Florian Lehner

Curriculum Vitæ

Department of Mathematics
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Work Experience

since 2022	**Lecturer**,	*University of Auckland*, Department of Mathematics.
2020 – 2022	**Project Assistant**,	*Graz University of Technology*, Institute of Discrete Mathematics.
2017 – 2020	**Erwin Schrödinger Research Fellow**,	*University of Warwick*, Department of Mathematics, and *Graz University of Technology*, Institute of Discrete Mathematics.
2015 – 2017	**University Assistant**,	*University of Hamburg*, Department of Mathematics.
2011 – 2015	**University Assistant**,	*Graz University of Technology*, Institute of Geometry.
2006 – 2010	**Teaching assistant**,	*Graz University of Technology*, Institutes of Mathematics A, B and C and Institute for Software Technology.

Academic Qualifications

2021   **Habilitation**,
Graz University of Technology.

2011 – 2014   **PhD: Mathematics and Scientific Computing**,
Graz University of Technology.
Graduation on 4 July 2014 with highest distinctions (sub auspiciis Praesidentis).

Thesis title: *Symmetry Breaking in Graphs and Groups*

2008 – 2011   **Master programme: Mathematical Computer Science**,
Graz University of Technology.

2005 – 2008   **Bachelor programme: Technical Mathematics**,
Graz University of Technology.

Research Grants

2023 – 2024   **University of Auckland New Staff Grant** (20.000 NZD).

2017 – 2020   **Erwin Schrödinger Postdoctoral Fellowship** (160.010 EUR).

2015 – 2017   **Exzellenzstipendium** (9.000 EUR).

Awards

2015	**Studienpreis der OeMG** (500 EUR).
	Awarded by the Austrian Mathematical Society for outstanding dissertations in mathematics, only one award in 2015.
2015	**Promotio sub auspiciis Praesidentis**.
	Highest level of distinction for PhD graduates in Austria, awarded for passing all final exams starting from secondary education with distinction.
2013	**CMSA Student Prize** (500 AUD).
	Awarded for the best student talk at 37ACCMCC.
2008/09 and 2006/07	**Leistungsstipendium** (725 EUR per award).
	Merit based stipend for undergraduate students.

Publications

Research Papers

[36] F. Lehner,
Asymmetric colouring of locally compact permutation groups,
Bulletin of the London Mathematical Society, 2023, to appear.

[35] F. Lehner,
A note on classes of subgraphs of locally finite graphs,
Journal of Combinatorial Theory, Series B, 161: 52–62, 2023.

[34] F. Lehner and C. Lindorfer,
Self-avoiding walks and multiple context-free languages,
Combinatorial Theory, 3(1), 2023.

[33] F. Lehner and J. Erde,
Hamiltonian decompositions of 4-regular Cayley graphs of infinite abelian groups,
Journal of Graph Theory, 101(3): 559–571, 2022.

[32] F. Lehner, P. Potočnik, and P. Spiga,
On fixity of arc-transitive graphs,
Science China Mathematics, 64: 2603–2610, 2021.

[31] F. Lehner and G. Verret,
Counterexamples to "A conjecture on induced subgraphs of Cayley graphs",
Ars Mathematica Contemporanea, 19: 77–82, 2020.

[30] F. Lehner and C. Lindorfer,
Comparing consecutive letter counts in multiple context-free languages,
Theoretical Computer Science, 868: 1–5, 2021.

[29] F. Lehner, M. Pilśniak, and M. Stawiski,
A bound for the distinguishing index of regular graphs,
European Journal of Combinatorics, 89: 103145, 2020.

[28] N. Bowler, J. Erde, F. Lehner, and M. Pitz,
Bounding the cop number of a graph by its genus,
SIAM Journal on Discrete Mathematics, 35(4): 2459–2489, 2021.

[27] F. Lehner,
On the cop-number of toroidal graphs,
Journal of Combinatorial Theory, Series B, 151: 250–262, 2021.

[26] M. Hamann, F. Lehner, B. Miraftab, and T. Rühmann,
A Stallings' type theorem for quasi-transitive graphs,
Journal of Combinatorial Theory, Series B, 157: 40–69, 2022.

[25] A. Georgakopoulos and F. Lehner,
Invariant spanning double rays in amenable groups,
Discrete Mathematics, 344(2): 112207, 2021.

[24] F. Lehner, M. Pilśniak, and M. Stawiski,
Distinguishing infinite graphs with bounded degrees,
Journal of Graph Theory, 101(1): 52–65, 2022.

[23] F. Lehner and G. Verret,
Distinguishing numbers of finite 4-valent vertex-transitive graphs,
Ars Mathematica Contemporanea, 19(2): 173–187, 2020.

[22] F. Lehner and S. M. Smith,
On symmetries of edge and vertex colourings of graphs,
Discrete Mathematics, 343(9): 111959, 2020.

[21] W. Imrich, F. Lehner, and S. M. Smith,
Distinguishing density and the distinct spheres condition,
European Journal of Combinatorics, 89: 103139, 2020.

[20] J. Erde, F. Lehner, and M. Pitz,
Hamilton decompositions of one-ended Cayley graphs,
Journal of Combinatorial Theory, Series B, 140: 171–191, 2020.

[19] S. Alikhani, S. Klavžar, F. Lehner, and S. Soltani,
Trees with distinguishing index equal distinguishing number plus one,
Discussiones Mathematicae Graph Theory, 40(3): 875–884, 2020.

[18] F. Lehner,
Firefighting on trees and Cayley graphs,
Australasian Journal of Combinatorics, 75(1): 66–72, 2019.

[17] J. Carmesin, F. Lehner, and R. G. Möller,
On tree-decompositions of one-ended graphs,
Mathematische Nachrichten, 292(3): 524–539, 2019.

[16] N. Bowler, J. Erde, F. Lehner, M. Merker, M. Pitz, and K. Stavropoulos,
A counterexample to Montgomery's conjecture on dynamic colourings of regular graphs,
Discrete Applied Mathematics, 229: 151–153, 2017.

[15] N. Bowler, J. Erde, P. Heinig, F. Lehner, and M. Pitz,
Non-reconstructible locally finite graphs,
Journal of Combinatorial Theory, Series B, 133: 122–152, 2018.

[14] N. Bowler, J. Erde, P. Heinig, F. Lehner, and M. Pitz,
A counterexample to the reconstruction conjecture for locally finite trees,
Bulletin of the London Mathematical Society, 49(4): 630–648, 2017.

[13] F. Lehner,
Breaking graph symmetries by edge colourings,
Journal of Combinatorial Theory, Series B, 127: 205–214, 2017.

[12] M. Hellmuth and F. Lehner,
Fast factorization of cartesian products of (directed) hypergraphs,
Theoretical Computer Science, 615: 1–11, 2016.

[11] F. Lehner and S. Wagner,
Maximising the number of independent sets in connected graphs,
Graphs and Combinatorics, 33(5): 1103–1118, 2017.

[10] F. Lehner and R. G. Möller,
Local finiteness, distinguishing numbers and Tucker's conjecture,
Electronic Journal of Combinatorics, 22(4): P4.19, 2015.

[9] F. Lehner,
Pursuit evasion on infinite graphs,
Theoretical Computer Science, 655(Part A): 30–40, 2016.

[8] T. Boiko, J. Cuno, W. Imrich, F. Lehner, and C. E. van de Woestijne,
The cartesian product of graphs with loops,
Ars Mathematica Contemporanea, 11(1): 1–9, 2016.

[7] C. Hofer-Temmel and F. Lehner,
Clique trees of infinite locally finite chordal graphs,
Electronic Journal of Combinatorics, 25(2): P2.9, 2018.

[6] M. Hamann, F. Lehner, and J. Pott,
Extending cycles locally to Hamilton cycles,
Electronic Journal of Combinatorics, 23(1): P1.49, 2016.

[5] F. Lehner,
Random colorings and automorphism breaking in locally finite graphs,
Combinatorics Probability and Computing, 22(6): 885–909, 2013.

[4] F. Lehner,
Distinguishing graphs with intermediate growth,
Combinatorica, 36(3): 333–347, 2016.

[3] W. Imrich, R. Kalinowski, F. Lehner, and M. Pilśniak,
Endomorphism breaking in graphs,
Electronic Journal of Combinatorics, 21(1): P1.16, 2014.

[2] J. Cuno, W. Imrich, and F. Lehner,
Distinguishing graphs with infinite motion and nonlinear growth,
Ars Mathematica Contemporanea, 7: 201–213, 2014.

[1] F. Lehner,
On spanning tree packings of highly edge connected graphs,
Journal of Combinatorial Theory, Series B, 105: 93–126, 2014.

Submitted Preprints

[5] A. Girão, K. Hendrey, F. Illingworth, F. Lehner, L. Michel, M. Savery, and R. Steiner,
Chromatic number is not tournament-local, 2023.

[4] W. Imrich, R. Kalinowski, <u>F. Lehner</u>, M. Pilśniak, and M. Stawiski,
     Asymmetrizing infinite trees, 2023.

[3] <u>F. Lehner</u>, P. E. Harris, and E. Insko,
     Tipsy cop and tipsy robber: collisions of biased random walks on graphs, 2022.

[2] <u>F. Lehner</u>,
     Universal planar graphs for the topological minor relation, 2022.

[1] <u>F. Lehner</u>, M. Pilśniak, and M. Stawiski,
     On asymmetric colourings of graphs with bounded degrees and infinite motion, 2019.

Presentations

Invited Conference Talks

2021   Cops, robbers, donuts, and teleportation,
       Student conference in Discrete Mathematics, AGH Krakow, PL/online.

2018   A topological game of cops and robbers,
       Student conference in Discrete Mathematics, AGH Krakow, PL.

2016   The reconstruction problem for infinite graphs,
       Symposium on Discrete Mathematics, Freie Universität Berlin, DE.

2014   Symmetry breaking in graphs and groups,
       Ljubljana–Leoben Graph Theory Seminar, University of Primorska, Koper, SI.

Student supervision

2019 – 2021   **Christian Lindorfer**, PhD supervised jointly with W. Woess.
              Thesis: A language theoretic approach for studying self-avoiding walks

Teaching

University of Auckland

2023   CS 120: Mathematics for Computer Science, Term 2,
       taught jointly with S. Stephen.

       MATHS 326: Combinatorics, Term 1.

       MATHS 715: Graph Theory and Combinatorics, Term 1,
       taught jointly with M. Conder.

2022   CS 225: Discrete Structures in Mathematics and Computer Science, Term 2,
       taught jointly with S. Stephen.

       MATHS 250: Algebra and Calculus 2, Term 2,
       taught jointly with S. Waldron and B. Ewertowski.

       CS 120: Mathematics for Computer Science, Term 1,
       taught jointly with S. Stephen and T. Popiel.

Graz University of Technology

2020/21   Linear Algebra 1, Exercises, WS.

2019/20   Mathematics for Electrical Engineers, Lecture, SS,
          taught jointly with P. Sprüssel.

University of Hamburg

2016/17	Random processes on graphs, Lecture & Exercises, WS.
	Linear Algebra, Tutorials, WS.
2015/16	Grundbildung Geometrie, Exercises, SS.
	Vorkurs Mathematik, Lecture & Exercises, WS.
2014/15	Linear Algebra, Exercises, SS.

Graz University of Technology

2014/15	Linear Algebra 1 & 2, Exercises, WS & SS.
	Geometry for Computer Scientists, Lecture, WS, taught jointly with J. Wallner.
	Projective Geometry, Exercises, WS & SS.
2013/14	Linear Algebra 1 & 2, Exercises, WS & SS.
	Geometry for Computer Scientists, Lecture, WS, taught jointly with J. Wallner.
2012/13	Projective Geometry, Exercises, WS.
2011/12	Differential Geometry, Exercises, WS & SS.

Service

Seminar and workshop organisation

Apr 2022	**Joint Workshop of GK Facets of Complexity Berlin, DK Discrete Mathematics Graz, and ETH Zürich** (Semriach) originally planned for Mar 2021, postponed to 2022 due to Covid
Dec 2021	**Discrete Mathematics Day** (online) one-day meeting in discrete mathematics
Apr 2021	**Open Problem Café** (online) open problem workshop for PhD students
2020 – 2022	**Advanced topics in discrete mathematics** (Graz) weekly Seminar, organiser from Nov 2020 until Feb 2022

Administration

2020 – 2022	**Coordinator of the DK Discrete Mathematics**, a joint PhD program of Graz University of Technology, University of Graz, and University of Leoben.

Refereeing

Reviewer for numerous journals, including:
Algebraic Combinatorics, Ars Combinatoria, Ars Mathematica Contemporanea, Australasian Journal of Combinatorics, Canadian Journal of Mathematics, Combinatorial Theory, Combinatorica, Discrete Applied Mathematics, Discrete Mathematics, Discrete Mathematics and Theoretical Computer Science, Discussiones Mathematicae Graph Theory, Electronic Communications in Probability, Electronic Journal of Combinatorics, European Journal of Combinatorics, Journal of Algebra, Journal of Combinatorial Designs, Journal of Combinatorial Theory A, Journal of Combinatorial Theory B, Journal of Graph Theory, Order, The Art of Discrete and Applied Mathematics, Theoretical Computer Science.