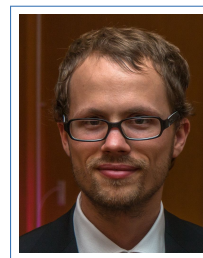# Paul-Henry Leemann

Researcher in Pure Mathematics

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Personal Information

Date of Birth	April 12, 1987
Citizenship	Switzerland

Main areas of research

My research interests lie in the intersection of geometric and combinatorial group theory, graph theory and symbolic dynamic. I am particularly interested in groups acting on rooted trees and their (weakly) maximal subgroups, limits and coverings of (Schreier) graphs, rigidity phenomenon in Cayley and Schreier graphs and graphs associated to dynamical systems.

Employment

Since September 2020	**Université de Neuchâtel**, *Post-Doc*, in Institut de mathématiques, with Alain Valette.
2018–2020	**ENS-Lyon**, *Post-Doc*, in Unité de Mathématiques Pures et Appliquées, with Mikael de la Salle. Post-Doc Labex MILYON
2016–2018	**ENS-Lyon**, *Post-Doc*, in Unité de Mathématiques Pures et Appliquées, with Mikael de la Salle. Early Postdoc.Mobility grant supported by the Swiss National Science Foundation

Education

2011–2016	**Université de Genève**, *Ph.D. in Mathematics*, "On Subgroups and Schreier Graphs of Finitely Generated Groups", advisor: Tatiana Smirnova-Nagnibeda. Mention très bien
2013–2015	**Université de Genève**, *Basic Certificate of Didactic in Mathematics and in Educational Science*.
2009–2011	**Université de Genève**, *M. Sc. in Mathematics*, Master-thesis: "Caractères irréductibles des groupes de Coxeter finis", advisors: Pierre de la Harpe and Tatiana Smirnova-Nagnibeda. grades: 6/6 (Master-thesis) and 5.7/6 (courses)
2006–2009	**Université de Genève**, *B. Sc. in Mathematics*.

Publications and Preprints

1. *Wreath products of groups acting with bounded orbits*, with G. Schneeberger. (2020). Preprint: https://arxiv.org/abs/2102.08001

2. *Property FW and wreath products of groups: a simple approach using Schreier graphs*, with G. Schneeberger. (2021). Preprint: https://arxiv.org/abs/2101.03817

3. *Subgroup induction property for branch groups*, with D. Francoeur. (2020). Preprint: https://arxiv.org/abs/2011.13310

4. *Cayley graphs with few automorphisms: the case of infinite groups*, with M. de la Salle. (2020). Preprint: https://arxiv.org/abs/2010.06020

5. *Up to a double cover, every regular connected graph is isomorphic to a Schreier graph.* (2020). Preprint: https://arxiv.org/abs/2010.06431

6. *Finitely generated subgroups of branch groups and subdirect products of just infinite groups*, with R. Grigorchuk and T. Nagnibeda. (2020). Accepted in Izvestia (special issue dedicated to Adian). Preprint: https://arxiv.org/abs/2006.16121

7. *Weakly maximal subgroups of branch groups.* (2019). Preprint: https://arxiv.org/abs/1910.06399

8. *Cayley graphs with few automorphisms*, with M. de la Salle. J Algebr Comb (2020). https://doi.org/10.1007/s10801-020-00956-1

9. *Schreier graphs: Transitivity and Coverings.* Internat. J. Algebra Comput., Vol. 26, Issue 1 (2016). www.worldscientific.com/doi/abs/10.1142/S021819671650003X

10. *Weakly maximal subgroups in regular branch groups*, with K. Bou-Rabee and T. Nagnibeda. Journal of Algebra, Vol. 455 (2016). www.sciencedirect.com/science/article/abs/pii/S0021869316001046

11. *Lamplighter groups, de Bruijn graphs, spider-web graphs and their spectra*, with R. Grigorchuk and T. Nagnibeda. Journal of Physics A: Mathematical and Theoretical, Vol. 49, Number 20 (2016). https://iopscience.iop.org/article/10.1088/1751-8113/49/20/205004

Prizes, Grants and Scientific Visits

2016	Vacheron Constantin prize for the best thesis in mathematics, Université de Genève
07-12 2015	Semester "Analytic and Geometric Aspects of Probability on Graphs", *EPFL, Switzerland*
01-04 2014	IHP Semester "Marches aléatoires et géométrie asymptotique des groupes", *CIRM and IHP, France*
April 2011	Topology and Geometric Group Theory, *Columbus, Ohio, USA*

Conferences organisation

June 2022	"Groups Acting on Fractals" Thematic Trimester, conference organizer, 30 May-3 June, Institut Henri Poincaré, France
May 2021	Kervaire seminar "Baum-Connes conjecture", co-organizer, 23-28 May, Les Diablerets, Switzerland
Spring 2021	"Group theory, topology and dynamics: Russian-Swiss collaboration", co-organizer, Université de Genève, Switzerland

March 2013	Kervaire seminar "Géométrie des groupes 2013", co-organizer, 10-15 March, Les Diablerets, Switzerland

Talks (selected)

Conferences:

June 2018	Trees Dynamics and Locally Compact Groups, Heinrich Heine University, Dusseldörf, Germany. *Profinite completion of weakly maximal subgroups of branch groups.*
January 2017	Rencontre GAMME, Sète, France. *Weakly maximal subgroups of the Grigorchuk group. Existence and construction of IRS.*
November 2014	Paroles aux jeunes chercheurs en géométrie et dynamique, GDR Platon, Université de Bordeaux, France. *A criterion for the transitivity of Schreier graphs.*
June 2014	Workshop in Algebra and Geometry, University of Bern, Switzerland. *Transitivity of Schreier graphs and strongly simple groups.*
September 2013	Geometric and Analytic Group Theory, Ventotene, Italy. *Transitivity of Schreier graphs.*

Seminars:

Februar 2021	Symmetry in Newcastle, University of Newcastle, Australia. *Rigidity of Cayley graphs*
December 2020	Séminaire Groupes et Analyse, Université de Neuchâtel, Switzerland. *Property FW and wreath products, the median graphs point of view*
November 2020	Colloque du département de mathématiques, Université de Neuchâtel, Switzerland. *Groups and graphs: rigidity phenomena.* Slides (in French): http://www.leemann.website/slides/rigidity.pdf
March 2020	Séminaire Groupes et Géométrie, Université de Genève, Switzerland. *Weakly maximal subgroups of branch groups.* Slides: http://www.leemann.website/slides/weaklymaximal.pdf
October 2019	Séminaire de Géométrie, Groupes et Dynamiques, ENS Lyon. *Rigidity of Cayley graphs.*
July 2019	Séminaire Darboux, Montpellier, France. *Rigidity of Cayley graphs.*
May 2015	Ergodic and Geometric Group Theory Seminar, EPFL, Lausanne, Switzerland. *Tarski's monster are strongly simple.*

Teaching Experiences

Since 2016	In ENS Lyon:
	- Teaching assistant of "Coverings and fundamental groups" (master)
	- Teacher of "Introduction to LaTeX" (3rd year class)
2011–2016	Teaching assistant at the University of Genève:
	- Advanced course on Combinatorics (master)
	- Algebra II: groups, rings, fields, Galois theory (2nd year class)
	- Algebra I: linear algebra (1st year class)
	- Analysis I: basics of logic and set theory, real analysis (1st year class)
	- General mathematics: 1st year class for students of other departments
	- Tutoring for first year students
2006–2011	Private tutor in mathematics for high school students

Refereeing

I have been a referee for the following journals: Journal of Algebra, International Journal of Algebra and Computation, L'enseignement mathématiques, Journal of Algebra and its Applications.

Scientific popularization

2017	MATHαLYON: interactive workshop in Junior High School, Lyon, France
2014-2016	Mentor in the "boussole"curriculum (one week of immersion in the mathematics' department, for High School's students), Genève, Switzerland
2012-2016	Facilitator at the University "Open Day", Genève, Switzerland
2011-2016	Mathematics' facilitator in Junior High School and High School classes, Genève, Switzerland
2015	Facilitator at the "Science's night", Genève, Switzerland

Languages

French: native   English: fluent   German: basics

Others

Computer skills	(LA)TEX (advanced), HTML/CSS and GAP (basics)
Summer camps	I have been organizing and running summer camps for children. I have taken part in over thirty camps.