Christian Ketterer – Curriculum Vitae

Institute of Mathematics
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Personal Data

Home Address:
Lauterbergstr. 16
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Citizenship: German

Language Skills: German (native), English (fluent), French (intermediate), Spanish (basic)

Education

10/10 - 06/2014	Doctoral Studies in Mathematics Institute of Applied Mathematics, University of Bonn, Germany Degree: Dr. rer. nat. (PhD) Supervisor: Karl-Theodor Sturm Thesis: Warped products and cones over metric measure spaces
10/02 - 04/09	Studies of Mathematics (Physics minor) Mathematical Institute, University of Freiburg, Germany Degree: Dipl. math. Supervisor: Viktor Bangert Thesis: Periodische Metriken und die Stabile Norm

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Appointments

04/22 - 03/23	Substitute Professor, Mathematical Institute, University of Freiburg
10/21 - 09/23	Wissenschaftlicher Mitarbeiter (Postdoc), KIT Karlruhe Mentor: Wilderich Tuschmann
07/21 - 09/21	DFG Research Fellow in Cologne, Germany, Mentor: Alexander Lytschak
07/20 - 06/21	Postdoc, University of Toronto Mentor: Robert McCann & Vitali Kapovitch & Robert Haslhofer
07/18 - 06/20	DFG Research Fellow in Toronto, Mentor: Robert McCann & Vitali Kapovitch & Robert Haslhofer
07/17 - 06/18	Postdoc, University of Toronto, Mentor: Robert McCann & Vitali Kapovitch & Robert Haslhofer
10/14 - 09/17	Wissenschaftlicher Mitarbeiter (Postdoc), Mathematical Institute, University of Freiburg, Mentor: Ernst Kuwert & Guofang Wang
10/10 - 09/14	Wissenschaftlicher Mitarbeiter (Postdoc), Institute of Applied Mathematics, University of Bonn, Mentor: Karl-Theodor Sturm

Teaching Experience

Lecturer

Winter 2022/23	Lecture (undergrad level): Funktionentheorie (Complex analysis) Mathematical Institute, University of Freiburg
Winter 2022/23	Seminar (undergrad level): Themen der elementaren Differentialgeometrie (Topics on curves and surfaces) Mathematical Institute, University of Freiburg
Summer 2022	Lecture (undergrad level): Kurven und Flächen (Curves and surfaces) Mathematical Institute, University of Freiburg
Summer 2022	Lecture (for Master and PhD students): Optimal Transport Mathematical Institute, University of Freiburg
Winter 2021/22	Instructor, Exercise Class (undergrad level): Mathematik für Naturwissenschaften (Mathematics for life sciences) Karlsruhe Institute of Technology (KIT)
Winter 2021/22	Instructor, Pro-seminar (undergrad level): Geometrie von Flächen (Geometry of surfaces), Karlsruhe Institute of Technology, KIT
Winter 2021	Lecture (undergrad level): Partial Differential Equations (MAT351Y1Y), University of Toronto, St. George Campus
Fall 2020	Lecture (undergrad level): Partial Differential Equations (MAT351Y1Y), University of Toronto, St. George Campus
Winter 2018	Lecture (undergrad level): Linear Algebra (MAT223), University of Toronto, St George Campus
Fall 2016	Seminar for highschool students: Mathematische Kartentricks (Mathematical Card Tricks), *Freiburger Mathematik Tage 2017* (together with Julian Scheuer)
Winter 2015/16	Lecture (undergrad level): Variationsrechnung (Calculus of Variations), Mathematical Institute (MI), Freiburg,
Winter 2014/15	Lecture (grad course): Metric Measure Spaces with Lower Ricci Curvature Bounds, MI, Freiburg

Teaching Assistant

Summer 2017	Lecture: Analysis 2, MI, Freiburg http://home.mathematik.uni-freiburg.de/analysis/Analysis2SS17/ (Preparation of the weekly exercise sheets, organizing problem solving sessions and supervision of tutors)
Winter 2016/17	Lecture: Analysis 1, MI, Freiburg http://home.mathematik.uni-freiburg.de/analysis/Analysis1WS1617/ (Preparation of the weekly exercise sheets, organizing problem solving sessions and supervision of tutors)
Summer 2016	Seminar: Fourier Analysis, MI, Freiburg, http://home.mathematik.uni-freiburg.de/analysis/ProSemSS16/ (Tutoring undergraduate students)
Summer 2015	Lecture: Complex Analysis, MI, Freiburg http://home.mathematik.uni-freiburg.de/analysis/Funktheo-2015ss/funktheo.html (Preparation of the weekly exercise sheets, organizing problem solving sessions and supervision of tutors) Lecture: Geometric Analysis II, MI, Freiburg (Preparation of the weekly exercise sheets and supervision of tutors, conducting a problem solving session)

Winter 2014/15	Seminar: Das Eigenwertproblem, MI, Freiburg (Tutoring undergraduate students)
Winter 2013/14	Seminar: Brownian Motion and Potential Theory, Institute of Applied Mathematics (IAM), Bonn (Tutoring undergraduate students) Lecture: Markov Processes, IAM, Bonn (Preparation of the weekly exercise sheets and supervision of tutors)
Summer 2013	Seminar: Markov Chains and Mixing Times, IAM, Bonn (Tutoring undergraduate students, conducting a problem solving session)
Summer 2012	Seminar: Selected Topics in Probability, IAM, Bonn (Tutoring undergraduate students)
Winter 2011/12	Lecture: Stochastic Analysis, IAM, Bonn (Preparation of the weekly exercise sheets and supervision of tutors)
Summer 2011	Lecture: Probability Theory II, IAM, Bonn (Preparation of the weekly exercise sheets and supervision of tutors)
Winter 2010/11	Lecture: Probability Theory I, IAM, Bonn (Preparation of the weekly exercise sheets and supervision of tutors)
Summer 2010	Lecture: Mathematics for Economists, Institute of Mathematics, Düsseldorf (Preparation of the weekly exercise sheets, conduction a problem solving session)
Winter 2009/10	Lecture: Analysis III (Integration Theory), Institute of Mathematics, Düsseldorf (Preparation of the weekly exercise sheets, conduction a problem solving session)

Academic Experience

07/22 - 12/22	Long Term Visitor of the Thematic Program on Nonsmooth Riemannian and Lorentzian Geometry at the Fields Institute, Toronto
10/21 - 02/22	Organizer, Group Seminar Differential Geometry Institute for Algebra and Geometry, KIT, Karlsruhe
2020 - 21	Organizer Geometric Analysis Group Seminar Department of Mathematics, University of Toronto
2019 - 20	Organizer Postdoc Seminar Department of Mathematics, University of Toronto
07/17 - 12/17	Postdoctoral Fellow Fields Institute, Toronto, Thematic Program on Geometric Analysis
01/16 - 03/16	Research Member MSRI Program 2016: Differential Geometry, Berkeley, US
01/16 - 04/16	Group Leader (Group: Global and Local Properties of Metric Measure Spaces with Synthetic Ricci Curvature Bounds) HIM Junior Trimester Program 2015: Optimal Transport, Bonn, Germany
11/15	Oberwolfach Seminar: *Min-Max Constructions of Minimal Surfaces*

Awards and Scholarships

1. DFH (Deutsch-Französische Hochschule) Conference for Young Scientists "Jeunes mathématicien.ne.s en géométrie et analyse / Junge MathematikerInnen in Geometrie und Analysis" (November 2022), Co-organizer: Nicola Juillet
(2865 EUR)

2. Long Term Visitor (LTV) of the Thematic Program *Nonsmooth Riemannian and Lorentzian Geometry* (July - December, 2022) at the Fields Institute
(12000 CAD)

3. DFG Rückkehrstipendium (Scholarship) (July 2021 - Dezember 2021)
(12000 EUR)

4. DFG Research Fellowship (July 2018 - June 2020):
Synthetische Krümmungsschranken durch Methoden des Optimalen Transports
Projektnummer 396662902
(81000 EUR)

5. FRIAS Nachwuchstagung (Workshop) (December 2017):
Geometric Analysis on Metric Spaces, Organizers: Christian Ketterer, Armin Schikorra
(10000 EUR)

6. HIM Follow-up Workshop (August 2016) for the Trimester Program: *Optimal Transport*
Organizers: Christian Ketterer, Lashi Bandara, Qintao Deng, Matthias Erbar, Yu Kitabeppu, Andrea Mondino, Michael Munn, André Schlichting

7. HIM Junior Trimester Program 2015: Optimal Transport, Bonn, Germany (January - April 2015)
Group Leader (Group: Global and Local Properties of Metric Measure Spaces with Synthetic Ricci Curvature Bounds)
(17000 EUR)

Conferences Organized

McGill University Geometric Analysis Workshop 2018
July 23 - 27, 2018, Montreal, Funded by McGill and NSF DMS 1309360
Organizers: Robert Haslhofer, Rohit Jain, Christian Ketterer, Christina Sormani

Follow-up Workshop for the Junior Trimester Program: Optimal Transportation
August 29 - September 2, 2016, Bonn, funded by Hausdorff Institute of Mathematics

Winter School & Workshop: New Developments in Optimal Transport, Geometry and Analysis
February 23 - 27, 2015, Bonn, funded by Hausdorff Institute of Mathematics
Organizers: Fabio Cavalletti, Christian Ketterer, Michael Munn

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Invited Seminars and Conferences

04/23	*BIRS-JP Workshop Invitation: A unified view of Quasi-Einstein Manifolds (23w5072)* April 23-28, 2022, Banff
01/23	*Seminar Geometric Analysis Group* Prof. Miles Simon Magdeburg
11/22	*Workshop on Aspects of Ricci Curvature Bounds* November 14-18, 2022, Fields Institute Toronto
08/22	*CMO Workshop on RCD spaces and group actions* August 2022, Oaxaca
12/21	*Seminar Geometric Analysis, Differential Geometry and Relativity* December 7, 2021, Tübingen-Potsdam
11/21	*RCD spaces: splitting theorems and applications* November 9 2021, UNAM, Mexico City (online)
09/21	*Workshop on Analysis on Singular Spaces* September 20-24, 2021, Münster
06/21	*CMS Summer Meeting* June 7-11, 2021, Ottawa, Session: Optimal Transport and Applications (online).

06/21 *8th European Congress of Mathematics*
Workshop "Metric Measure Spaces, Optimal Transport, and Synthetic Ricci Bounds"
June 20-26, 2021, Portoroz, Slovenia (canceled)

03/21 *Online Seminar: Geometric Analysis*
March 9, 2021, https://blatt.sbg.ac.at/onlineseminar.php
Organizers: Simon Blatt (University Salzburg), Philipp Reiter (University Halle), Armin Schikorra (University Pittsburgh), Guofang Wang (University Freiburg)

11/20 *CMO Workshop: Integral and Metric Geometry*
November 1-6, 2020, Oaxaca, Mexico (canceled)

12/19 *CMS Winter Meeting*
December 6-9, 2019, Toronto, Session: Geometric Analysis and General Relativity

07/19 *5th Summer School on Stochastic and Geometric Analysis*
July 6-13, 2019, Piz Buen (Bielerhöhe), Austria

04/19 *SCGP Convergence and Low Regularity in General Relativity*
April 29-May 3, 2019, Simons Center, Stony Brook

04/19 *Optimal transport and geometric analysis*
April 1-5, 2019, Venice

02/19 *Fields Institute Geometric Analysis Colloquium*
February 22, 2019, Toronto

12/18 *Oberseminar Differentialgeometrie*
December 17, 2019, Arbeitsgruppe Differentialgeometrie, Münster.

07/18 *SFB Seminar*
July 10, 2018, Bonn

05/18 *Geometric Analysis on Samothrace, Conference*
May 28 - June 1, 2018, Samotrace, Greece.

04/18 *CRMW Seminars*
April 6, 2018, UNAM, Mexico City

09/17 *Intense Activity Period: Metric Measure Spaces and Ricci Curvature*
September 4-29, 2017, Max Planck Institute, Bonn

06/17 *Süddeutsches Kolloquium über Differentialgeometrie*
June 30 - July 1, 2017, Goethe Universität, Frankfurt

06/17 *Geometric Analysis on smooth and nonsmooth spaces*
June 19 - June 23, 2017, SISSA, Trieste

09/16 *RIMS Conference: Geometric Analysis on Riemannian and Metric Spaces*
September 5-9, 2016, Kyoto

02/16 *Seminar Geometry: Metric measure spaces with variable lower Ricci curvature bounds*,
February 3, 2016, MSRI, Berkeley

07/15 Oberwolfach Workshop: *Differentialgeometrie im Großen*
June 29 - August 3, 2015, Oberwolfach

06/15 *International Workshop on Optimal Transport and Geometry*
June 22-26. 2015, Montpellier

04/15 *Oberseminar Stochastische und Geometrische Analysis*
April 8, 2015, Institute of Applied Mathematics, Bonn

10/14 *ERC Workshop on Optimal Transportation and Applications*
October 27-31, 2014, Centro di Ricerca Matematica Ennio De Giorgi, Pisa

06/14 *ERC Research Period on Calculus of Variations and Analysis in Metric Spaces*
June 9-13, 2014, Scuola Normale Superiore, Pisa

11/13	*Oberseminar Differentialgeometrie* Universität Freiburg, Mathematisches Institut
11/13	*Jyväskylä Analysis Seminar* University of Jyväskylä
10/13	*Conference ProbaGeo 2013 at Luxembourg* October 28-31, 2013, University of Luxembourg

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Journals Refereed

Stochastic Processes and their Applications (2016)
Stochastic Analysis and related Fields (2016)
Proceedings of the American Mathematical Society (2017)
Crelle's Journal (2017)
Calculus of Variations and Partial Differential Equations (2018)
Journal of Differential Geometry (2018)
Advances in Mathematics (2019)
Journal de Mathématiques Pures et Appliquées (2019)
Probability Theory and related Fields (2019)
Journal of Functional Analysis (2019)
Annali della Scuola Normale Superiore di Pisa (2020)
Journal of the European Mathematical Society (2020)
Symmetry, Integrability and Geometry: Methods and Applications (2020)
Inventiones mathematicae (2020)
Annales de Toulouse (2020)
Journal of Functional Analysis (2020)
Journal of Geometric Analysis (2021)
American Journal of Mathematics (2021)
Journal de Mathématiques Pures et Appliquées (2022)
Proceedings of the American Mathematical Society (2022)
Manuscripta Mathematica (2022)
Inventiones mathematicae (2022)
Crelle's Journal (2022)
Mathematische Annalen (2022)
Annales de l'Institut Fourier (2022)

Research Interests

Analysis and Geometry of Metric Measure Spaces
Optimal Transport
Synthetic Ricci and mean curvature lower bounds
Lorentzian length spaces
Alexandrov Spaces
Geometric Measure Theory
Dirichlet Forms
Stochastic Analysis
Geometric Flows

Other Experience

09/05 - 03/06	Studies of Mathematics at Université Paris Diderot (Paris 7)
08/01 - 06/02	Community Service (Diakonie Hospital Freiburg)

Preprints

a. Yu Kitabeppu, Christian Ketterer and Sajjad Lakzian, *On rigidity of sharp spectral gap in non-negatively curved spaces.* https://arxiv.org/abs/2110.05045, submitted.

b. Christian Ketterer and Guofang Wang, *Characterization of transvers lower Ricci bounds by displacement convexity.* available at request.

c. Christian Ketterer. *Evolution variational inequality and Wasserstein control in variable curvature context.* http://arxiv.org/abs/1509.02178.

Published Articles

18. Christian Ketterer, *Rigidity of mean convex subsets in nonnegatively curved RCD spaces and stability of mean curvature bounds.*
Accepted for publication in *Journal of Topology and Analysis.*

17. Vitali Kapovitch, Martin Kell and Christian Ketterer, *On the structure of RCD spaces with upper curvature bounds.*
Math. Zeitschrift volume 301, pages 3469–3502 (2022)

16. Vitali Kapovitch, Christian Ketterer and Karl-Theodor Sturm, *On gluing Alexandrov spaces with Ricci curvature bounds.*
Accepted for publication in *Comm. Anal. Geom.*

15. Christian Ketterer. *Stability of metric measure spaces with integral Ricci curvature bounds.*
Accepted for publication in *J. Funct. Anal.* https://doi.org/10.1016/j.jfa.2021.109142

14. Annegret Burtscher, Christian Ketterer, Robert McCann and Eric Woolgar, *Inscribed radius bounds for lower Ricci bounded metric measure spaces with mean convex boundary.*
SIGMA Symmetry Integrability Geom. Methods Appl. 16 (2020), 131, 29 pages.
(Special Issue on Scalar and Ricci Curvature in honor of Misha Gromov on his 75th Birthday)

13. Armando J. Cabrera Pacheco, Christian Ketterer and Raquel Perales, *Stability of graphical tori with almost nonnegativ scalar curvature.*
Calc. Var. Partial Differential Equations 59 (2020), no. 4, 134.

12. Christian Ketterer, *The Heintze-Karcher inequality for metric measure spaces.*
Proc. American Math. Soc. 148 (2020), no. 9, 4041-4056.

11. Vitali Kapovitch and Christian Ketterer, *Weakly noncollapsed RCD spaces with upper curvature bounds.*
Anal. Geom. Metr. Spaces 7 (2019), no. 1, 197-211.

10. Jerome Bertrand, Ilaria Mondello, Christian Ketterer and Thomas Richard, *Stratified spaces and synthetic Ricci curvature bounds.*
Accepted in *Anal. Inst. Fourier*

9. Vitali Kapovitch and Christian Ketterer, *CD meets CAT.*
J. Reine Angew. Math. J. Reine Angew. Math. 766 (2020), 1-44.

8. Nicola Gigli, Christian Ketterer, Kazumasa Kuwada and Shin-ichi Ohta, *Rigidity for the spectral gap on $RCD(K,\infty)$-spaces.*
American Journal of Mathematics 142, no. 5 (2020), 1559-1594.

7. Christian Ketterer and Andrea Mondino. *Sectional and intermediate Ricci curvature lower bounds via optimal transport.*
Adv. Math. 329 (2018), 781-818.

6. Christian Ketterer. *Lagrangian calculus for non-symmetric diffusion operators.*
Adv. Calc. Var. https://doi.org/10.1515/acv-2018-0001

5. Christian Ketterer. *On the geometry of metric measure spaces with variable curvature bounds.*
J. Geom. Anal. 27 (2017), no. 3, 1951-1994.

4. Christian Ketterer. *Obata's rigidity theorem for metric measure spaces.*
Anal. Geom. Metr. Spaces 3 (2015), 278-295.

3. Christian Ketterer and Tapio Rajala. *Failure of topological splitting and topological maximal diameter theorems for $MCP(K,N)$-spaces.*
Potential Anal. 42 (2015), no. 3, 645-655.

2. Christian Ketterer. *Cones over metric measure spaces and the maximal diameter theorem.*
J. Math. Pures Appl. (9) 103 (2015), no. 5, 1228-1275.

1. Christian Ketterer. *Ricci curvature bounds for warped products.*
J. Funct. Anal. 265 (2013), no. 2, 266-299.