Curriculum Vitae - Matthias Keller

Contact information

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Personal information

Date of birth: December 31, 1980
Country of Citizenship: Germany
Marital Status: married, four children

Education

Habilitation in Mathematics (May 2015)
Friedrich Schiller University Jena, Germany,
On the analysis and geometry of graphs,
Reviewer: Jürgen Jost, Alexander Grigor'yan, Daniel Lenz, Karl-Theodor Sturm.

Ph.D. in Mathematics (December 2010)
Friedrich Schiller University Jena, Germany,
On the spectral theory of operators on trees,
Reviewer: Daniel Lenz, Simone Warzel and Richard Froese.

Diploma in Mathematics (June 2006)
Chemnitz University of Technology, Germany,
Produkte zufälliger Matrizen und der Lyapunov-Exponent,
Reviewer: Peter Stollmann and Daniel Lenz.

Academic activity

Professor, University of Potsdam, since October 2015.

Research and teaching assistant, Friedrich Schiller University Jena, with Daniel Lenz, October 2008 until September 2015 (in between on leave for stay in Jerusalem and Haifa).

Visiting Assistant Professor, Technion Haifa, on an invitation of Yehuda Pinchover, February until March 2015.

Postdoctoral Fellow, Hebrew University Jerusalem, with Jonathan Breuer and Dan Mangoubi, February until June 2011 and October 2012 until September 2013.

Visiting Student Research Collaborator, Princeton University, with Michael Aizenman and Simone Warzel, October 2007 until May 2008.

Klaus Murmann Fellow as PhD student, Klaus Murmann Fellowship (SDW), July 2007 until June 2010.

Research associate, Chemnitz University of Technology, with Daniel Lenz and Peter Stollmann, July 2006 until June 2007.

Student assistant, Chemnitz University of Technology and Fraunhofer Institute Chemnitz, 2001 until 2006.

Grants

German Science Foundation Research Grant, *Boundaries, Greens formulae and harmonic functions for graphs and Dirichlet spaces - follow up*, (joint with Prof. Dr. D. Lenz and Dr. M. Schmidt) since February 2018.

Grant within the priority program of the German Science Foundation, *Boundaries, Greens formulae and harmonic functions for graphs and Dirichlet spaces*, (joint with Prof. Dr. D. Lenz) since June 2017.

German Science Foundation Research Grant, *Geometry of discrete spaces and spectral theory of non-local operators*, (joint with Prof. Dr. D. Lenz) since June 2012.

Programme to support junior researchers in obtaining third-party funding Programme, Line A (Advanced), Friedrich Schiller University, *Geometry and Analysis of Graphs*, traveling grant, September 2014 until September 2016.

Short visiting grant of the European Science Foundation for stay at Technical University of Graz, July 2012.

Fellowships

Golda Meir Fellowship, for stay at Hebrew University Jerusalem October 2012 until September 2013 (additional scholarship by the Hebrew University).

Post-Doctoral Fellowship by the Hebrew University, Jerusalem, February until June 2011.

PhD Fellowship, Klaus Murmann Fellowship Programme (SDW), July 2007 until June 2010.

Research interests

Dirichlet forms and Markov processes

Curvature and spectrum of graphs

Spectral theory of random operators

Reviewer for journals and book series

Advances in Mathematics

AMS, University Lecture Notes series

Analysis and Geometry in Metric Spaces

Analysis, Mathematical Physics and Geometry

Annales Henri Poincaré

Calculus of Variations and Partial Differential Equations

Communications in Analysis and Geometry

Computers in Biology and Medicine

CRC Press, Mathematics, Physics, and Life Sciences

Discrete & Computational Geometry

Discrete Mathematics

Documenta Mathematics

European Journal of Combinatorics

Filomat

Israel Journal of Mathematics

Journal for Analysis and Applications

Journal of Combinatorial Theory, Series A

Journal of Fractional Geometry

Journal of Functional Analysis

Journal of Spectral theory

Linear Algebra and Its Applications

Mathematical Physics, Analysis and Geometry

Mathematische Annalen

Modern Physics Letters B

New York Journal of Mathematics

Nonlinear Analysis: Theory, Methods & Applications

Nonlinearity

Operators and Matrices

Physica A

Potential Analysis

Revista Matemática Iberoamericana

SIAM Journal on Discrete Mathematics

The Journal of Geometric Analysis

Transactions of the American Mathematical Society

Organization of scientific meetings

Two Day Workshop, *Dirichlet forms on graphs*, Friedrich Schiller University Jena, June 2018.

Conference *Analysis and Geometry on Graphs and Manifolds*, Potsdam University 2017.

Workshop on *Discrete Analysis*, Fudan University Shanghai, August 2016.

Workshop on *Spectral Geometry*, University of Potsdam, January 2016.

One Day Workshop, *New directions in mathematical physics and beyond*, Friedrich Schiller University Jena, January 2014.

International Conference *Fractal Geometry and Stochastics V*, in Tabarz, local organizing committee, March 2014.

Workshop *Geometric aspects of probability and geometry*, Friedrich Schiller University Jena, September 2013.

One-Day-Workshop *Schrödinger operators*, Friedrich Schiller University Jena, December 2011.

Graduate student symposium within the Summer school on 'Graphs and spectra' at Chemnitz University of Technology, July 2011.

Graduate student symposium with the Walkshop 2010 at Friedrich Schiller University Jena, September 2010.

Organization of the weekly seminar Analysis Geometry and Probability at the Friedrich Schiller University in Jena, September 2011 until September 2012,

Short research stays

Technion Haifa, Yehuda Pinchover, March/April 2018.

Technion Haifa, Yehuda Pinchover and Felix Pogorzelski, April 2017.

Remnin University Beijing, Yong Lin, August 2016.

Fudan University, Bobo Hua, August 2016.

Graduate Center CUNY, New York City, Radoslaw Wojciechowski, May 2016.

Technion Haifa, Yehuda Pinchover, March 2016.

Tohoku University, Sendai, Japan, Jun Masamune, April 2015.

Université de Carthage, Bizerte Tunesia, Nabila Torki-Hamza, March 2014.

University of Toronto, Balint Virag, March 2013.

Harvard University, group of Shing-Tung Yau, March 2013.

University of Connecticut, group of Alexander Teplayev, February 2013.

Graduate Center CUNY, New York City, Jozef Dodziuk and Radoslaw Wojciechowski, February 2013.

Max-Planck-Institut Leipzig, group of Jürgen Jost, August 2012.

Chemnitz University of Technology, groups of Peter Stollmann and Ivan Veselic, July 2012.

Graz University of Technology, group of Wolfgang Woess, July 2012.

Université Bordeaux 1, Sylvain Golénia, May 2012.

Max-Planck-Institut Leipzig, group of Jürgen Jost, May 2012.

Hebrew University Jerusalem, Jonathan Breuer and Dan Mangoubi, December 2011.

Bielefeld University, group of Alexander Grigor'yan, November 2011.

Munich University of Technology, group of Simone Warzel, July 2011.

Universität Bielefeld, group of Alexander Grigor'yan, Dezember 2010.

Humboldt University Berlin, group of Jochen Brüning, December 2010.

University of Lisbon, Group of Mathematical Physics Jean-Claude Zambrini, November 2009.

Bielefeld University, group of Michael Baake, December 2008.

Graz University of Technology, group of Wolfgang Woess, November 2008.

Graduate Center New York City University, group of Jozef Dodziuk, May 2008.

Munich University of Technology, Simone Warzel, October 2008.

Durham University, Norbert Peyerimhoff, September 2007.

Invitations to conferences

September 2018, Summer school *Generalized Curvatures GenCurv2018*, EPFL Lausanne, *Upper curvature bounds and spectral theory.*

January 2018, Dodziuk Fest, CUNY, *On Cheeger inequality for graphs.*

November 2017, ZiF Bielefeld, *Workshop – Discrete and continuous models in the theory of networks*, *Optimal Hardy inequalities on graphs.*

October 2017, Bordeaux *Journées du GDR AFHP*, *Optimal Hardy inequalities on graphs.*

March 2017, TSIMF Sanya China *Curvatures of Graphs, Simplicial Complexes and Metric Spaces Workshop,*, *Sectional curvature of polygonal complexes with planar substructures.*

February 2017, Bielefeld University, *IRTG Workshop*, *Optimal Hardy inequalities on graphs.*

August 2016, Fudan University Shanghai, *Discrete Analysis*, *On compactifications of graphs.*

August 2016, Euler Institute St. Petersburg, *OTAMP 2016*, *Optimal Hardy inequalities on graphs.*

July 2016, University of Bielefeld, *Heat kernels and analysis on manifolds and fractals*, *On compactifications of graphs.*

January 2016, CIRM Luminy, *Spectrum of Random Graphs*, *Does diffusion determine the geometry of a graph?.*

June 2015, BIRS Banff, *Groups, Graphs and Stochastic Processes*, *On the compactification of graphs ... the Royden compactification revisited.*

February 2015, Oberwolfach Workshop *Discrete p-Laplacians: Spectral Theory and Variational Methods in Mathematics and Computer Science*, *On Cheeger's inequality for graphs.*

January 2015, Oberwolfach Workshop *Spectral Theory and Weyl Functions*, *Cheeger inequalities for unbounded graph Laplacians.*

October 2014, Conference Bordeaux *Spectral Theory and Its Applications*, *Intrinsic metrics on graphs.*

September 2014, Meeting *Mathematical Physics in Jena*, *Absolutely continuous spectrum of Galton-Watson trees.*

March 2014, Conference *Fractal Geometry and Stochastics V* in Tabarz, *Cheeger's inequality for unbounded graph Laplacians.*

March 2014, Cours pour Doctorants, Université de Carthage, Bizerte Tunesia, L^p *Spectrum of Graphs.*

March 2014, Journée-Workshop *Géométrie et Analyse sur les Graphes*, Université de Carthage, Bizerte Tunesia, *Curvature and Spectrum on Tessellating Graphs.*

December 2013, Conference on *Mathematical Technology of Networks - QGraphs 2013*, ZiF Bielefeld, *Intrinsic metrics on graphs.*

November 2013, *A colloquium on discrete curvature*, C.I.R.M. Luminy, *On the spectral theory of negatively curved planar graphs.*

September 2013, Fall school *Dirichlet forms, operator theory and mathematical physics* Chemnitz, Minicourse *Dirichlet forms on graphs.*

July 2013, LMS Symposium, *Graph Theory and Interactions*, Durham, *On negative curvature and spectrum of graph Laplacians.*

September 2012, *Workshop on Probability*, Kansai University Osaka, *Large time behavior of heat kernels.*

September 2012, Conference *Stochastic Analysis and Applications*, Okayama, *Essential spectra and volume growth of regular Dirichlet forms.*

August 2012, Conference *Spectral Theory and Differential Operators*, Graz, *Volume growth and spectra of Dirichlet forms.*

January 2012, Oberwolfach Mini-Workshop *Boundary Value Problems and Spectral Geometry*, *Curvature and spectrum on graphs.*

October 2011, Oberwolfach Workshop *Correlations and Interactions for Random Quantum Systems*, *Absolutely continuous spectrum on trees.*

September 2011, BMS Summer School *Random motion and random graphs*, Berlin, *Absolutely continuous spectrum for multi-type Galton Watson trees.*

September 2010, Walkshop and PhD Symposium, Jena, *On the spectral theory of trees and tessellations.*

September 2010, *QMath 11*, Hradec Kralove, *Absolutely continuous spectrum for substitution trees.*

July 2010, Workshop *Analysis on Graphs and its Applications*, Isaac Newton Institute for Mathematical Sciences Cambridge, *Absolutely continuous spectrum for trees of finite forward cone type.*

June 2010, Workshop *Random Schrödinger operators,* Lausanne CIB, *Stability of ac spectrum: Contraction properties of the recursion relation.*

May 2010, AIMS Conference *Dynamical Systems, Differential Equations and Applications*, Dresden, *Stability of ac spectrum under random perturbations on trees.*

September 2009, *Walkshop*, Chemnitz, *Dirichlet forms on discrete sets and absence of essential spectrum.*

July 2009, Workshop *Structure and Dynamics of Networks*, Blaubeuren, *Heat transport to the boundary on discrete graphs.*

July 2009, *Alp-Workshop*, St. Kathrein, *Random trees and absolutely continuous spectrum.*

June 2009, Workshop *Boundaries*, Graz, *Heat transport to the boundary.*

November 2008, Workshop *Structural Probability*, Erwin-Schrödinger-Institut Wien, *The Laplacian (plus potential) on trees and rapidly branching graphs.*

Seminars and Colloquia

May 2018, University of Potsdam, GAMS Seminar, *Hardy inequalities on graphs.*

April 2018, Technion Haifa, PDE Seminar, *On Courant's nodal domain theorem for positivity preserving forms.*

July 2017, Universität Greifswald, Colloquium, *Curvature on graphs.*

April 2017, Technion Haifa, PDE Seminar, *Schrödinger operators on sparse graphs.*

March 2016, Technion Haifa, PDE Seminar, *Compactifications of graphs and the Dirichlet problem.*

November 2015, Potsdam University Differenial Geometry Seminar, *Intrinsic metrics on graphs.*

June 2015, Bonn University Probability Seminar, *Intrinsic metrics on graphs.*

May 2015, Tohoku University Sendai, Geometry and Analysis Seminar, *Intrinsic metrics on graphs.*

April 2015, FSU Jena, Habilitation Defense, *Über die Geometrie und Analysis auf Graphen.*

March 2015, Technion Haifa, PDE and Applied Mathematics Seminar, *Does diffusion determine the geometry of a graph?*

March 2015, Hebrew University Jerusalem, PDE Seminar, *Compactifications of uniformly transient graphs.*

December 2014, Seminar Hagen University, *Schrödinger operators on sparse graphs.*

November 2014, Seminar Bielefeld University, *On the analysis and geometry on graphs.*

May 2014, Seminar Jena University, *Intrinsic metrics on graphs.*

May 2014, Seminar Ulm University, *Analysis and geometry on graphs.*

May 2013, Friedrich Schiller University Jena, PhD Seminar, *Negative curvature and spectrum of graphs.*

March 2013, University of Toronto, Special lecture, *Isoperimetric inequalities on graphs*

March 2013, University of Toronto, Toronto Probability Geometry Seminar, *Absolutely continuous spectrum of Galton-Watson trees*

March 2013, Harvard University, Differential Geometry Seminar, *Intrinsic metrics for Laplacians on graphs*

February 2013, University of Connecticut, Analysis and Probability Seminar, *Graphs of unbounded geometry and intrinsic metrics*

February 2013, Graduate Center CUNY, NY, Differential Geometry Seminar, *Spectral consequences of upper curvature bounds on planar graphs*

January 2013, PDE and Applied Mathematics Seminar, Technion Haifa, *Isoperimetric inequalities and volume growth estimates for unbounded graph Laplacians*

December 2012, Colloquium, University of Haifa, *Periodic and random Schrödinger operators on trees*

November 2012, PDE Seminar Jerusalem, *Cheeger inequalities and volume growth for unbounded graph Laplacians*

August 2012, Max Planck Institute Leipzig, Special Seminar, *Geometric and spectral consequences of upper curvature bounds on planar graphs.*

July 2012, Chemnitz University of Technology, Research seminar Analysis, Stochastik und Mathematische Physik, *Anti-trees - the perfect (counter)example.*

July 2012, Friedrich Alexander University Erlangen, *Negative curvature and discrete spectrum for graphs.*

July 2012, Graz University of Technology, Seminar Mathematische Strukturtheorie, *Stability of spectral types for Galton Watson trees.*

May 2012, Université Bordeaux 1, Séminaire Analyse, *On the spectral theory of operators on trees.*

May 2012, Max Planck Institute Leipzig, Special Seminar, *Negative curvature and spectrum of graph Laplacians.*

December 2011, Hebrew University Jerusalem, PDE Seminar, *Absolutely continuous spectrum for Galton Watson trees.*

November 2011, Clausthal University of Technology, Oberseminar Analysis und Spektraltheorie, *Dirichlet forms on graphs.*

May 2011, Technion Haifa, PDE and Applied Mathematics Seminar, *On the long time behavior of heat kernels.*

April 2011, Weizmann Institute Rehovot, Geometric Functional Analysis & Probability Seminar, *Absolutely continuous spectrum for trees.*

March 2011, Hebrew University Jerusalem, PDE Seminar, *Curvature and spectrum for graphs.*

December 2010, Friedrich Alexander University Erlangen, *Absolutely continuous spectrum for trees.*

December 2010, Bielefeld University, Seminar Geometric Analysis, *Curvature and spectrum for graphs.*

November 2010, Friedrich Schiller University Jena, Seminar Analysis, Geometrie und Stochastik, *Planar graphs of non-positive curvature.*

June 2010, Humboldt University Berlin, Seminar Geometrische Analysis und Spektraltheorie, *Cheeger constants, exponential growth and spectrum of planar graphs.*

June 2010, Chemnitz University of Technology, Research seminar Analysis, Stochastik und Mathematische Physik, *Cheeger constants, exponential growth and spectrum of planar graphs.*

May 2010, Friedrich Schiller University Jena, Seminar Analysis, Geometrie und Stochastik, *Discrete Spectrum for Schrödinger operators on graphs.*

January 2010, Friedrich Schiller University Jena, Seminar Analysis, *Cheegerkonstanten, exponentielles Wachstum und Spektrum von planaren Graphen.*

November 2009, University of Lisbon, Seminar of Mathematical Physics, *Cheeger constants, exponential growth and spectrum of planar graphs.*

October 2009, Hebrew University Jerusalem, PDE Seminar, *Trees of finite vertex type and absolutely continuous spectrum.*

December 2008, Bielefeld University, Seminar Mathematik in den Naturwissenschaften, *The Laplacian on rapidly branching graphs.*

November 2008, Graz University of Technology, Seminar Mathematische Strukturtheorie, *The Laplacian on rapidly branching graphs.*

November 2008, Wien University, Seminar Analysis, *The Laplacian on rapidly branching graphs.*

October 2008, Ludwig Maximilian University Munich, Seminar Analysis und Zufall, *The Laplacian on rapidly branching graphs.*

April 2008, Houston Rice University, Geometry-Analysis Seminar, *The Laplacian on rapidly branching graphs.*

February 2008, Graduate Center CUNY, NY, Differential Geometry Seminar, *The Laplacian on rapidly branching graphs.*

September 2007, Durham University, Geometry Seminar, *Spectral properties of rapidly branching graphs.*

Supervision and Co-supervision

Christian Scholz, *Topic on heat equation on graph*, PhD ongoing.

Florian Fischer, *Topic on discrete Hardy inequalities*, PhD ongoing.

Florentin Münch, *Topic on curvature and heat flow on graphs*, PhD ongoing.

Michael Schwarz, *Topic on boundaries of graphs*, PhD ongoing.

Florian Fischer, *Riesz Decompositions and Martin Compactification Theory for Schrödinger Operators on Graphs*, Master 2018

Christian Scholz, *Boundary conditions and resolvent limits of graphs*, Master 2017.

Sarah Burchert, *The Puisseux expansion*, Bachelor 2017.

Katja Ohde, *Geometry of rapidly growing graphs*, Bachelor 2016.

Florentin Münch, *Li-Yau inequalities on graphs*, Master 2014.

Melchior Wirth, *Does diffusion determine the graph structure?*, Bachelor 2013.

Oliver Siebert, *Spectra of lamplighter random walks associated with percolation*, Bachelor 2013.

Florentin Münch, *Ultra metric Cantor sets and boundaries of trees*, Bachelor 2012.

Ricardo Kalke, *Ricci curvature on graphs*, Staatsexamen 2012.

Teaching experience

Lecture *Analysis on graphs*, winter semester 2018/19.

Lecture *Mathematics for computer scientists*, winter semester 2018/19.

Lecture *Analysis III for mathematicians*, winter semester 2017/18.

Seminar *Choquet theory* winter semester 2017/18.

Lecture *Mathematics for computer scientists*, winter semester 2017/18.

Lecture *Analysis II for mathematicians*, summer semester 2017.

Seminar *Heat kernels on graphs* summer semester 2017.

Lecture *Analysis I for mathematicians*, winter semester 2016/17.

Lecture C^**-algebras*, winter semester 2016/17.

Lecture *Simplicial complexes*, summer semester 2016.

Lecture *Analysis on graphs*, winter semester 2015/16.

Lecture *Mathematics for computer scientists in economics*, winter semester 2015/16.

Lecture *Analysis I for physicists*, summer semester 2015.

Lecture *Analysis II for mathematicians and physicists*, winter semester 2014/15.

Tutorial *Analysis II for mathematicians and physicists*, summer semester 2014.

Lecture *Topics in operator theory* (2 hours per week), winter semester 2013/14.

Tutorial *Analysis I for mathematicians*, winter semester 2013/14.

Lecture *Applications of operator theory* (4 hours per week), summer semester 2012.

Tutorial *Analysis III for mathematicians*, Tutorial *Analysis III for physicists*, winter semester 2011/12.

Tutorial *Analysis I for mathematicians*, winter semester 2010/11.

Tutorial *Analysis III for physicists*, winter semester 2009/10.

Tutorial *Analysis II for physicists*, Seminar *Random Schrödinger Operators*, summer semester 2009.

Publications

1. Scattering the geometry of weighted graphs (with Batu Güneysu), *Mathematical Physics Analysis and Geometry*, 21, p. 21-28.

2. The Kazdan-Warner equation on canonically compactifiable graphs (with Michael Schwarz), *Calculus of Variations and Partial Differential Equations* 57 (2018), no. 2, Art. 70, 18 pp.

3. Optimal Hardy inequalities for Schrödinger operators on graphs (with Yehuda Pinchover, Felix Pogorzelski), *Communications in Mathematical Physics* 358 (2018), no. 2, 767–790.

4. An improved discrete Hardy inequality (with Yehuda Pinchover, Felix Pogorzelski) *American Mathematics Monthly*, 125 (2018), no. 4, 347–350.

5. Global properties of Dirichlet forms in terms of Green's formula (with Sebastian Haeseler, Daniel Lenz, Jun Masamune, Marcel Schmidt), *Calc. Var. Partial Differential Equations* 56 (2017), no. 5, 56–124.

6. Geometric and spectral consequences of curvature bounds on tessellations, book chapter in *Modern Approaches to Discrete Curvature*, *Lecture Notes in Mathematics*, 2184, 2017.

7. Sectional curvature of polygonal complexes with planar substructures (with Norbert Peyerimhoff, Felix Pogorzelski), *Advances in Mathematics*, 307 (2017), 1070–1107.

8. General Cheeger inequalities for p-Laplacians on graphs (with Delio Mugnolo), *Nonlinear Anal.* 147 (2016), 80–95.

9. Note on uniformly transient graphs (with Daniel Lenz, Marcel Schmidt, Radoslaw K. Wojciechowski), to appear in *Revista Matemática Iberoamericana*, arXiv:1412.0815.

10. Note on short time behavior of semigroups associated to selfadjoint operators (with Daniel Lenz, Florentin Münch, Marcel Schmidt, Andras Telcs), Bull. Lond. Math. Soc. 48 (2016), no. 6, 935–944.

11. Geometry and spectrum of rapidly branching graphs, (with Florentin Münch, Felix Pogorzelski), *Math. Nachr.* 289 (2016), no. 13, 1636–1647.

12. A Feynman-Kac-Itô formula for magnetic Schrödinger operators on graphs (joint with Batu Güneysu, Marcel Schmidt), *Probability Theory and Related Fields* 165 (2016), no. 1-2, 365–399.

13. An overview of curvature bounds and spectral theory of planar tessellations, *Proceedings of the CIRM Meeting*, 3 nr. 1, Discrete Curvature; theory and applications (2013).

14. Eigenvalue asymptotics for Schrödinger operators on sparse graphs (with Michel Bonnefont, Sylvain Golénia), *Annales de l'Institut Fourier*, Volume 65 no. 5 (2015), 1969–1998.

15. Graphs of finite measure (with Agelos Georgakopoulos, Sebastian Haeseler, Daniel Lenz, Radosław Wojciechowski), *Journal Mathématiques Pures Appliquées*, Volume 103 (2015), no. 5, 1093–1131.

16. Intrinsic metrics on graphs: A survey, *Mathematical technology of networks*, 81–119, *Springer Proceedings in Mathematics and Statistics*, Volume 128, Springer, Cham, 2015.

17. Diffusion determines the recurrent graph (joint with Daniel Lenz, Marcel Schmidt, Melchior Wirth), *Advances in Mathematics*, Volume 269, (2015), 364–398.

18. An invitation to trees of finite cone type: random and deterministic operators, (joint with Daniel Lenz and Simone Warzel), *Markov Processes and Related Fields* 21 (2015), no. 3, part 1, 557–574.

19. Cheeger inequalities for unbounded graph Laplacians (joint with Frank Bauer, Radosław Wojciechowski), *Journal of the European Mathematical Society (JEMS)*, Volume 17 (2015), no. 2, 259–271.

20. Harmonic functions of general graph Laplacians (joint with Bobo Hua), *Calculus of Variations and Partial Differential Equations*, 51 (2014), no. 1–2, 343–362.

21. On the l^p spectrum of Laplacians on graphs (joint with Frank Bauer, Bobo Hua), *Advances in Mathematics*, Volume 248, Issue 25 (2013), 717–735.

22. Note on basic features of large time behaviour of heat kernels (mit Daniel Lenz, Hendrik Vogt, Radosław Wojciechowski), *Journal für die reine und angewandte Mathematik (Crelle's Journal)*, Volume 708 (2015), 73–95.

23. A note on self-adjoint extensions of the Laplacian on weighted graphs (joint with Xueping Huang, Jun Masamune, Radosław Wojciechowski), *Journal of Functional Analysis*, Volume 265, Issue 8 (2013), 1556-1578.

24. Volume growth and bounds for the essential spectrum for Dirichlet forms (joint with Sebastian Haeseler, Radosław Wojciechowski), *Journal of the London Mathematical Society*, Volume 88, Issue 3 (2013), 883–898.

25. Volume growth, spectrum and stochastic completeness of infinite graphs (joint with Daniel Lenz, Radosław Wojciechowski), *Mathematische Zeitschrift*, Volume 274, Issue 3 (2013), 905-932.

26. Spectral analysis of certain spherically homogeneous graphs (joint with Jonathan Breuer), *Operators and Matrices*, Volume 7, Number 4 (2013), 825–847.

27. Laplacians on infinite graphs: Dirichlet and Neumann boundary conditions (joint with Sebastian Haeseler, Daniel Lenz, Radosław Wojciechowski), *Journal of Spectral Theory*, Volume 2, Issue 4, (2012) 397-432.

28. Absolutely continuous spectrum for multi-type Galton Watson trees, *Annales Henri Poincaré*, Volume 13, Issue 8 (2012), 1745-1766.

29. Absolutely continuous spectrum for random operators on trees of finite cone type (joint with Daniel Lenz and Simone Warzel), *Journal d'Analyse Mathématique* Volume 118, Issue 1, 2012 363-396.

30. On the spectral theory of trees with finite cone type (joint with Daniel Lenz and Simone Warzel), *Israel Journal of Mathematics*, Volume 194, Issue 1, (2013), 107–135.

31. Dirichlet forms and stochastic completeness of graphs and subgraphs (joint with Daniel Lenz), *Journal für die reine und angewandte Mathematik (Crelle's Journal)*, Volume 2012, Issue 666, 189-223.

32. Curvature, geometry and spectral properties of planar graphs, *Discrete & Computational Geometry*, 46, Issue 3 (2011), 500-525.

33. Generalized solutions and spectrum for Dirichlet forms on graphs (joint with Sebastian Haeseler), *Random Walks, Boundaries and Spectra, Progress in Probability*, 2011 Birkhäuser, 181-201.

34. Cheeger constants, growth and spectrum of locally tessellating planar graphs (joint with Norbert Peyerimhoff), *Mathematische Zeitschrift*, 268, Issue 3-4 (2011), 871-886.

35. Unbounded Laplacians on Graphs: Basic Spectral Properties and the Heat Equation (joint with Daniel Lenz), *Mathematical modeling of natural phenomena: Spectral Problems*, 5, No. 4 (2010), 198-224.

36. The essential spectrum of the Laplacian on rapidly branching tessellations, *Mathematische Annalen*, 346, Issue 1 (2010), 51-66.

Preprints

1. Feynman path integrals for magnetic Schrödinger operators on infinite weighted graphs (joint with Batu Güneysu), arXiv:1708.06934.

2. Criticality theory for Schrödinger operators on graphs (with Yehuda Pinchover, Felix Pogorzelski), arXiv:1708.09664.

3. A note on eigenvalue bounds for non-compact manifolds (with Shiping Liu, Norbert Peyerimhoff), arXiv:1706.02437.

4. Magnetic sparseness and Schrödinger operators on graphs (with Michel Bonnefont, Sylvain Golénia, Shiping Liu, Florentin Münch), arXiv:1711.10418.

5. Sobolev-Type Inequalities and Eigenvalue Growth on Graphs with Finite Measure (with Bobo Hua, Michael Schwarz, Melchior Wirth), arXiv:1804.08353.

6. Boundary representation of Dirichlet forms on discrete spaces (with Daniel Lenz, Marcel Schmidt, Michael Schwarz), arXiv:1711.08304.

7. Courant's Nodal Domain Theorem for Positivity Preserving Forms (with Michael Schwarz), arXiv:1712.07414

8. Gradient estimates, Bakry-Emery Ricci curvature and ellipticity for unbounded graph Laplacians (with Florentin Münch)

9. A discrete Hopf-Rinow-theorem (with Florentin Münch), arXiv:1807.10080.