

Lennart Meier - Curriculum Vitae

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Research Interests

Interactions of algebraic topology and (derived) algebraic geometry, especially chromatic homotopy theory

Education

- **University of Bonn**

Ph.D. in Mathematics, August 2012

Advisor: Stefan Schwede. Title: *United Elliptic Homology*

Diplom in Mathematics and Philosophy (minor), 2009 (with distinction)

Advisor: Matthias Kreck. Title: *A Geometric View on String Topology*

- **University of Bielefeld**

Vordiplom in Mathematics and Philosophy (minor), 2006

Employment

- **Universiteit Utrecht**, Universitair hoofddocent (Associate Professor), **2023 - present**
- **Universiteit Utrecht**, Universitair docent (Assistant Professor), **2018 - 2023** (tenured since 2020)
- **University of Bonn**: Wissenschaftlicher Mitarbeiter: **2015 - 2017**
- **University of Virginia**: Whyburn Instructor: **2013 - 2015**
- **University of Bonn**: Wissenschaftlicher Mitarbeiter: **2012**

Publications

1. Purity in chromatically localized algebraic K-theory (with Markus Land, Akhil Mathew, George Tamme), *Journal of the American Mathematical Society* (2024).
2. Picard sheaves, local Brauer groups, and topological modular forms (joint with Benjamin Antieau and Vesna Stojanoska), *Journal of Topology* 17 (2), e12333, (2024)
3. On equivariant topological modular forms (with David Gepner), *Compositio Mathematica* 159 (12), 2638-2693 (2023)
4. Connective Models for Topological Modular Forms of Level n , *Algebraic & Geometric Topology* 23 (8), 3553-3586 (2023)

5. Norms of Eilenberg-Mac Lane Spectra and Real Bordism (with XiaoLin Danny Shi and Mingcong Zeng), *Advances in Mathematics*, Volume 412, (2023)
6. Topological modular forms with level structures: decompositions and duality, *Transactions of the American Mathematical Society* 375 (02), 1305-1355 (2022)
7. Decomposition results for rings of modular forms, *Doc. Math.* 27, 427-488 (2022)
8. A Whitehead theorem for periodic homotopy groups (with Tobias Barthel and Gijs Heuts), *Israel Journal of Mathematics* volume 241 (2021)
9. The Brauer group of the moduli stack of elliptic curves (with Benjamin Antieau), *Algebra and Number Theory*, Vol. 14 (2020), No. 9, 2295-2333
- 9 $\frac{1}{2}$. Appendix B of Descent in algebraic K-theory and a conjecture of Ausoni-Rognes (with Niko Naumann and Justin Noel), *Journal of European Mathematical Society* (2020)
10. Rings of modular forms and a splitting of $TMF_0(7)$ (with Viktoriya Ozornova), *Selecta Mathematica* (2020) 26:7
11. Monadicity of the Bousfield-Kuhn functor (with Rosona Eldred, Gijs Heuts and Akhil Mathew), *Proc. Amer. Math. Soc.* 147 (2019), 1789-1796
12. Gorenstein duality for Real spectra (with John Greenlees), *Algebraic & Geometric Topology* 17-6 (2017), 3547-3619
13. The C_2 -spectrum $Tmf_1(3)$ and its invertible modules (with Mike Hill), *Algebraic & Geometric Topology* 17 (2017) 1953-2011
14. Fibration Categories Are Fibrant Relative Categories, *Algebraic & Geometric Topology* 16 (2016) 3271-3300
15. Fibrancy of Partial Model Categories (with Viktoriya Ozornova), *Homology, Homotopy and Applications* 17.2 (2015), 53-80
16. Affineness and Chromatic Homotopy Theory (with Akhil Mathew), *Journal of Topology* (2015) 8(2), 476-528
17. Vector Bundles over the Moduli Stack of Elliptic Curves, *Journal of Algebra* 428 (2015), 425-456
18. Hilbert Manifolds, *Bulletin of the Manifold Atlas* (2014, expository)
19. Spectral Sequences in String Topology, *Algebraic & Geometric Topology* 11 (2011), 2829-2860

Preprints

20. Invariant prime ideals in equivariant Lazard rings (with Markus Hausmann, 2023)
21. Transchromatic phenomena in the equivariant slice spectral sequence (with XiaoLin Danny Shi and Mingcong Zeng, 2024)

Grants and Scholarships

- NWO Vidi (Principal Investigator): *Understanding symmetries of spaces via modular forms*
Financing PhD position, postdoc position and conferences (800.000€), 2021-2026
- NWO-Klein-1 (Principal Investigator): *The interplay of orientations and symmetry*
Financing one PhD position (295.000€), 2020-24
- Principal investigator of DFG grant:
Chromatic Derived Algebraic Geometry and Equivariant Homotopy Theory, 2015-2018
Financing own postdoc position, part of SPP 1786: *Homotopy theory and algebraic geometry*
- Scholarship from Deutsche Telekom-Stiftung, 2009–2012
- Scholarship from GRK 1150 (Research training group on homotopy and cohomology), 2009
- Scholarship from Deutsche Studienstiftung, 2006–2009

Teaching Experience

- **Universiteit Utrecht**

Spring 2024: Seminar on K-theory (with Carrick), Algebraic Topology II (with Sagave)

Fall 2023: Proofs in Mathematics

Spring 2023: Algebraic Topology II (with Sagave)

Fall 2022: Introduction to topology

Spring 2022: Algebraic Topology II (with Sagave); Seminar on the Immersion Conjecture (with Blans)

Fall 2021: Introduction to topology

Spring 2021: Seminar on spectral sequences (with Heuts)

Fall 2020: Algebraic Topology I (with Heuts); Proofs in mathematics; Introduction to topology

Fall 2019: Algebraic Topology I; Elementary Number Theory; Orientation in Mathematical Research (with Spitoni)

Spring 2019: Topology and Geometry; Seminar on rational homotopy theory (with Heuts); Algebraic Topology II (with Heuts)

Spring 2018: Topology and Geometry; Seminar on topological K-theory (with Heuts)

- **University of Virginia**

Spring 2015: Survey of Algebra; Introduction to Geometry

Fall 2014: Calculus III

Spring 2014: Topics in Algebraic Topology: Homology Theories and Spectra; Elementary Linear Algebra

Fall 2013: Elementary Linear Algebra

Spring 2013: Survey of Algebra (two courses)

- **University of Bonn**

Winter 2017: Reading course on the Adams spectral sequence

Summer 2017: Lecture course on Elliptic Cohomology and Topological Modular Forms

2015-16: (Co-)Organizer of work group seminar 'Homotopy Theory'

Winter 2012: Assistant for Linear Algebra 1 (developing exercise sheets)

2009-11: (Co-)Organized PhD seminars on the topics 'The Nilpotence Theorem', 'The Atiyah-Singer Index Theorem and Spin Geometry' and 'Chromatic Homotopy Theory'

2007-09: Teaching assistant (grading and recitations) at the University of Bonn for the courses Analysis 1, Analysis 2 and Classification of 1-connected 4-manifolds

Postdocs mentored

- Christian Carrick (2023-)
- Mingcong Zeng (2019-2021)

PhD students, with (projected) finishing years

- Ryan Quinn (2026)
- Sven van Nigtevecht (2025)
- Itamar Mor (2024, cosupervision; student based at Queen Mary with Behrang Noohi as official supervisor)
- Jaco Ruit (2024)
- Jack Davies (2022, now at University of Bonn)

Master students, with (projected) finishing years

- Julie Creemers: Massey products on spectral sequences from an ∞ -categorical point of view (2025)
- Megan Verrijdt: String topology (2025)
- Shenqi Fan: Equivariant elliptic genera (2024)
- Bouke Jansen: Finding Generalized Cohomologies from Supersymmetric Field Theories (2023, with Grimm)
- Leon Görtz: Elliptic genera in mathematics and physics and a generalization to G -manifolds (2023, with Grimm)
- Antonie de Potter: Infinity-categorical constructions of spectral sequences (2023)
- Ryan Quinn: Equivariant Localization Theorems (2022)
- Christiaan van den Brink: Collapsing theorem for Delaunay complexes in non-general position and symmetry (2022)
- Divya Ghanshani: Homology theories in cofibration categories (2021)

- Pascal Sitbon: Equivariant bordism (2020)
- Abe ten Voorde: Cyclic algebras over local fields arising from elliptic curves (2020)
- Jeroen van der Meer: K -local spectra and stacks (2019)
- Jorge Becerra: K-theory with Reality (2019)
- Joost van Geffen: Bordism rings (2019)
- Simone Fabbrizzi: Brauer groups of stacks (2018)

Bachelor students

- Nathan van den Berg, The Stone representation theorem (2022)
- Wietse Bosman, Category Theory and Haskell (2022)
- Vincent Kuhlmann, The Aharonov–Bohm effect (2022, with Dirk Schuricht)
- Tess van Leeuwen, Representations of the Lie algebra $\mathfrak{su}(2)$ and the AKLT model (2021, with Dirk Schuricht)
- Marien Matser, The categorical origin of monads in Haskell (2021)
- Dennis Hilhorst, Braid groups (2021, with Dirk Schuricht)
- Paul van Hoegaerden, Clifford algebras and their application in the Dirac equation (2021, with Dirk Schuricht)
- Hanna den Oudsten, The path integral (2021, with Dirk Schuricht)
- Casper van Hal: An introduction into Lie Groups, Lie Algebras, Representations and Spin (2021, with Dirk Schuricht)
- Corijn Rudrum: Elliptic curves and the Yang–Baxter equation (2020, with Dirk Schuricht)
- Gerben Lamers: Homotopy groups of spheres using the Pontryagin theorem (2020)
- Bouke Jansen: Principal Bundles (2020)
- Max Meijer: Combinatorial topology and distributed computing (2019)
- Martijn de Waal: De Rham cohomology (2018)
- Niklas Hellmer: Geschlechtsformeln für Modulkurven (2017)
- Süleyman Karaca: Homologie mit lokalen Koeffizienten (2016)

Conferences and workshops organized

- Organizer of conference on (∞, n) -categories and their applications, 2024, Utrecht
- Organizer for a spring school on interactions of algebraic topology and field theories, 2022, Driebergen
- Coorganizer of the European Autumn Schools in Topology 2017, 2018, 2019 and 2022, Driebergen
- Coorganizer of ‘Workshop on ∞ -operads’ (2018), Driebergen
- Coorganizer of miniworkshops on ‘ ∞ -categories’ (2017), ‘Infinite loop spaces and ∞ -categories’ (2018) and ‘The Picard group of TMF and ∞ -categories’ (2019), Utrecht.

Outreach

- Teacher at numerous math olympiad training camps and other mathematical activities for high school students (including math clubs at the universities in Bielefeld and Bonn), starting in 2003
- Grading of exams at the NRW math olympiad in Germany, almost yearly since 2006
- Written two chapters for math books for high-school students, one being *Mathe ist cool! - Junior* (2003) and one for *Mathe ist cool! 3* (to appear).

Research Visits

- June 2022, CRM, Barcelona
- April 2022, Mittag-Leffler Institute, Djursholm
- February 2020, MSRI Berkeley
- July – October 2018, Isaac Newton Institute Cambridge
- October - December 2016, Hausdorff Institute Bonn
- June - August 2015, Hausdorff Institute Bonn
- May - August 2014, University of Bremen
- January 2014, University of Bremen
- June - July 2013, University of Bonn

Talks

I have given the following plenary conference talks.

- 2023, SPP 1786 Abschlusstagung, Essen (Germany)
- 2023, Workshop on Homotopy Theory, Oberwolfach (Germany)
- 2023, Chromatic Homotopy Theory, K-theory and Functors, CIRM Luminy (France)
- 2022, Follow-up Workshop to JTP Topology, Bonn (Germany)
- 2022, Workshop on Topology, Oberwolfach (Germany)
- 2022, Workshop on derived geometry (Lecture series), CRM Barcelona (Spain)

- 2021, Workshop on Equivariant techniques in stable homotopy theory, AIM (USA)
- 2021, Opening workshop Higher Homotopical Structures, CRM Barcelona (Spain)
- 2020, Elliptic Cohomology and Physics, Perimeter Institute, Waterloo (Canada)
- 2020, Equivariant Stable Homotopy Theory and p-adic Hodge Theory, Banff (Canada)
- 2019, Workshop on Algebraic Geometry and Homotopy Theory, Nijmegen (Netherlands)
- 2019: British topology meeting, Warwick (UK)
- 2019: International Workshop on Algebraic Topology, Shanghai (China)
- 2019: Workshop on Homotopy Theory, Oberwolfach (Germany)
- 2019: Elliptic Cohomology Days, Urbana–Champaign (USA)
- 2018: Derived algebraic geometry and chromatic homotopy theory, Isaac Newton Institute, Cambridge (UK)
- 2018: GQT Colloquium, Groesbeek (Netherlands)
- 2017: Conference on invertible objects and duality in derived algebraic geometry and homotopy theory, Regensburg (Germany)
- 2016: Equivariant Derived Algebraic Geometry, Banff (Canada)
- 2015: NRW Topology Meeting, Bochum (Germany)
- 2015: Midwest Topology Seminar, Chicago (USA)
- 2014: Modular Invariants in Topology and Analysis, Regensburg (Germany)
- 2012: NRW Topology Meeting, Bielefeld (Germany)

I have given lecture series at summer schools in Copenhagen (2023), Strasbourg (France, 2019), Utrecht (Netherlands, 2019) and Groesbeek (Netherlands, 2018).

I have given invited talks in topology seminars in Aberdeen (UK, 2021), Bochum (Germany, 2020, 2018, 2016, 2011), Bonn (Germany, 2020, 2016, 2015, 2014), Chicago (USA, 2020, 2016), Copenhagen (Denmark, 2019, 2016), Hamburg (Germany, 2022), Johns Hopkins (USA, 2016, 2014), MIT (USA, 2013), Münster (Germany, 2020, 2018), Regensburg (Germany, 2019, 2016), Rochester (USA, 2016), Sheffield (UK, 2016), Stockholm (Sweden, 2017), Strasbourg (France, 2017, 2012), UIC (USA, 2016), Virginia (USA, 2016, 2014, 2013), Warwick (UK, 2020), Wayne State (USA, 2013), Western Ontario (USA, 2016), and Wuppertal (Germany, 2011).

I have given further talks at the Quantum Mathematics Seminar in Odense (Denmark, 2024), the Mathematics Colloquium at the VU in Amsterdam (Netherlands, 2022), the Mittag-Leffler Institute (Sweden, 2022), the algebraic seminar of Queen Mary (UK, 2022), the program Higher Categories and Categorification at the MSRI (USA, 2020), the Online Algebraic Topology Seminar (UK, 2020), the Electronic Algebraic K-theory Seminar (worldwide, 2020), the SFB lecture in Regensburg (Germany, 2019), the Mathematics Colloquium in Amsterdam (Netherlands, 2018), the Algebra Seminar in Leiden (Netherlands, 2018), the Séminaire Homotopie en Géométrie Algébrique in Toulouse (France, 2018), the Electronic computational homotopy theory seminar (worldwide, 2021, 2017) and the Arbeitsgemeinschaft arithmetische Geometrie Rapoport–Scholze in Bonn (Germany, 2016).

Other activities

- Committee work in Utrecht on reevaluating the double-degree math-physics bachelor program and for quality assurance for the evaluation of bachelor and master theses and exams in the master.
- Reviewer for Zentralblatt and MathSciNet

Paternity leave

- 19 weeks in 2023-2024