmund University, Germany
1997–2007	University Entrance Qualification, Erzbischöfliches St.-Angela-Gymnasium, Wipperfürth

Employment

Since 03/2020	Postdoctoral researcher in the group of Andrea Lodi, Polytechnique Montréal
2015–2019	PhD student and research associate, TU Dortmund University, within the Collaborative Research Center SFB 876, advised by Petra Mutzel (now University of Bonn) and Kristian Kersting (Technical University of Darmstadt)
2007–2008	Mandatory civil service

Publications

Conference Papers

[1] Christopher Morris, Gaurav Rattan, Petra Mutzel. *Weisfeiler and Leman Go Sparse: Towards Scalable Higher-order Graph Neural Networks*, Neural Information Processing Systems (NeurIPS), pages TBD, 2020,

[2] Matthias Fey, Jan E. Lenssen, Christopher Morris, Jonathan Masci, Nils M. Kriege. *Deep Graph Matching Consensus*, International Conference on Learning Representations (ICLR) 2020.

[3] Lutz Oettershagen, Nils Kriege, Christopher Morris, Petra Mutzel. *Temporal Graph Kernels for Classifying Dissemination Processes*, SIAM International Conference on Data Mining (SDM), pages 496–504, 2020.

[4] Christopher Morris, Martin Ritzert, Matthias Fey, William L. Hamilton, Jan Eric Lenssen, Gaurav Rattan, Martin Grohe. *Weisfeiler and Leman Go Neural: Higher-order Graph Neural Networks*, AAAI Conference on Artificial Intelligence (AAAI), pages 4602–4609, 2019.

[5] Rex Ying, Jiaxuan You, Christopher Morris, Xiang Ren, William L. Hamilton, Jure Leskovec. *Hierarchical Graph Representation Learning with Differentiable Pooling*, Neural Information Processing Systems (NeurIPS), pages 4805–4815, 2018, spotlight presentation.

[6] Nils M. Kriege, Christopher Morris, Anja Rey, Christian Sohler. *A Property Testing Framework for the Theoretical Expressivity of Graph Kernels*, International Joint Conference on Artificial Intelligence (IJCAI), pages 2348–2354, 2018.

[7] Christopher Morris, Kristian Kersting, Petra Mutzel. *Glocalized Weisfeiler-Lehman Graph Kernels: Global-Local Feature Maps of Graphs*, IEEE International Conference on Data Mining (ICDM), pages 327–336, 2017, full paper.

[8] Christopher Morris, Nils M. Kriege. *Recent Advances in Kernel-Based Graph Classification*, European Conference on Machine Learning & Principles and Practice of Knowledge Discovery in Databases (ECML PKDD), pages 388–392, 2017.

[9] Christopher Morris, Nils M. Kriege, Kristian Kersting, Petra Mutzel. *Faster Kernels for Graphs with Continuous Attributes via Hashing*, IEEE International Conference on Data Mining (ICDM), pages 1095–1100, 2016.

Journal Articles

[10] Lutz Oettershagen, Nils M. Kriege, Christopher Morris, and Petra Mutzel *Classifying Dissemination Processes in Temporal Graphs*, *Big Data* 8 (5), pages 363–378, 2020.

[11] Nils M. Kriege, Fredrik D. Johansson, Christopher Morris. *A Survey on Graph Kernels*, *Applied Network Science* 5 (1), pages 1-42, 2020.

[12] Nils M. Kriege, Marion Neumann, Christopher Morris, Kristian Kersting, Petra Mutzel. *A Unifying View of Explicit and Implicit Feature Maps for Structured Data: Systematic Studies of Graph Kernels*, *Data Mining and Knowledge Discovery* 33 (6), pages 1505-1547, 2019.

[13] Fritz Bökler, Mathias Ehrgott, Christopher Morris, Petra Mutzel. *Output-sensitive Complexity of Multiobjective Combinatorial Optimization*, Journal of Multicriteria Decision Analysis 24 (1-2), pages 25-36, 2017.

Workshop Papers (Peer-reviewed)

[14] Weisfeiler and Leman go sparse: Towards scalable higher-order graph embeddings. Christopher Morris, Gaurav Rattan, Petra Mutzel, Graph Representation Learning and Beyond (GRL+, ICML 2020).

[15] TUDataset: A collection of benchmark datasets for learning with graphs. Christopher Morris, Nils M. Kriege, Franka Bause Kristian Kersting, Petra Mutzel, Marion Neumann, Graph Representation Learning and Beyond (GRL+, ICML 2020).

[16] Rex Ying, Jiaxuan You, Christopher Morris, Xiang Ren, William L. Hamilton, Jure Leskovec. *Hierarchical Graph Representation Learning with Differentiable Pooling*, KDD Deep Learning Day 2018.

Thesis

[17] Christopher Morris. *Learning with Graphs: Kernel and Neural Approaches*, PhD thesis, TU Dortmund University, 2019.

[18] Christopher Morris. *Enumeration Complexity of Multicriteria Linear Optimization*, MSc thesis, TU Dortmund University, 2015.

Academic Honors

2020	Nominated (by TU Dortmund University) for the dissertation award of the German computer science association (GI Dissertationspreis)

Invited Talks

11/2020	INFORMS Annual Meeting, *Limits Of Graphs Neural Networks For Combinatorial Optimization*
10/2019	IBM Research, Zürich, *Graph Classification: Kernel and Neural Approaches*
05/2019	NEC Research, Heidelberg, *Graph Classification: Kernel and Neural Approaches*
03/2018	Stanford, SNAP, Infolab, *Learning Higher-order Graph Embeddings: Theory and Practice*
07/2017	RWTH Aachen, Chair of Logic and the Theory of Discrete Systems, *Graph Classification: Kernels and Beyond*

Teaching

Supervised eight bachelor and master thesis, one intern.

SS 2019	Proseminar *Graph Algorithms* (supervised students and helped with organization)
SS 2018	Seminar *Algorithm Engineering* (supervised students and helped with organization
SS 2017	Seminar *Algorithm Engineering* (supervised students and helped with organization
WS 2016/17	Student project group *Algorithm Engineering for Graph Data Mining* (co-organizer), Seminar *Algorithms Unplugged* (supervised students and helped with organization
SS 2016	Seminar *Algorithm Engineering*, Seminar *Graph Mining* (supervised students and helped with organization
SS 2016	Seminar *Algorithm Engineering* (supervised students and helped with organization
As a student	Programming tutorials for engineering students, teaching assistant for a course on theoretical computer science

Service to the Profession

Co-organizer of the Dagstuhl seminar *Graph Embeddings: Theory and Practice* (2021) (together with Martin Grohe (RWTH Aachen), Stephan Günnemann (TU Munich), Stefanie Jegelka (MIT))

Program committee member for IJCAI 2019, NeurIPS 2019, AAAI 2020, ICML 2020, IJCAI 2020, ECML-PKDD 2020, NeurIPS 2020, ICLR 2021, AAAI 2021

Program committee member for *Representation Learning on Graphs and Manifolds* (ICLR 2019 workshop), *Learning and Reasoning with Graph-Structured Data* (ICML 2019 workshop), *Graph Representation Learning* (NeurIPS 2019 workshop), *Graph Representation Learning and Beyond* (ICML 2020 workshop), *Graphs and more Complex Structures for Learning and Reasoning* (AAAI 2021 workshop)

(Sub-)Reviewer for WALCOM 2017, ISAAC 2018, ALENEX 2019, ESA 2018, ICALP 2020

Occasional reviews for IEEE Transactions on Pattern Analysis and Machine Intelligence (2× 2020), Journal of Machine Learning Research (2020), ACM Transactions on Knowledge Discovery from Data (2019), IEEE Transactions on Cybernetics (2020), IEEE Transactions on Mobile Computing (2020)

Initiator of `www.graphlearning.io`, a large collection of benchmark datasets for graph classification and regression

Member of the appeal commission for the professorship *Data Mining* (TU Dortmund University, 2017)

Other

Computational Skills Python, C++, LaTeX, Scikit-learn, NumPy, PyTorch, PyTorch Geometric
Languages German (native), English (fluent)

Citizenship German and British

Referees

Prof. Petra Mutzel
Computational Analytics,
Department of Computer Science,
University of Bonn
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Prof. Kristian Kersting
Machine Learning Group,
Department of Computer Science,
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