Stefan Neumann

Curriculum Vitae

stefan.neumann@tuwien.ac.at
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Research Interests

- Social Network Analysis
- Opinion Formation
- Graph Algorithms
- Foundations of Data Science

Work Experience

Since 2024 **Assistant Professor**, TU Wien, Vienna, Austria

2023–2024 **Assistant Professor**, KTH Royal Institute of Technology, Stockholm, Sweden

2020–2023 **Postdoctoral Researcher**, KTH Royal Institute of Technology, Stockholm, Sweden
- Hosted by Aristides Gionis

Spring 2021 **Adjunkt (Adjunct Instructor)**, Uppsala University, Uppsala, Sweden
- Co-taught *Data Mining I* (5 ECTS)

2019 **Visiting Researcher**, Brown University, Providence, RI, USA
- Hosted by Eli Upfal for 6 months

2016–2020 **Research and Teaching Assistant**, University of Vienna, Vienna, Austria
- Hosted by Monika Henzinger

Education

2016–2020 **Ph.D. in Computer Science**, *with distinction*, University of Vienna, Vienna, Austria
- Thesis: "Provably Finding and Exploiting Patterns in Data"
- Supervised by Monika Henzinger

2013–2015 **M.Sc. in Computer Science**, *with distinction*, Max Planck Institute for Informatics and Saarland University, Saarbrücken, Germany

2010–2013 **B.Sc. in Mathematics**, *Friedrich Schiller University*, Jena, Germany

Grants and Awards

Funding *Vienna Research Group for Young Investigators* from the Vienna Science and Technology Fund (WWTF), worth 1.5M€

Ph.D. Thesis *Won* the **Heinz Zemanek Award** from the Austrian Computer Society (best Austrian Computer Science dissertation in 2020 and 2021; co-won with Daniela Kaufmann)

Won the **Award of Excellence** from the Austrian Ministry of Education, Science and Research (among the 40 best dissertations of 2020 across all fields)

Nominated for the Dissertationspreis of Gesellschaft für Informatik (among the Top 36 Computer Science dissertations in Germany, Austria and Switzerland in 2020)

Papers	*Oral presentation* at the WebConf 2024
	Oral presentation at ICML 2022 (among Top 118 submissions out of 5630)
	Best paper candidate at ICDM 2016
	My single-authored NeurIPS 2018 paper was presented as *Best of Data Science Made in Germany, Austria and Switzerland* at INFORMATIK 2019
Reviewing	Among the *best reviewers* of WebConf 2023 (Top 130 out of 1,300+)
	Honorable Mention as one of the best reviewers of WebConf 2022 (Top 50 out of 1,500+)
	Outstanding Reviewer at ICML 2022 (among Top 10% reviewers)

Scientific Activities

Program Committees	WebConf (2022–2024), KDD (2022–2024), WSDM (2022–2024), ICML (2022–2024), NeurIPS (2022, 2023), ICDM (2021–2023), ECML PKDD (2020–2023), LoG (2022), SDM (2021, 2022), IJCAI-ECAI Survey Track (2021, 2022), ASONAM (2022), SIROCCO (2021)
Organizing Committees	SDM 2022 Publicity Co-Chair
Conference Reviewing	SODA (2022–2024), ITCS (2024), ICALP (2016, 2017, 2019–2024), ESA (2016, 2021, 2023), SoCG (2022), STOC (2018, 2021), KDD (2020, 2021), MFCS (2021), WADS (2021), NeurIPS (2020), WebConf (2020), WSDM (2020), ICDM (2020), SWAT (2020), ICDM (2019), CIKM (2019), ECML PKDD (2019), STACS (2019), SWAT (2018), WADS (2017)
Journal Reviewing	SICOMP, IEEE TIT, VLDBJ, DAMI, ACM TIST, Algorithmica, TCS
Grant Reviewing	NSF (2023), Polish National Science Centre (2023)
Research Visits	*University of Eastern Finland*, Host: Pauli Miettinen, Sep. 2019
	Brown University, Host: Eli Upfal, Jan.–Jun. 2019
Workshops	*ECML PKDD 2021 Satellite Meetup* in Ghent, Belgium, Sep. 14–16, 2021
	Computation and Statistics in Data Science in Bertinoro, Italy, Sep. 30–Oct. 4, 2019
	Data Science in Low-dimensional Spaces at ICERM, Providence, RI, USA, May 13–17, 2019
Talks and Posters	*Dynamic Maintenance of Monotone Dynamic Programs and Applications*, HALG 2023 (Contributed Talk)
	Dynamic Maintenance of Monotone Dynamic Programs and Applications, STACS 2023
	Opinion Formation in Social Networks: Models and Computational Problems, RAIS Summer School and Workshop 2022
	Sublinear-Time Clustering Oracle for Signed Graphs, ICML 2022
	Opinion Formation in Social Networks: Models and Computational Problems, IJCAI 2022
	Sublinear-Time Clustering Oracle for Signed Graphs, SoBigData++ Plenary Meeting
	Provably Finding and Exploiting Patterns in Data, Heinz Zemanek Award Hearing 2022
	Opinion Formation in Social Networks: Models and Computational Problems, WebConf 2022

Provably Finding and Exploiting Patterns in Data, Hearing for the Dissertationspreis of Gesellschaft für Informatik 2021

Tight Bounds for Online Graph Partitioning, HALG 2021 (Contributed Talk)

Tight Bounds for Online Graph Partitioning, SODA 2021

Biclustering and Boolean Matrix Factorization in Data Streams, VLDB 2020

Dynamic Approximate Maximum Independent Set of Intervals, Hypercubes and Hyperrectangles, SoCG 2020

Finding Tiny Clusters in Bipartite Graphs, Workshop on Computation and Statistics in Data Science, Bertinoro, 2019

Finding Tiny Clusters in Bipartite Graphs, INFORMATIK 2019

Bipartite Stochastic Block Models with Tiny Clusters, University of Eastern Finland, 2019

Efficient Distributed Workload (Re-)Embedding, SIGMETRICS 2019

Bipartite Stochastic Block Models with Tiny Clusters, NeurIPS 2018

Ranking the Teams in European Football Leagues With Agony, MLSA@ECML PKDD 2018

What You Will Gain By Rounding: Theory and Algorithms for Rounding Rank, ICDM 2016

Incremental and Fully Dynamic Subgraph Connectivity For Emergency Planning, ESA 2016

Memberships

Association for Computing Machinery (ACM) (since 2023)

Austrian Computer Society (since 2022)

Teaching and Supervision

Instructor

Applied Programming and Computer Science at KTH (Fall 2023)

Data Mining I at Uppsala University (Spring 2021)

Teaching Assistant

Algorithms and Data Structures at University of Vienna (Summer 2020)

Algorithms and Data Structures 2 at University of Vienna (Winter 2019)

Mathematical Foundations of Computer Science 1 at University of Vienna (Winter 2018, Winter 2017, Summer 2017, Winter 2016)

Ph.D. Supervision

Sebastian Lüderssen, Ph.D. student at TU Wien (main supervisor)

Thibault Marette, Ph.D. student at KTH Royal Institute of Technology (informal co-supervision)

Sijing Tu, Ph.D. student at KTH Royal Institute of Technology (informal co-supervisor)

Tianyi Zhou, Ph.D. student at KTH Royal Institute of Technology (informal co-supervisor)

B.Sc./M.Sc. Supervision

4 M.Sc. Theses, 1 B.Sc. Thesis, 1 Teaching Assistant, 1 Student Assistant

Education

Teaching and Learning in Higher Education (LH231V), 7.5 ECTS, at KTH (Fall 2023)

Doctoral Supervision (LH207V), 3 ECTS, at KTH (Fall 2023)

Publications

Note that the publication culture in Computer Science is to publish mostly at conferences and that papers in conference proceedings are fully refereed publications. In Data Science, authors are usually ordered by contribution; in Algorithms, authors are ordered alphabetically.

Conference Publications

Stefan Neumann, Yinhao Dong, and Pan Peng. "Sublinear-Time Opinion Estimation in the Friedkin–Johnsen Model". In: *ACM Web Conference (WebConf, formerly WWW)*. To appear. 2024.

Tianyi Zhou, Stefan Neumann, Kiran Garimella, and Aristides Gionis. "Modeling the Impact of Timeline Algorithms on Opinion Dynamics Using Low-rank Updates". In: *ACM Web Conference (WebConf, formerly WWW)*. To appear. 2024.

Corinna Coupette, Stefan Neumann, and Aristides Gionis. "Reducing Exposure to Harmful Content via Graph Rewiring". In: *ACM International Conference on Knowledge Discovery & Data Mining (KDD)*. 2023, pp. 323–334.

Sijing Tu, Stefan Neumann, and Aristides Gionis. "Adversaries with Limited Information in the Friedkin-Johnsen Model". In: *ACM International Conference on Knowledge Discovery & Data Mining (KDD)*. 2023, pp. 2201–2210.

Klaus-Tycho Foerster, Thibault Marette, Stefan Neumann, Claudia Plant, Ylli Sadikaj, Stefan Schmid, and Yllka Velaj. "Analyzing the Communication Clusters in Datacenters". In: *ACM Web Conference (WebConf, formerly WWW)*. Authors ordered alphabetically. 2023, pp. 3022–3032.

Thibault Marette, Pauli Miettinen, and Stefan Neumann. "Visualizing Overlapping Biclusterings and Boolean Matrix Factorizations". In: *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery (ECML PKDD)*. 2023, pp. 743–758.

Stefan Neumann and Pan Peng. "Sublinear-Time Clustering Oracle for Signed Graphs". In: *International Conference on Machine Learning (ICML). Oral presentation* (Top 118 submissions out of 5630). 2022, pp. 16496–16528.

Sijing Tu and Stefan Neumann. "A Viral Marketing-Based Model for Opinion Dynamics in Online Social Networks". In: *ACM Web Conference (WebConf, formerly WWW)*. 2022, pp. 1570–1578.

Monika Henzinger, Stefan Neumann, Harald Räcke, and Stefan Schmid. "Tight Bounds for Online Graph Partitioning". In: *ACM-SIAM Symposium on Discrete Algorithms (SODA)*. Authors ordered alphabetically. 2021, pp. 2799–2818.

Monika Henzinger, Stefan Neumann, and Andreas Wiese. "Dynamic Approximate Maximum Independent Set of Intervals, Hypercubes and Hyperrectangles". In: *Symposium on Computational Geometry (SoCG)*. Authors ordered alphabetically. 2020, 51:1–51:14.

Monika Henzinger, Stefan Neumann, and Stefan Schmid. "Efficient Distributed Workload (Re-)Embedding". In: *ACM SIGMETRICS*. Authors ordered alphabetically. 2019, pp. 43–44.

Stefan Neumann. "Bipartite Stochastic Block Models with Tiny Clusters". In: *Neural Information Processing Systems (NeurIPS)*. 2018, pp. 3871–3881.

Monika Henzinger, Andrea Lincoln, Stefan Neumann, and Virginia Vassilevska Williams. "Conditional Hardness for Sensitivity Problems". In: *Innovations in Theoretical Computer Science (ITCS)*. Authors ordered alphabetically. 2017, 26:1–26:31.

Stefan Neumann and Pauli Miettinen. "Reductions for Frequency-Based Data Mining Problems". In: *IEEE International Conference on Data Mining (ICDM)*. 2017, pp. 997–1002.

Monika Henzinger and Stefan Neumann. "Incremental and Fully Dynamic Subgraph Connectivity for Emergency Planning". In: *European Symposium on Algorithms (ESA)*. Authors ordered alphabetically. 2016, 48:1–48:11.

Stefan Neumann, Rainer Gemulla, and Pauli Miettinen. "What You Will Gain By Rounding: Theory and Algorithms for Rounding Rank". In: *IEEE International Conference on Data Mining (ICDM). Best paper candidate*. 2016, pp. 380–389.

Stefan Neumann and Andreas Wiese. "This House Proves That Debating is Harder Than Soccer". In: *Fun with Algorithms (FUN)*. Authors ordered alphabetically. 2016, 25:1–25:14.

Journal Publications

Stefan Neumann and Pauli Miettinen. "Biclustering and Boolean Matrix Factorization in Data Streams". In: *Proc. VLDB Endow.* 13.10 (2020), pp. 1709–1722.

Sayan Bhattacharya, Monika Henzinger, and Stefan Neumann. "New amortized cell-probe lower bounds for dynamic problems". In: *Theor. Comput. Sci. (TCS)* 779 (2019). Authors ordered alphabetically., pp. 72–87.

Monika Henzinger, Stefan Neumann, and Stefan Schmid. "Efficient Distributed Workload (Re-)Embedding". In: *Proc. of the ACM on Measurement and Analysis of Computing Systems (POMACS)* 3.1 (2019). Authors ordered alphabetically. Conference version in *SIGMETRICS'19*, 13:1–13:38.

Publications at Workshops and National Conferences

Thibault Marette and Stefan Neumann. "Drawing Clusterings of Bipartite Graphs". In: *International Symposium on Graph Drawing and Network Visualization (GD)*. Poster presentation. 2021.

Stefan Neumann. "Beweisbar Gesetzmäßigkeiten in Daten finden und ausnutzen". In: *Ausgezeichnete Informatikdissertationen 2020*. Vol. D-21. LNI. Gesellschaft für Informatik (GI), 2020, pp. 239–248.

Stefan Neumann. "Finding Tiny Clusters in Bipartite Graphs". In: *INFORMATIK*. Session *Best of Data Science Made in Germany, Austria and Switzerland*. 2019, pp. 253–254.

Stefan Neumann, Julian Ritter, and Kailash Budhathoki. "Ranking the Teams in European Football Leagues with Agony". In: *Machine Learning and Data Mining for Sports Analytics (MLSA@PKDD/ECML)*. 2018, pp. 55–66.

Tutorials and Surveys

Aristides Gionis, Stefan Neumann, and Bruno Ordozgoiti. “Opinion Formation in Social Networks: Models and Computational Problems”. In: *ACM Web Conference (WebConf, formerly WWW)*. Authors ordered alphabetically. 2022, pp. 391–399.

Aristides Gionis, Stefan Neumann, and Bruno Ordozgoiti. “Opinion Formation in Social Networks: Models and Computational Problems”. In: *International Joint Conferences on Artificial Intelligence (IJCAI)*. Authors ordered alphabetically. 2022.

Pauli Miettinen and Stefan Neumann. “Recent Developments in Boolean Matrix Factorization”. In: *International Joint Conferences on Artificial Intelligence (IJCAI)*. Survey Article. 2020, pp. 4922–4928.