Stefan Neumann

Curriculum Vitae

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Research Interests

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

Work Experience

Since 2024	**Assistant Professor**, TU Wien, Vienna, Austria
Since 2024	**Associate Faculty**, Complexity Science Hub, 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 NeurIPS 2024 (among Top 77 submissions out of 21,575)
	Oral presentation at the WebConf 2024 (among Top 189 submissions out of 2,008)
	Oral presentation at ICML 2022 (among Top 118 submissions out of 5,630)
	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	*Top reviewer* at NeurIPS 2025 (among Top 1,958 out of 24,429)
	Among the *best reviewers* of WebConf 2023 (among Top 130 out of 1,300+)
	Among the *best reviewers* of WebConf 2022 (among Top 50 out of 1,500+)
	Outstanding Reviewer at ICML 2022 (among Top 10% reviewers)
Teaching	The first-semester Bachelor's course "Grundzüge digitaler Systeme" that I am co-teaching was *nominated* for the Best Lecture Award 2025 at TU Wien (among Top 9 courses of the entire university)

Scientific Activities

Reviewing	I am a regular program committee member at top conferences, such as NeurIPS, ICML, the WebConf, KDD, WSDM, etc. I am also regularly reviewing for leading theory conferences (such as SODA, ITCS, ICALP, etc.) and for top journals (such as SICOMP, IEEE TIT, VLDBJ, DAMI, etc.).
Community Service	Editor of the *TCS on the Web* column of the Bulletin of the European Association for Theoretical Computer Science (since 2024)
	SDM 2025 Tutorials Chair
	SDM 2022 Publicity Co-Chair
Grant Reviewing	DFG, Israel Science Foundation, NSF, Polish National Science Centre
Research Visits	*University of Eastern Finland*, Host: Pauli Miettinen, Sep. 2019
	Brown University, Host: Eli Upfal, Jan.–Jun. 2019
Workshops	*Statistical and Probabilistic Methods in Algorithmic Data Analysis* in Dagstuhl, Germany, Sep. 22–27, 2024
	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	*Sublinear-Time Clustering Oracle for Signed Graphs*, SIAM LA 2024
	Reducing Exposure to Harmful Content via Graph Rewiring, DESI Seminar at the University of Lausanne, April 2024
	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, IJ-CAI 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, Web-Conf 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

Summer 2025   *Algorithms for Data Science*

▹ A specialized Master's course covering important data science algorithms, which are used in companies like Google, Facebook, Pinterest, etc.

▹ The course covers the theory behind the algorithms, as well as their applications.

▹ Lecturing, exercise creation and examination.

▹ 6 ECTS

Fall 2024–2025   *Fundamentals of Digital Systems (in German)*

▹ A first semester Bachelor course with 800+ students at the beginning of the semester.

▹ Co-taught with a team of 15+ people; mainly gave lectures, participated in exam preparation and correction.

▹ 6 ECTS

Fall 2023   *Applied Programming and Computer Science* at KTH

▹ Gave lectures, prepared lab sessions and exams

	▷ The ≈ 60 students were enrolled in Physics (M.Sc.) and other non-computer-science majors
	▷ 7.5 ECTS
Spring 2021	*Data Mining I* at Uppsala University
	▷ Gave lectures, conducted oral and written exams
	▷ The ≈ 30 students were enrolled in Computer Science (B.Sc.) and Industrial Analytics (M.Sc.)
	▷ 5 ECTS, taught jointly with Florian Adriaens
Ph.D. Supervision	Sebastian Lüderssen, Ph.D. student at TU Wien since 2024 (main supervisor)
	Ashwin Singh, Ph.D. student at TU Wien since 2025 (main supervisor)
	Thibault Marette, Ph.D. student at KTH Royal Institute of Technology (informal co-supervision, 2 joint papers)
	Sijing Tu, Ph.D. student at KTH Royal Institute of Technology (informal co-supervisor, 4 joint papers)
	Tianyi Zhou, Ph.D. student at KTH Royal Institute of Technology (informal co-supervisor, 2 joint papers)
B.Sc./M.Sc. Supervision	4 M.Sc. Theses, 1 B.Sc. Thesis
Other Engagement	Talk "PageRank: The Algorithms That Changed the Web" at the Vienna Science School in Applied Mathematics 2025 for the winners of national mathematics tournaments in Germany, Belgium, and the Netherlands
	Talk "Recommender Systems in Online Social Networks" at the AITHYRA AI for Science School 2025 for Ukrainian high-school students who are prize-winners of national and international science competitions
	Jury member for the 2025 Austrian Society for Artificial Intelligence MSc Thesis Prize
Teaching Education	*Teaching and Learning in Higher Education (LH231V)*, 7.5 ECTS, at KTH (Fall 2023)
	Doctoral Supervision (LH207V), 3 ECTS, at KTH (Fall 2023)

Other Activities

Department Duties	Coordinator of the machine learning courses at TU Wien Informatics
In the News	*Profil:* Brücken bauen in der Filterblase, Jul. 2025
	Kurier TV: Gefangen im Feed: Wie Algorithmen unsere Sicht auf die Welt verändern, Aug. 2025
	Kurier: "Panik um chinesische KI: "Völliger Blödsinn"", Jan. 2025
	Ö1 Digital Leben: "Modell-Kollaps", Dec. 2024
	Ö1 Matrix: "Wettrennen um KI: Der Hype um Künstliche Intelligenz", Dec. 2024
	Wiener Zeitung: "Wie böse ist Google wirklich?", Apr. 2024
Other Outreach	Panelist on "AI — The Next Generation" during the CAIML Symposium 2024
	Short Talk during the Austrian Computer Science Day 2024
Other Activities	*Chairman and Elected Member* of Students' Representatives Council of Mathematics at University of Jena, 2011–2013

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

Sebastian Lüderssen, Stefan Neumann, and Pan Peng. "Near-Optimal Four-Cycle Counting in Graph Streams". In: *ACM-SIAM Symposium on Discrete Algorithms (SODA)*. To appear. Authors ordered alphabetically. 2026.

Peter Blohm, Florian Chen, Aristides Gionis, and Stefan Neumann. "Discovering Opinion Intervals from Conflicts in Signed Graphs". In: *Neural Information Processing Systems (NeurIPS). Oral presentation* (Top 77 submissions out of 21,575). 2025.

Tianyi Zhou, Stefan Neumann, Kiran Garimella, and Aristides Gionis. "Calibrated and Diverse News Coverage". In: *International Conference on Information and Knowledge Management (CIKM)*. 2025, pp. 4509–4518.

Stefan Neumann, Yinhao Dong, and Pan Peng. "Sublinear-Time Opinion Estimation in the Friedkin-Johnsen Model". In: *ACM Web Conference 2024 (WebConf, formerly WWW)*. 2024, pp. 2563–2571.

Charlotte Out, Sijing Tu, Stefan Neumann, and Ahad N. Zehmakan. "The Impact of External Sources on the Friedkin-Johnsen Model". In: *International Conference on Information and Knowledge Management (CIKM)*. 2024, pp. 1815–1824.

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). Oral presentation* (Top 189 submissions out of 2,008). 2024, pp. 2694–2702.

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 5,630). 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.

Manuscripts

Pablo Barceló, Fabian Jogl, Alexander Kozachinskiy, Matthias Lanzinger, Stefan Neumann, and Cristóbal Rojas. "Message Passing on the Edge: Towards Scalable and Expressive GNNs". In: *CoRR* abs/2510.13615 (2025). Authors ordered alphabetically. Manuscript.

Monika Henzinger, Stefan Neumann, and Andreas Wiese. "Explicit and Implicit Dynamic Coloring of Graphs with Bounded Arboricity". In: *CoRR* abs/2002.10142 (2020). Authors ordered alphabetically. Manuscript.