

Martin Lüdtke

Curriculum Vitae

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<https://martinluedtke.github.io>



Mathematical Interests

arithmetic geometry, rational points, non-abelian Chabauty, fundamental groups, section conjecture

Academic career

- Aug 2025– present **Minerva Fellow**, University of Oldenburg, in cooperation with Ben-Gurion University
- Feb–Jul 2025 **Postdoctoral Fellow**, Max Planck Institute for Mathematics, Bonn (Germany)
- 2021–2025 **Postdoctoral Researcher**, Rijksuniversiteit Groningen, Groningen (Netherlands)
Research on non-abelian Chabauty in the group of Steffen Müller
- 2020–2021 **Postdoctoral Researcher**, Goethe-Universität, Frankfurt am Main (Germany)
Research on anabelian geometry in the GAUS cluster Darmstadt/Frankfurt/Heidelberg
(Geometry and Arithmetic of Uniformized Structures)
- 2015–2020 **PhD**, Goethe-Universität, Frankfurt am Main (Germany), magna cum laude
Dissertation: *The p -adic section conjecture for localisations of curves*
Advisor: Jakob Stix
Date of defense: 14.12.2020
- 2013–2015 **M.Sc. in Mathematics**, Ruprecht-Karls-Universität, Heidelberg (Germany), 1.0
Thesis: *Birational Anabelian Geometry of Curves over Algebraically Closed Fields*
Advisor: Alexander Schmidt
- 2012–2013 **MASt in Mathematics**, University of Cambridge, Cambridge (UK), honours
Part iii of the mathematical tripos
Part iii essay: *The Grunwald–Wang Theorem*
Advisor: Tom Fisher
- 2009–2012 **B.Sc. in Mathematics**, Ruprecht-Karls-Universität, Heidelberg (Germany), 1.0
Thesis: *p -adic L -functions and Leopoldt's Conjecture*
Advisor: Kay Wingberg
- 2000–2009 **High school**, Uhland-Gymnasium, Tübingen (Germany), 1.3

Publications

- 2025 **Refined Chabauty–Kim computations for the thrice-punctured line over $\mathbb{Z}[1/6]$**
Res. Number Theory **11**, 24 (2025), ANTS XVI proceedings
<https://doi.org/10.1007/s40993-024-00597-4>
- 2024 **Refined Selmer equations for the thrice-punctured line in depth two**
(with A. Best, L. A. Betts, T. Kumpitsch, A. McAndrew, L. Qian, E. Studnia and Y. Xu)
Math. Comp. **93** (2024), 1497–1527
DOI: <https://doi.org/10.1090/mcom/3898>

- 2023 **Linear and quadratic Chabauty for affine hyperbolic curves**
(with J. S. Müller and M. Leonhardt)
Int. Math. Res. Not. IMRN **21** (2023), 18752–18780
DOI: <https://doi.org/10.1093/imrn/rnab185>
- 2020 **The p-adic section conjecture for localisations of curves**
Doctoral thesis at Goethe-Universität Frankfurt supervised by Jakob Stix
URN: urn:nbn:de:hebis:30:3-574318
- 2018 **Birational Anabelian Geometry of Curves over Algebraically Closed Fields in Arbitrary Characteristic**
Isr. J. Math. **227** (2018), 987–1011
DOI: <https://doi.org/10.1007/s11856-018-1757-2>

Preprints

- 2023 **Chabauty–Kim and the Section Conjecture for locally geometric sections**
(with L. A. Betts and T. Kumpitsch), submitted
<https://arxiv.org/abs/2305.09462>
- 2022 **Foundations of the nonabelian method of Chabauty**
(with M. Kim)
Lecture notes for Minhyong Kim's course at the Arizona Winter School 2020
to be published in the AWS proceedings volume

Teaching

- 2024/25 **Lecturer Topics in Algebra and Geometry**, Groningen
- 2023 **Lecturer Group Theory**, Groningen
- 2022/23 **Lecturer Advanced Algebraic Structures**, Groningen, with S. Müller
- 2022 **Lecturer Group Theory**, Groningen, with P. Kılıçer
- 2021/22 **Security and Coding Theory**, Groningen, with P. Kılıçer and S. Müller
- 2021 **Seminar Central Simple Algebras**, Frankfurt, with J. Stix and T. Kumpitsch
- 2019/20 **TA Linear Algebra**, Frankfurt
- 2019 **TA Geometry and Algebra**, Frankfurt
- 2018/19 **TA Linear Algebra**, Frankfurt
- 2018 **TA Elementary Mathematics II**, Frankfurt
- 2018 **TA Foundations of Algebra**, Frankfurt
- 2017 **TA Seminar Proofs from the Book**, Frankfurt, with J. Stix
- 2015–2017 **Lead Coordinator of “Study centre”**, Frankfurt
- 2015 **Tutor Functional Analysis**, Heidelberg
- 2014/15 **Tutor Algebraic Geometry 1**, Heidelberg
- 2014 **Tutor Algebra 2**, Heidelberg
- 2013/14 **Tutor Algebra 1**, Heidelberg
- 2013 **STIMULUS Volunteer**, Long Road Sixth Form College, Cambridge
- 2012 **Tutor Theoretical Computer Science**, Heidelberg
- 2010/11 **Tutor Practical Computer Science**, Heidelberg

Supervised students

2025 **Arif Batiray**

Bachelor project: *The number of roots of a random p -adic polynomial*

2022 **Niek Veltman**

Bachelor project: *Linear Relations for Multiple Zeta Values*

2021 **Leonie Scherer**

Bachelor thesis: *Galoistheorie nach Grothendieck* (2nd examiner)

Refereeing

Essential Number Theory

Indagationes Mathematicae

Expositiones Mathematicae

Talks

Sep 2025 **Arithmetic and Algebraic Geometry Week**, Iași

Abel–Jacobi images in the generalised Jacobian

June 2025 **33ème Journées Arithmétiques**, Luxembourg

Affine Chabauty I

May 2025 **AGNT seminar at Ben Gurion University**, Be'er Scheva (online)

Refined Chabauty–Kim computations for the thrice-punctured line over $\mathbb{Z}[1/6]$

May 2025 **GAUS Seminar**, Heidelberg

Refined Chabauty–Kim computations for the thrice-punctured line over $\mathbb{Z}[1/6]$

Apr 2025 **MPIM, Number Theory Lunch Seminar**, Bonn

Refined Chabauty–Kim for the thrice-punctured line

Feb 2025 **Groningen/Oldenburg workshop on Geometry, Number Theory, Algorithms and Applications in Cryptography**, Groningen

Refined Chabauty–Kim for the thrice-punctured line over $\mathbb{Z}[1/6]$

Jan 2025 **Algebraic Geometry Seminar**, Utrecht

Refined Chabauty–Kim for the thrice-punctured line over $\mathbb{Z}[1/6]$

Oct 2024 **Algebraic and arithmetic geometry seminar, Scuola Normale Superiore**, Pisa

Non-abelian Chabauty and the Selmer Section Conjecture

Oct 2024 **MFO workshop Anabelian Geometry and Representations of Fundamental Groups**, Oberwolfach

Non-abelian Chabauty and the Selmer Section Conjecture

Jul 2024 **Algorithmic Number Theory Symposium (ANTS XVI)**, MIT

Refined Chabauty–Kim computations for the thrice-punctured line over $\mathbb{Z}[1/6]$

Mar 2024 **Algebraic Days of Gabon**, Libreville

Fundamental groups in arithmetic and geometry (5 lectures with exercise sessions)

Feb 2024 **Winter workshop Chabauty–Kim**, Heidelberg

Linear and quadratic Chabauty for affine hyperbolic curves

- Feb 2024 **Winter workshop Chabauty–Kim**, Heidelberg
Foundations of Chabauty–Kim (2 lectures and exercise session)
- Nov 2023 **Rational points consortium meeting**, Utrecht
Rational points and the étale fundamental group
- Jun 2023 **Intercity Number Theory Seminar**, Amsterdam
Chabauty–Kim and the locally geometric section conjecture
- May 2023 **Online seminar on Selmer schemes organised by M. Kim**
Mixed Tate Selmer schemes beyond the polylog quotient
- Jan 2023 **AGNT seminar at Ben Gurion University**, Be'er Scheva (online)
Non-abelian Chabauty for the thrice-punctured line and the Selmer section conjecture
- Nov 2022 **GAUS seminar**, Heidelberg
Non-abelian Chabauty for the thrice-punctured line and the Selmer section conjecture
- Oct 2022 **Junior Algebraic Geometry Seminar**, Leiden
Non-abelian Chabauty for the thrice-punctured line
- Oct 2022 **Groningen/Oldenburg seminar**, Groningen
The motivic Selmer scheme of the thrice-punctured line
- Nov 2021 **DIAMANT Symposium**, Utrecht
Refined Selmer equations for the thrice-punctured line
- Nov 2021 **Ruth Moufang Lecture, introductory talk**, Frankfurt (online)
Algebraic curves
- Jul 2021 **Groningen algebra seminar**, Groningen (online)
Refined Selmer equations for the thrice-punctured line
- Mar 2021 **Oberwolfach workshop Homotopic and Geometric Galois Theory**, Oberwolfach
The p -adic section conjecture for localisations of curves
- Dec 2020 **Online seminar on Selmer schemes organised by M. Kim**
Refined Selmer equations for the thrice-punctured line in depth 2
- Nov 2019 **Pro-Doc seminar**, Frankfurt
Étale fundamental groups and the section conjecture
- Jun 2019 **DaFra seminar**, Darmstadt/Frankfurt
The Coleman–Chabauty method
- May 2019 **Kleine AG Learning Seminar**, Bonn
Serre's Modularity Conjectures
- Nov 2018 **Young Researchers in Algebraic Number Theory**, Sheffield
Anabelian Geometry
- May 2018 **Frankfurt learning seminar**, Frankfurt
Log Geometry and the Kummer-étale site
- 2018 **DaFra seminar**, Darmstadt/Frankfurt
Tamely Ramified Geometric Class Field Theory
- Nov 2017 **HU Berlin Algebra Seminar**, Berlin
Birational Anabelian Reconstruction of Curves

- Nov 2017 **Frankfurt learning seminar**, Frankfurt
Cartan involutions on algebraic groups and Lie algebras
- Nov 2017 **Kleine AG learning seminar**, Heidelberg
Heights on abelian varieties
- Jun 2017 **Banff workshop Nilpotent Fundamental Groups**, Banff
Birational Anabelian Geometry of Curves
- May 2017 **Student symposium on analogies**, Paris
Milnor invariants and higher residue symbols
- Dec 2016 **DaFra seminar**, Darmstadt/Frankfurt
Hodge theory
- Sep 2016 **Heidelberg Laureate Forum**, Heidelberg
Ranks of Elliptic Curves (workshop with A. Wiles)
- May 2016 **DaFra seminar**, Darmstadt/Frankfurt
Unramified cohomology
- Sep 2016 **Student conference of the Deutsche Mathematikervereinigung**, Hamburg
Galois Groups and Fundamental Groups
- Sep 2015 **Kleine AG learning seminar**, Heidelberg
Monads and Generalised Rings
- Jun 2015 **Frankfurt algebra seminar**, Frankfurt
Birational Anabelian Geometry of Curves

Awards and scholarships

- 2025 **2-year Minerva Fellowship**
- 2025 **MPIM postdoc scholarship**
- 2024 **Shortlisted for the RUG Faculty of Science and Engineering postdoc prize**
- 2024 Offered a 2-year Kreitman postdoctoral fellowship at BGU, Be'er Sheva
- Apr–May **Stay at Max Planck Institute for Mathematics**, Bonn
- 2016 Main prize of the student conference of the Deutsche Mathematikervereinigung DMV
- 2010–2015 **Studienstiftung des Deutschen Volkes**, scholarship
- 2006–2009 **Various prizes at competitions for high school students**
e.g. Bundeswettbewerb Mathematik, Bundeswettbewerb Informatik, Abiturpreise Mathematik & Physik, Intel Leibniz Challenge, MPI student contest on self-organization in information processing

Languages

- German**, native
- English**, fluent
- Dutch**, good
- Spanish**, good
- Latin**, good
- French**, basic