

Fabian Burghart

Education and Career

- Oct 2025–today **University Assistant/PostDoc in Discrete Mathematics, TU Graz**
Advisor: Mihyun Kang
- Oct 2023–Sep 2025 **PostDoc Position in Mathematics, Eindhoven University of Technology**
Research area: Combinatorial probability
Advisors: Noëla Müller, Remco van der Hofstad, Ross Kang (external, UvA)
Position was part of the Networks-Cofund program
- Sep 2018–Aug 2023 **PhD Program in Mathematics, Uppsala University**
Affiliated to the Wallenberg AI, Autonomous Systems and Software Program (WASP)
Obtained a licentiate degree in December 2021
Completed in August 2023, with the Thesis *Building and Destroying Urns, Graphs, and Trees*
Thesis defence August 24, 2023, with opponent Klas Markström, Umeå University
Advisors: Cecilia Holmgren and Svante Janson
- Apr 2016–July 2018 **Master of Science in Mathematics, University of Stuttgart**
First subject: Mathematics; Second subject: Computer Science
Erasmus stay at Uppsala University Aug 2016–Jun 2017
Thesis: The Einstein relation on metric measure spaces
Advisor: Uta Freiberg
- Oct 2014–Apr 2016 **Bachelor of Science in Mathematics, University of Stuttgart**
First subject: Mathematics; Second subject: Computer Science
Thesis: Kleine Abweichungen für eine Familie von glatten Gaussprozessen
Advisor: Ingo Steinwart
- July 2014 **Abitur, Ernst-Abbe-Gymnasium Oberkochen**

Research Publications and Manuscripts

- [12] Calum Buchanan, Fabian Burghart, Stephan Wagner, and Mei Yin. On cycles in multiset permutations, parking functions, and related structures. In: *37th International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2026)*. Leibniz International Proceedings in Informatics (LIPIcs), Volume 381, pp. 16:1–16:17, Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2026.
- [11] Fabian Burghart. Ancestries in random d-DAGs, arXiv:2606.30475, 2026. Submitted.
- [11a] Fabian Burghart. Ancestries and descendants in a random DAG. In: *37th International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2026)*. Leibniz International Proceedings in Informatics (LIPIcs), Volume 381, pp. 7:1–7:14, Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2026. Extended abstract of [12]
- [10] Miklós Bóna, Fabian Burghart, and Stephan Wagner. On the intersection of pairs of trees, arXiv:2501.18570, 2025. Submitted.
- [9] Fabian Burghart, Annika Heckel, Marc Kaufmann, Noëla Müller, and Matija Pasch. Sharp thresholds for factors in random graphs, arXiv:2411.14138, 2024. Submitted.

- [8] Fabian Burghart, Marc Kaufmann, Noëla Müller, and Matija Pasch. The hitting time of nice factors, arXiv:2409.17764, 2024. Submitted.
- [8a] Fabian Burghart, Marc Kaufmann, Noëla Müller, and Matija Pasch. The hitting time of nice factors. In *Proceedings of the 13th European Conference on Combinatorics, Graph Theory and Applications EUROCOMB25*, 204–212, 2025. Extended abstract of [8].
- [7] Fabian Burghart and Stephan Wagner. On the histories of B -trees. *Theoretical Computer Science*, 1070:115821, 2026
- [7a] Fabian Burghart and Stephan Wagner. A bijection for the evolution of B -trees. In *35th International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2024)*. Leibniz International Proceedings in Informatics (LIPIcs), Volume 302, pp. 10:1–10:15, Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2024. Extended abstract of [7].
- [6] Fabian Burghart. A central limit theorem for m -dependent random variables in sparse graphs. In preparation.
- [5] Fabian Burghart and Paul Thévenin. Concatenating random matchings. *Electronic Journal of Probability*, 29:178.1–28, 2024.
- [4] Fabian Burghart. Polynomial invariants for rooted trees related to their random destruction. *Electronic Journal of Combinatorics*, 31(4):#P4.37, 2024.
- [3] Fabian Burghart. A modification of the random cutting model. *Advances in Applied Probability*, 56(1):287–314, 2024.
- [3a] Fabian Burghart. A modification of the random cutting model. In *33rd International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2022)*. Leibniz International Proceedings in Informatics (LIPIcs), Volume 225, pp. 4:1–4:14, Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2022. Extended abstract of [3].
- [2] Fabian Burghart. A semiring structure for generalised Pólya urns, arXiv:2111.07810, 2021.
- [1] Fabian Burghart and Uta Freiberg. The Einstein relation on metric measure spaces, arXiv:1903.07166, 2019. Reworked in 2023. To appear in P. Alonso Ruiz, M. Hinz, K. Okoudjou, L. Rogers, A. Teplyaev (Eds.): *From Classical Analysis to Analysis on Fractals. A Tribute to Robert Strichartz, Volume II*. Birkhäuser, 2026.

Miscellaneous Publications

- [T2] Fabian Burghart. *Building and Destroying Urns, Graphs, and Trees*. Uppsala Dissertations in Mathematics, Department of Mathematics, Uppsala University, 2023.
- [T1] Fabian Burghart. *Modifying the cutting model and combining Pólya urns*. Licentiate Thesis, Department of Mathematics, Uppsala University, 2021.
- [O1] Fabian Burghart. How can we know something exists if we cannot find it?, The Networks Pages, July 29, 2024. Outreach article. Available at www.networkpages.nl/how-can-we-know-something-exists-if-we-cannot-find-it/

Teaching

Qualifications **Academic Teacher Training Course, Uppsala University**

Successful completion of a course on university didactics, 7.5 ECTS, Fall 2022

NETCO-PD workshop on supervision, Networks training week

Participation in a one-day workshop on supervision for postdoctoral researchers. October 2024

Supervision	Bachelor students ○ Lorenzo Parisotto, joint Bachelor project between Eindhoven University of Technology and Tetractys. Spring 2025 ○ Lars Nobbe, <i>The random cutting model on conditioned Galton–Watson trees</i>. Eindhoven University of Technology. Spring 2025 Modelling week, Eindhoven University of Technology Supervised a group of MSc students for a 1-week modelling project on bacterial growth in the presence of antibiotics. Joint with Mikhail Langovoy, Tetractys. November 2024 Summer Math Camp, Uppsala University Assistant supervisor to a 1-month summer research internship to promising undergraduate students, lead by Stephan Wagner. August 2020
Course responsible teacher	TU Graz ○ Winter 25/26: Random Graphs (MSc/PhD level course) Uppsala University ○ Fall 20,21,22: Graph Theory (1MA170, BSc level course)
Teaching Assistant	TU Graz ○ Summer 26: Discrete Mathematics for Computer Science, Mihyun Kang ○ Summer 26: Linear Algebra II, Franz Lehner Eindhoven University of Technology ○ Spring 25: Probability and Statistics for Computer Science (2DRR10), Noëla Müller ○ Autumn 24: Probability and Stochastics 2 (2MMS30), Noëla Müller ○ Autumn 24: Premaster Calculus and Probability (2DL10), Lucas van Kreveld ○ Spring 24: Probability and Statistics for Computer Science (2DRR10), Noëla Müller. Also involved in redesigning the course with a competency-based grading system. ○ Autumn 23: Premaster Probability and Statistics (2DS70), Benoît Corsini Uppsala University ○ Spring 22,23: Probability and Statistics (1MS005), Måns Thulin, Christoffer Olsson ○ Autumn 20,21,22: Automata Theory (1MA009), Vera Koponen ○ Autumn 19: Algebra I (1MA004), Rostom Getsadze ○ Autumn 19: Linear Algebra and Geometry I (1MA025), Sebastian Pöder Balkeståhl ○ Spring 19: Multivariable Calculus, Limited (1MA017), Erik Lindgren ○ Spring 19,20: Multivariable Calculus (1MA016), Magnus Jacobsson ○ Autumn 18: Linear Algebra II (1MA024), Magnus Jacobsson
Student Assistant	University of Stuttgart ○ Summer 18: Linear Algebra and Analytic Geometry II, Steffen König ○ Winter 17/18: Linear Algebra and Analytic Geometry I, Steffen König ○ Summer 16: Linear Algebra and Analytic Geometry II, Steffen König ○ Winter 15/16: Linear Algebra and Analytic Geometry I, Anne Henke

Talks

June 22, 2026	Ancestries and descendants in a random DAG, AofA 2026, Munich
Mar 31, 2026	Sharp thresholds and hitting times for factors in random graphs, Research seminar, TU Dortmund
Dec 05, 2025	Ancestors and descendants in a random recursive DAG, Advanced Topics in Discrete Mathematics Seminar, TU Graz
Oct 10, 2025	Concatenating Random Mathings, Combinatorics Seminar, TU Graz
Sep04, 2025	F -factors in random graphs, Joint ÖMG–DMV meeting, Linz
Aug 04, 2025	F -factors in random graphs, RS&A 2025, Vienna
May 05, 2025	Sharp thresholds for factors in random graphs, AofA 2025, Toronto

Apr 08, 2025 Sharp thresholds for factors in random graphs, WORDS Groningen
 Jan 15, 2025 1-balanced factors in random graphs, Umeå Midwinter Meeting
 Oct 31, 2024 A bijection for the evolution of B -trees, Networks training week, Doorn
 June 28, 2024 The hitting time of nice factors, Complex networks in perspective, Leiden
 June 18, 2024 A bijection for the evolution of B -trees, AofA 2024, Bath
 Apr 18, 2024 Concatenating Random Matchings, Discrete Math Seminar, University of Amsterdam
 Jan 10, 2024 A CLT for m -dependent random variables in graphs, Umeå Midwinter Meeting
 Oct 23, 2023 Concatenating Random Matchings, Networks training week, Asperen
 Jan 11, 2023 Obtaining polynomial invariants from destroying trees, Umeå Midwinter Meeting
 Aug 01, 2022 A modification of the random cutting model, RS&A 2022, Gniezno
 June 20, 2022 A modification of the random cutting model, AofA 2022, Philadelphia (remotely)
 Dec 18, 2019 The Einstein relation on metric measure spaces, Seminar Analysis and Probability, TU Chemnitz

Conferences

June 2026 International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2026), Munich
 Sep 2025 ÖMG–DMV 2025, Linz
 Aug 2025 Random Structures and Algorithms, Vienna
 May 2025 International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2025), Toronto
 Apr 2025 Workshop on Randomness and Discrete Structures, Groningen
 Jan 2025 Midwinter Meeting in Discrete Probability, Umeå
 June 2024 Workshop Complex networks in perspective, Leiden
 June 2024 International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2024), Bath
 Jan 2024 Probabilistic Midwinter Meeting, Umeå
 Jan 2023 Probabilistic Midwinter Meeting, Umeå
 Aug 2022 Random Structures and Algorithms, Gniezno
 June 2022 International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2022), Philadelphia (remotely)

Schools and Research Stays

Mar 2026 Research stay at TU Dortmund. Host: Amin Coja-Oghlan
 June 2025 Young European Probabilists Workshop XX: Interacting particles on random structures, Eindhoven
 Apr 2025 Networks Training Week, Doorn
 Oct 2024 Networks Training Week, Doorn
 Apr 2024 Course: Combinatorics on Words, CWI Amsterdam
 Apr 2024 Networks Training Week, Asperen
 Mar 2024 Young European Probabilists Workshop 2024: Interplay between local and global structures of graphs, Eindhoven
 Jan 2024 Research stay at Uppsala University. Host: Stephan Wagner

Oct 2023 Networks Training Week, Asperen
 Mar 2020 Spring School in Probability: Complex Networks, Darmstadt
 Dec 2019 Research stay at TU Chemnitz. Host: Uta Freiberg
 Sep 2015 Research internship at the Max-Planck-Institute for Mathematics, Bonn
 Aug 2013 Multinationale Schülerakademie, Torgelow

Distinctions

Oct 2024 **Invitation to submit to AofA24 Special Issue of Theoretical Computer Science**
 For the extended abstract [7a], joint with Stephan Wagner.

July 2019 **Preis der Freunde der Universität Stuttgart**
 Awarded the price of the Association of friends of the University of Stuttgart for scientific achievements in a Master's thesis

Mar 2015–July 2018 **Scholarship Studienstiftung des deutschen Volkes**
 Fellow of the German Academic Scholarship Foundation

2014 **Bundeswettbewerb der Mathematik**
 Awarded highest price category, Bundessieger

2013 & 2014 **Mathematical Olympiad, Germany**
 Reached the national finals, awarded 3rd price in 2013

Sep 2011–Sep 2014 **Schülerstudent at Stuttgart University**
 Participant of a program which enabled me to take university courses while still attending school

Service

Seminars Since February 2026, I have been an organizer of the Graz Combinatorics Seminar

Reviews I have acted as reviewer for Discrete Mathematics, Journal of Applied Probability, Compositionality, and the conference proceedings for AofA

Languages

German As native language
 English Fluent
 Swedish Intermediate
 French Elementary

Miscellaneous

Outreach Succesfully completed the course "Analytic Storytelling" within the Networks-Cofund program in June 2024, resulting in the article [O1].

Music I have been playing the piano since age 9, and was co-organising the Ångström chamber music concerts during my PhD at Uppsala University. Preferably, I study pieces from the romantic and expressionistic era, with particular fondness for the music of Schumann, Chopin, and Scriabin.