Philipp Schlicht – Curriculum Vitae

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	38 Princes Street		
	Auckland 1010		
	New Zealand		
Date of Birth	16th October 1978		
Nationality	German		

Summary

My research is in descriptive set theory, general topology, infinite combinatorics and connections with analysis, model theory, graph theory, computability and theoretical computer science. I have experience in teaching introductory and advanced courses in mathematics and working with students at all levels. I have 48 publications in journals and proceedings such as the Journal of the London Mathematical Society, Israel Journal of Mathematics, Proceedings of the Royal Society A and Journal of Mathematical Logic, and I have given invited talks at well known conferences such as the European Logic Colloquium, the European Set Theory Conference and the Atelier International de Theorie des Ensembles Luminy.

Education

Jan 2018 Privatdozent in mathematics, Mathematical Institute, University of Bonn

Dec 2017 Habilitation, Dr. habil. in mathematics, Mathematical Institute, University of Bonn;

Habilitation thesis: Topics in generalized and classical descriptive set theory;
Head of committee: Prof. Dr. Peter Koepke

Oct 2008 Doctor rerum naturalium, Dr. rer. nat. (doctor of sciences) in mathematics, University of Münster, 28 Oct 2008;

Doctoral thesis: Thin equivalence relations in $L(\mathbb{R})$ and inner models (magna cum laude);
Supervisor: Prof. Dr. Ralf Schindler
Second supervisor: Prof. Dr. Gregory Hjorth, UCLA

2005-2006 Visiting scholar, University of California, Los Angeles (UCLA)

May 2004 Diplom (master) in mathematics with distinction (1.0), University of Munich (LMU);

Diplom thesis: Classifying Borel equivalence relations;
Supervisor: Prof. Dr. Dieter Donder

Experience

Mar 2024 - current School of Computer Science, University of Auckland, New Zealand
Research Fellow

Sep 2021 - Feb 2024 School of Mathematics, University of Bristol, UK
EPSRC research associate

- Project: Graphs on generalised Baire spaces (joint with Prof. Philip Welch)

Apr 2021 - Aug 2021 Mathematical Institute, University of Bonn, Germany
Temporary associate professor (W2) (Vertretungsprofessur, substitute for unfilled position)

Oct 2020 - **Mar 2021**	Faculty of Mathematics, University of Vienna, Austria *Postdoctoral researcher*
Jul 2020 - **Aug 2020**	School of Mathematics, University of Bristol, UK *Research fellow*
Jul 2018 - **Sep 2020**	School of Mathematics, University of Bristol, UK *Marie Curie research fellow* (on leave Jul 2020 -Aug 2020)

- Project: Inner models and infinite computations (joint with Prof. Philip Welch)

Mar 2018 - **Jun 2018**	Department of Computer Science, University of Auckland, New Zealand *Postdoctoral researcher*
April 2015 - **Mar 2016**	Institute for Mathematical Logic and Foundations, University of Münster, Germany *Temporary associate professor (W2) (Vertretungsprofessur, substitute for unfilled position)*
Nov 2015 - **Dec 2015**	Isaac Newton Institute, Cambridge, UK *Invited researcher*
Jun 2014	Institute for Mathematical Sciences, National University of Singapore, Singapore *Invited researcher*
Feb 2011 - **Feb 2018**	Mathematical Institute, University of Bonn, Germany *Fixed-term assistant professor (Akademischer Rat auf Zeit)* (on leave June 2014, Nov-Dec 2015 and April 2015 -Mar 2016)
Aug 2009 - **Dec 2009**	Mittag-Leffler Institute, Djursholm, Sweden *Invited researcher*
Nov 2008 - **Feb 2011**	Hausdorff Center, Bonn, Germany *Postdoctoral researcher*
Jun 2004 - **Aug 2008**	Institute for Mathematical Logic and Foundations, University of Münster, Germany *Research assistant*

Teaching

- Advised and co-advised theses
  - Currently supervised bachelor theses in Bonn (remote):
    Joe Faber: Variants of the open graph axiom and automorphisms of reduced products
    Arthur Sliwa: Hausdorff gaps, construction schemes and the open graph axiom
    Pietro De Micheli: Continuous games
  - Supervised master thesis in Bristol:
    Sherwin Pereira, 2022-23, Computability and randomness (now working as an engineer)
  - Helped supervise Ph.D. thesis in Bristol:
    Christopher Turner, 2020-22, Name Principles, and Hierarchies of Regular Cardinals applied to LST numbers and Inner Model Theory (now postdoc at the Polish Academy of Sciences)
  - Supervised bachelor thesis in Bristol:
    Joseph MacManus, 2020-21, Decision problems within combinatorial group theory (now Ph.D. student at the University of Oxford)
  - Supervised 2 bachelor theses and co-supervised 3 master theses in Bonn, helped supervise 3 Ph.D., 6 master and 2 bachelor theses in Bonn and Münster (three now in academia as postdoc, assistant professor and Akademischer Rat)

- External referee for Ph.D. thesis

  – Martina Ianella, University of Udine, 2023

- Lecture courses

  – Winter 2021-22, University of Bristol: Forcing for mathematicians (for graduate stutents at Bristol, Imperial College, Oxford, Warwick, online)

  – Summer 2021, University of Bonn: Einführung in die Mathematische Logik (introduction to mathematical logic, bachelor, in German, online)

  – Winter 2017-18, University of Bonn: Advanced mathematical logic: model theory (master), with Philipp Lücke

  – Summer 2016, University of Bonn: Advanced topics in mathematical logic (master), with Philipp Lücke

  – Winter 2015-16, University of Münster: Logik II - Einführung in die Mengenlehre (bachelor/master, in German)

  – Summer 2015, University of Münster: Logik I - Einführung in die Mathematische Logik (bachelor, in German)

  – Winter 2014-15, University of Bonn: Introduction to set theory, with Philipp Lücke

  – Summer 2014, University of Bonn: Advanced topics in mathematical logic (master), with Philipp Lücke

  – Summer 2013, University of Bonn: Descriptive set theory (bachelor/master), with Stefan Geschke

  – Summer 2012, University of Bonn: Iterated ultrapowers (master)

- Seminar series

  – 2011-17: 13 seminar series for bachelor and master students in Bonn and Münster, taught jointly with Peter Koepke, Stefan Geschke, Philipp Lücke, Peter Holy and Ralf Schindler:
    - 11 seminars in mathematical logic
    - seminar in combinatorics: ergodic Ramsey theory
    - seminar in real analysis: the Jordan curve theorem for students of mathematics education

- Assisting with lecture courses and preparation of problem sheets

  – 2011-16: Organisation of tutorial sessions and preparation of problem sheets for 7 lecture courses of Peter Koepke and Stefan Geschke on Introduction to Mathematical Logic, Introduction to Set Theory, Models of Set Theory I and II, Mathematics for Physicists

- Organisation of research seminars

  – Winter 2018-Summer 2020, Winter 2021-Summer 2023 Bristol: Logic and Set Theory Seminar, with Philip Welch and Kentaro Fujimoto

  – Winter 2009-Winter 2014, Bonn: Oberseminar Mathematische Logik, with Peter Koepke, Stefan Geschke and and Philipp Lücke

Articles in journals or books

42. Asymmetric cut and choose games with Peter Holy, Christopher Turner and Philip Welch
    accepted for Bulletin of Symbolic Logic in January 2023, 30 pages

41. Generalized Polish spaces at regular uncountable cardinals, with Claudio Agostini and Luca Motto Ros
    Journal of the London Mathematical Society, 108, 5 (2023), 1886-1929

40. Forcing axioms via ground model interpretations with Christopher Turner
    Annals of Pure and Applied Logic 174, 6 (2023), 103260, 45 pages

39. Uniformization and internal absoluteness, with Sandra Müller
    Proceedings of the American Mathematical Society 151, 7 (2023), 3089–3102

38. Descriptive properties of higher Kurepa trees, with Philipp Lücke
    accepted in December 2020 for the book "Research Trends in Contemporary Logic", College Publications, 16 pages

37. Coarse groups, and the isomorphism problem for oligomorphic groups, with Andre Nies and Katrin Tent, 26 pages
    Journal of Mathematical Logic 22, 1 (2022), 2150029, 26 pages

36. Lebesgue's density theorem and definable selectors for ideals, with Sandra Müller, David Schrittesser and Thilo Weinert, 29 pages
    Israel Journal of Mathematics 249 (2022), 501–551

35. Ideal topologies in higher descriptive set theory, with Peter Holy, Marlene Koelbing and Wolfgang Wohofsky
    Annals of Pure and Applied Logic, 173, 4 (2022), 103061, 36 pages

34. Decision times of infinite computations, with Philip Welch and Merlin Carl, 11 pages
    accepted for Notre Dame Journal of Formal Logic 63, 2 (2022), 197-212

33. Canonical truth, with Merlin Carl, 19 pages
    Axiomathes, August 2022 (appeared online)

32. Long games and sigma-projective sets, with Juan P. Aguilera and Sandra Müller, 23 pages
    Annals of Pure and Applied Logic (appeared online, January 2021)

31. Preserving levels of projective determinacy by tree forcings, with Fabiana Castiblanco
    Annals of Pure and Applied Logic 172, 4 (2021)

30. How to have more things by forgetting how to count them, with Asaf Karagila
    Proceedings of the Royal Society A, 476, 2239 (2020), 1-12

29. The exact strength of the class forcing theorem, with Victoria Gitman, Joel David Hamkins, Peter Holy and Kameryn Williams,
    Journal of Symbolic Logic 85, 3 (2020), 869-905

28. Reachability of infinite time Turing machines with long tapes, with Merlin Carl and Benjamin Rin
    Logical Methods in Computer Science 16, 2 (2020), 1-16

27. The isomorphism problem for tree-automatic ordinals with addition, with Sanjay Jain, Bakhadyr Khoussainov, and Frank Stephan
    Information Processing Letters 149 (2019), 19-24

26. Sufficient conditions for the forcing theorem, and turning proper classes into sets, with Peter Holy and Regula Krapf
    Fundamenta Mathematicae 246 (2019), 27-44

25. Borel subsets of the real line and continuous reducibility, with Daisuke Ikegami and Hisao Tanaka
    Fundamenta Mathematicae 244 (2019), 209-241

24. A hierarchy of Ramsey-like cardinals, with Peter Holy
    Fundamenta Mathematicae 242 (2018), 49-74

23. Characterizations of pretameness and the Ord-cc, with Peter Holy and Regula Krapf
    Annals of Pure and Applied Logic 169, 8 (2018), 775-802

22. Measurable cardinals and good $\Sigma_1(\kappa)$-wellorderings, with Philipp Lücke
    Mathematical Logic Quarterly 64, 3 (2018), 207-217

21. Randomness via infinite computation and effective descriptive set theory, with Merlin Carl
    Journal of Symbolic Logic 83, 2 (2018), 766-789

20. Recognizable sets and Woodin cardinals: Computation beyond the constructible universe, with Merlin Carl and Philip Welch
    Annals of Pure and Applied Logic, Volume 169, 4 (2018), 312-332

19. Continuous reducibility and dimension of metric spaces
    Archive for Mathematical Logic 57, 3 (2018), 329-359

18. Perfect subsets of generalized Baire spaces and long games
    Journal of Symbolic Logic 82, 4 (2017), 1317-1355

17. Σ_1-definable subsets of $H(\omega_2)$, with Philipp Lücke and Ralf Schindler
    Journal of Symbolic Logic 82, 3 (2017), 1106-1131

16. Choiceless Ramsey theory for linear orders, with Philipp Lücke and Thilo Weinert
    Order 34, 3 (2017), 369-418

15. Pumping for ordinal-automatic structures, with Alexander Kartzow and Martin Huschenbett
    Computability 6, 2 (2017) 125-164

14. Infinite computations with random oracles, with Merlin Carl
    Notre Dame Journal of Formal Logic 58, 2 (2017), 249-270

13. Class forcing, the forcing theorem and Boolean completions, with Regula Krapf, Philipp Lücke and Ana Njegomir
    Journal of Symbolic Logic 81, 4 (2016), 1500-1530

12. Generalized Choquet spaces, with Samuel Coskey
    Fundamenta Mathematicae 232 (2016), 227-248

11. The Hurewicz dichotomy for generalized Baire spaces, with Philipp Lücke and Luca Motto Ros
    Israel Journal of Mathematics 216, 2 (2016), 973-1022

10. Tree-automatic scattered linear orders, with Sanjay Jain, Bakhadyr Khoussainov, and Frank Stephan
    Theoretical Computer Science 626 (2016), 83-96

9. Continuous images of closed sets in generalized Baire spaces, with Philipp Lücke
   Israel Journal of Mathematics 209, 1 (2015), 421-461

8. Wadge-like reducibilities in arbitrary quasi-Polish spaces, with Luca Motto Ros and Victor Selivanov
   Mathematical Structures in Computer Science 25, 8 (2015), 1705-1754

7. Lipschitz and uniformly continuous reducibilities on ultrametric Polish spaces, with Luca Motto Ros
   Ontos Verlag, 2014, 213-258

6. Thin equivalence relations and inner models
   Annals of Pure and Applied Logic 165, 10 (2014), 1577-1625

5. Automata on ordinals and automaticity of linear orders, with Frank Stephan
   Annals of Pure and Applied Logic 164, 5 (2013), 523-527

4. A minimal Prikry-type forcing for singularizing a measurable cardinal, with Karen Räsch and Peter Koepke
   Journal of Symbolic Logic 78, 1 (2013), 85-100

3. Tree representations via ordinal machines, with Benjamin Seyfferth
   Computablility 1, 1 (2012), 45-57

2. Non-isomorphism invariant Borel quantifiers, with Fredrik Engström
   Proceedings of the American Mathematical Society 139 (2011), 4487-4496

1. Thin equivalence relations in scaled pointclasses, with Ralf Schindler
   Mathematical Logic Quarterly 57, 6 (2011), 615-620

Articles in conference proceedings

6. Ordered Semiautomatic Rings with Applications to Geometry, with Ziyuan Gao, Sanjay Jain, Ji Qi, Frank Stephan and Jacob Tarr
   Language and Automata Theory and Applications (LATA) 2020

5. Automatic learning from repetitive texts, with Rupert Hölzl, Sanjay Jain, Karen Seidel and Frank Stephan
   Algorithmic Learning Theory (ALT) 2017

4. The recognizability strength of infinite time Turing machines with ordinal parameters, with Merlin Carl
   Computability in Europe (CiE) 2017

3. Structures without scattered-automatic presentation, with Alexander Kartzow
   Computability in Europe (CiE) 2013

2. The mate-in-n problem of infinite chess is decidable, with Dan Brumleve and Joel David Hamkins
   Computability in Europe (CiE) 2012

1. Automata on ordinals and linear orders, with Frank Stephan
   Computability in Europe (CiE) 2011

Submitted articles

4. The open dihypergraph dichotomy for generalized Baire spaces and its applications, with Dorottya Sziraki
   submitted to Memoirs of the European Mathematical Society in December 2023, 128 pages

3. Between Ramsey and measurable cardinals, with Victoria Gitman
   submitted to Journal of the Mathematical Society of Japan in November 2023, 33 pages

2. Forcing over choiceless models and generic absoluteness, with Daisuke Ikegami
   submitted to Journal of Mathematical Logic in December 2022, 28 pages

1. Countable ranks at the first and second projective levels, with Merlin Carl and Philip Welch
   submitted to Israel Journal of Mathematics in December 2022, 30 pages

Articles in preparation

2. The interplay of iterated forcing with determinacy and regularity, with Jonathan Schilhan and Johannes Schürz
   in preparation, 35 pages

1. Simply definable sets in the presence of measurable cardinals, with Merlin Carl and Philip Welch,
   in preparation, 15 pages

Co-edited books

1. Infinity, Computability, and Metamathematics, with Stefan Geschke and Benedikt Löwe
College Publications 2014

Grants

Third-part funding as a PI:

- Horizon 2020 Marie Sklodowska-Curie Individual Fellowship (MSCA) "Inner models and Infinite Computations" (IMIC), 2018-20: 126.000 Euros

Successful grant applications:

- EPSRC grant application (scientific part written by me in collaboration with Prof. Philip Welch, submitted by him) for my postdoc fellowship, University of Bristol, 2021-24: 303.864 GBP

- LMS scheme 1 grant for Fifth Workshop on Generalised Baire Spaces, February 2020, University of Bristol

- Fellowship of the German Academic Exchange Service (DAAD) 2005-2006, UCLA, Los Angeles

Participation in other grants:

- Visiting fellowship for the program "Large cardinals and strong logics", CRM Bellaterra, Barcelona, November 2016

- Visiting fellowship for the program "Mathematical, Foundational and Computational Aspects of the Higher Infinite", Isaac Newton Institute Cambridge, October-December 2015

- Participation in the grant "Complexity and Definability at Higher Cardinals – Studies in Generalized Descriptive Set Theory" of the German Research Foundation (DFG) in 2015-2017 with Philipp Lücke, Peter Holy and Peter Koepke, Bonn

- Short visit grant to visit Prof. Mati Rubin in Beersheba, Israel, February-March 2015

- Several short visit grants in the program "New Frontiers of Infinity" of the European Science Foundation (ESF) 2009 Stockholm, 2010 Torino, 2014 Torino

- Fellowship of the German Academic Exchange Service (DAAD) and funding from Prof. Itay Neeman's NSF grant 2005-2006, UCLA, Los Angeles

Prizes

- Prize for best doctoral theses (biennial) of the German association for mathematical logic and foundations (DVMLG), Ph.D. Colloquium Darmstadt 2009

Recent conference invitations (41 total)

18. Three tutorial lectures, 120 Years of Choice, University of Leeds, July 2024

17. Determinacy and iterated forcing, 17th Atelier International de Theorie des Ensembles, CIRM Luminy, October 2023

16. Open hypergraphs, covering properties and games, Annual meeting of the Swiss Society for Logic and Philosophy of Science, Lausanne, September 2023

15. Interaction of determinacy and forcing, Annual conference of the German mathematical society (DMV), logic section, Berlin, September 2022

14. Determinacy and iterated forcing, 5th Münster Conference on Inner Model Theory, June 2022

13. Open hypergraphs on generalized Baire spaces, Fifth arctic set theory workshop, Kilpisjärvi, February 2022

12. Open dihypergraphs on generalized Baire spaces, Model Theoretic Logics and their Frontiers, Budapest, January 2022

11. Effective overtness of generalised Cantor spaces, Descriptive Set Theory and Computable Topology, Dagstuhl conference, November 2021

10. Forcing axioms via ground model interpretations, Joint meeting of the German Mathematical Society (DMV) and Austrian Mathematical Society (ÖMG), Passau, September 2021

9. Forcing over Cohen's symmetric model, Special session in choiceless set theory and related areas, Joint Mathematics Meeting, Denver, January 2020

8. Internal absoluteness, 15th Atelier International de Theorie des Ensembles, CIRM Luminy, September 2019

7. Ideal topologies on generalized Cantor spaces, Workshop on Set Theory of the Reals, Oaxaca CMO-BIRS, August 2019

6. Randomness notions for infinite time Turing machines, Workshop on Recursion Theory, Set Theory and Interactions, Institute for Mathematical Sciences (IMS), NUS Singapore, May-June 2019

5. Descriptive set theory in the setting of generalized Baire spaces, Master class, Academy Colloquium Amsterdam on generalized Baire spaces, August 2018

4. The open coloring axiom for generalized Baire spaces, First inner model theory conference Girona, July 2018

3. Writability and reachability for alpha-tape infinite time Turing machines, Workshop in Computability and Set Theory, Swansea, July 2018

2. The isomorphism problem for oligomorphic groups, Novi Sad Conference in Set theory and General Topology (SETTOP), July 2018

1. Lebesgue's density theorem for ideals, Descriptive set theory conference, Bernoulli center Lausanne, June 2018

Recent seminar invitations (41 total)

15. Forcing over choiceless models, Guangzhou Logic Seminar, February 2024

14. Interplay of determinacy and forcing, Kobe Set Theory Seminar, June 2023

13. Forcing over choiceless models, Leeds Logic Seminar, December 2022

12. Interaction of determinacy and forcing, Leeds Models and Sets Seminar, October 2022

11. Open dihypergraphs on generalized Baire spaces, Toronto Set Theory Seminar, April 2022

10. Forcing axioms via ground model interpretations, Set theory seminar, University of Barcelona, December 2021

9. Sets and graphs in generalised descriptive set theory, Logic Seminar, National University of Singapore, March 2021

8. The recognisable universe in the presence of measurable cardinals, New York Set Theory Seminar, CUNY, November 2020

7. Structural results about Π^1_1 and Σ^1_2 sets, Logic Seminar, National University of Singapore, November 2020

6. Tree forcings, sharps and absoluteness, Kurt Gödel Research Center Research Seminar, University of Vienna, November 2020

5. Borel sets in effective descriptive set theory, Ghent-Leeds Virtual Logic Seminar, September 2020

4. The lengths of countable ranks, Logic and set theory seminar, University of Bristol, February 2020

3. Internal absoluteness, Set theory seminar, Université de Paris, December 2019

2. Oligomorphic groups are essentially countable, Logic seminar, Université de Paris, December 2019

1. An introduction to automatic structures, Logic seminar, Swansea University, April 2019

Administrative activities

- Organisation of research seminars at the University of Bonn and the University of Bristol

- Co-organisation of 9 international conferences (see *Conference organisation*)

- Management of Marie Curie grant

- Webmaster of the European Set Theory Society (ESTS) website ests.wordpress.com, including an overhaul of the website and more than 100 new followers

Conference organisation

- Seventh Workshop on Generalised Baire Spaces, Bristol, February 2024

- Two-Day Logic Meeting, Bristol, June 2023

- Set Theory in the UK 6 (online), December 2020, grant from the London Mathematical Society

- Fifth Workshop on Generalised Baire Spaces, Bristol, February 2020, grant from the London Mathematical Society

- Set Theory in the UK 2, Bristol, February 2019, grant from the London Mathematical Society

- Mini-Workshop on Computability and its Relation to Set Theory, Auckland, April 2018

- Third Workshop on Generalized Baire spaces, Bonn, September 2016, obtained grant from the Hausdorff Centre, Bonn

- Ninth Young Set Theory Workshop, Copenhagen, June 2016 (program committee)

- Infinity, Computability and Metamathematics, Bonn, May 2014, obtained grant from the Hausdorff Centre, Bonn

- INFTY Final Conference, Bonn, March 2014

- Fifth Young Set Theory Workshop, Luminy, May 2012 (program committee)

- Fourth Young Set Theory Workshop, Königswinter, March 2011, obtained grant from the Hausdorff Centre, Bonn

Public engagement

- Mathematical experiments at *FUTURES: European Researchers Days*, Bristol, 2018 and 2019

- Co-organisation of mathematical experiments, Cheltenham Science Festival 2019

- General audience talk: Large infinities in mathematics, Basic notions seminar, Bonn 2017

Other professional activities

- Referee for the journals:

  Journal of the American Mathematical Society (co-referee), Memoirs of the American Mathematical Society, Advances in Mathematics, Journal of Mathematical Logic, Bulletin of the London Mathematical Society, Journal of Symbolic Logic, Annals of Pure and Applied Logic, Notre Dame Journal of Formal Logic, Contemporary Mathematics, Logical Methods in Computer Science, Archive for Mathematical Logic, Computability, Mathematical Logic Quarterly, Bulletin of Symbolic Logic, Bulletin of the Canadian Mathematical Society, Communications of the American Mathematical Society; other journals, conferences and book publications.

- External referee for grant applications, Austrian Science Fund (FWF)

- Reviewer for Mathscinet

- Member of the Association for Symbolic Logic, European Set Theory Society, London Mathematical Society, British Logic Colloquium, German Mathematical Society (DMV), German Society for Mathematical Logic and Foundational Studies (DVMLG)