# Florian Lehner

*curriculum vitæ*

*Institute of Discrete Mathematics*
*Graz University of Technology*
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## Work Experience

since 2020 **Project Assistant**,
*Graz University of Technology*, Institute of Discrete Mathematics.

since 2017 **Erwin Schrödinger Research Fellow**,
*University of Warwick*, Department of Mathematics,
*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.

## Education

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

PhD Thesis: *Symmetry Breaking in Graphs and Groups*
Supervisor: J. Wallner.

2008 – 2011 **Master programme: Mathematical Computer Science**,
*Graz University of Technology*.
Graduation on 10 June 2011 with distinction.

2005 – 2008 **Bachelor programme: Technical Mathematics**,
*Graz University of Technology*.
Graduation on 27 October 2008 with distinction.

## Fellowships and Awards

2017 – 2020 **Erwin Schrödinger Fellowship** (163.780 EUR).
3-year postdoctoral research fellowship granted by the Austrian Science Fund FWF.

2015 – 2017 **Exzellenzstipendium** (9.000 EUR)).
Travel grant awarded by the Austrian Ministry of Science.

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

[25] F. Lehner and G. Verret,
Counterexamples to "A conjecture on induced subgraphs of Cayley graphs",
*Ars Mathematica Contemporanea*, 2020, to appear.

[24] F. Lehner, M. Pilśniak, and M. Stawiski,
A bound for the distinguishing index of regular graphs,
*European Journal of Combinatorics*, 2020, to appear.

[23] F. Lehner and G. Verret,
Distinguishing numbers of finite 4-valent vertex-transitive graphs,
*Ars Mathematica Contemporanea*, 2020, to appear.

[22] F. Lehner and S. M. Smith,
On symmetries of edge and vertex colourings of graphs,
*Discrete Mathematics*, 2020, to appear.

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

[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*, 2018, to appear.

[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

[9] F. Lehner and J. Erde,
Hamiltonian decompositions of 4-regular cayley graphs of infinite abelian groups, 2020.

[8] F. Lehner, P. Potočnik, and P. Spiga,
On fixity of arc-transitive graphs, 2020.

[7] F. Lehner and C. Lindorfer,
Comparing consecutive letter counts in multiple context-free languages, 2020.

[6] F. Lehner, M. Pilśniak, and M. Stawiski,
On asymmetric colourings of graphs with bounded degrees and infinite motion, 2019.

[5] N. Bowler, J. Erde, F. Lehner, and M. Pitz,
Bounding the cop number of a graph by its genus, 2019.

[4] F. Lehner,
On the cop-number of toroidal graphs, 2019.

[3] M. Hamann, F. Lehner, B. Miraftab, and T. Rühmann,
A Stallings' type theorem for quasi-transitive graphs, 2019.

[2] A. Georgakopoulos and F. Lehner,
Invariant spanning double rays in amenable groups, 2018.

[1] F. Lehner, M. Pilśniak, and M. Stawiski,
Distinguishing infinite graphs with bounded degrees, 2018.

## Presentations

### Invited Conference Talks

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.

### Contributed Conference Talks

2019 On the cop-number of toroidal graphs,
*42nd ACCMCC*, University of New South Wales, Sydney, AU.

Asymmetric colourings of graphs with bounded maximal degree,
*28th Workshop 3in1*, Hotel Mercur, Dosłońce, PL.

On the cop-number of toroidal graphs,
*9th Slovenian International Conference on Graph Theory*, Bled, SI.

On symmetries of vertex and edge colourings of graphs,
*CanaDAM 2019*, Simon Fraser University, Vancouver, CA.

2018 A Stallings' type theorem for quasi-transitive graphs,
*41st ACCMCC*, Millenium Hotel, Rotorua, NZ.

Bounding the cop-number of a graph in terms of its genus,
*GRASTA 2018*, Technische Universität Berlin, DE.

Distinguishing numbers of infinite graphs with bounded degrees,
*Symmetry Breaking in Discrete Structures*, Casa Matemática Oaxaca, MX.

Hamilton decompositions of one-ended cayley graphs,
*Graphs, Groups, and More*, University of Primorska, Koper, SI.

2017 Bounding the cop-number of a graph in terms of its genus,
*5th ICC*, Monash University, Melbourne, AU.

Breaking graph symmetries by edge colourings,
*Ljubljana–Leoben Graph Theory Seminar*, University of Maribor, SI.

2016 The reconstruction problem for infinite graphs,
*40th ACCMCC*, University of Newcastle, AU.

The reconstruction problem for infinite graphs,
*Leoben–Ljubljana Graph Theory Seminar*, Judenburg, AT.

The reconstruction problem for infinite graphs,
*CSASC 2016*, Institut d'Estudis Catalans, Barcelona, ES.

2015 Cops, robbers, and infinite graphs,
*39th ACCMCC*, University of Queensland, Brisbane, AU.

Random colourings and automorphism breaking in locally finite graphs,
*8th Slovenian International Conference on Graph Theory*, Kranjska Gora, SI.

2014 Cops, robbers, and infinite graphs,
*7th Cracow Conference on Graph Theory*, Rytro, PL.

Breaking graph symmetries by random colourings,
*Groups, Graphs, and Random Walks*, Cortona, IT.

2013 Almost all colourings are almost distinguishing,
*37th ACCMCC*, University of Western Australia, Perth, AU.

Random colourings and automorphism braking in graphs,
*18th ÖMG–DMV-Congress*, Universität Innsbruck, AT.

Random colourings and automorphism braking in graphs,
*Leoben–Ljubljana Graph Theory Seminar*, Bildungshaus Mariatrost, Graz, AT.

Stabilisers of random colourings in subdegree finite permutation groups,
*24th BCC*, Royal Holloway University, London, UK.

Automorphism breaking in locally finite graphs,
*CanaDAM 2013*, Memorial University of Newfoundland, St. Johns, CA.

2012 Distinguishing graphs with intermediate growth,
*36th ACCMCC*, University of New South Wales, Sydney, AU.

### Seminar Talks

2019 A Stallings' type theorem for quasi-transitive graphs,
*Seminarium Matematyka Dyskretna*, AGH Krakow, PL.

A topological game of cops and robbers,
*Advanced Topics in Discrete Mathematics*, Graz University of Technology, AT.

2018 A Stallings' type theorem for quasi-transitive graphs,
*Group theory workshop*, University of Auckland, NZ.

The reconstruction problem for infinite graphs,
*Seminarium Matematyka Dyskretna*, AGH Krakow, PL.

Bounding the cop-number of a graph in terms of its genus,
*Combinatorics Seminar*, University of Birmingham, UK.

2017 The permutation topology and almost distinguishing colourings,
*Seminarium Matematyka Dyskretna*, AGH Krakow, PL.

Breaking graph symmetries by edge colourings,
*Algebra and combinatorics seminar*, University of Auckland, NZ.

2016 Breaking graph symmetries by edge colourings,
*Algebra seminar*, Lincoln University, UK.

Automorphism groups of one-ended graphs,
*Festkolloquium anlässlich des 75. Geburtstages von Wilfried Imrich*, Graz University of Technology, AT.

2015 Cops, robbers, and infinite graphs,
*Mathematics Seminar*, University of Iceland, Reykjavik, IS.

Cops, robbers, and infinite graphs,
*Mathematikseminar*, Universität Greifswald, DE.

Cops and robbers on infinite graphs,
*Seminar za diskretno matematiko*, University of Ljubljana, SI.

2014 Chasing robbers on infinite graphs,
*Mathematics Colloquium*, Universiteit Stellenbosch, ZA.

Cops and robbers on infinite graphs,
*Seminar Diskrete Mathematik und Optimierung*, Graz University of Technology, AT.

2013 Symmetry breaking in graphs,
*Mathematics Colloquium*, Vrije Universiteit Amsterdam, NL.

Symmetry breaking in graphs,
*Mathematics Seminar*, University of Iceland, Reykjavik, IS.

Automorphism breaking in graphs,
*Combinatorics Seminar*, University of Warwick, UK.

Symmetries of random graph colourings,
*Mathematics Seminar*, University of Liverpool, UK.

Distinguishing graphs with intermediate growth,
*Seminar IMFM in FNM v Mariboru iz diskretne matematike*, University of Maribor, SI.

2012 Spanning tree packings in highly edge connected graphs,
*Mathematisches Forschungsseminar*, Universität Hamburg, DE.

2011 A connectivity condition for Hamiltonicity of locally finite line graphs,
*Discrete Mathematics Day*, Graz University of Technology, AT.

## Teaching

### Graz University of Technology

2020 **Lectures: Mathematics for Electrical Engineers**, SS 2020, taught jointly with P. Sprüssel.

### University of Hamburg

2016 **Lectures and exercises: Random processes on graphs**, WS 2016/17.
Introduction into random walks on infinite graphs, aimed at PhD and advanced master students. Designed the course based on 'Probability on trees and networks' by R. Lyons and Y. Peres, compiled lecture notes in LaTeX, held lectures and exercise classes.

2016 **Tutorials: Linear Algebra**, WS 2016/17.
Taught tutorials classes.

2016 **Exercises: Grundbildung Geometrie**, SS 2016.
Taught exercise classes, prepared sample solutions for problem sheets in LaTeX.

2015 **Lectures and exercises: Vorkurs Mathematik**, WS 2015/16.
Preparatory mathematics course for first year mathematics and mathematics teaching students, about 150 participants. Compiled lecture notes in LaTeX, held lectures, recruited and supervised 7 teaching assistants for the exercise classes.

2015 **Exercises: Linear Algebra**, SS 2015.
Taught exercise classes, supervised and marked written exams.

### Graz University of Technology

2013 – 2015 **Exercises: Linear Algebra 1 & 2**, academic year 2013/14 and 2014/15.
Taught exercise classes, supervised and marked written exams.

2013 – 2015 **Lecture: Geometry for Computer Scientists**, WS 2013/14 and 2014/15, taught jointly with J. Wallner.
Held lectures based on notes by J. Wallner, supervised and marked written exams.

2012 – 2014 **Exercises: Projective Geometry**, WS 2012/13, WS 2014/15 and SS 2015.
Compiled exercise sheets and taught exercise classes.

2011 – 2012 **Exercises: Differential Geometry**, WS 2011/12 and SS 2012.
Compiled exercise sheets and taught exercise classes.

2006 – 2010 **Teaching Assistant**.
Held tutorials and taught exercise classes for the following courses:
Mathematics courses for civil and electrical engineers,
Probability and stochastic processes for electrical engineers,
Enumerative combinatoric algorithms,
Analysis 1 & 2.