

# Curriculum vitae of Oliver Lorscheid

Institute: University of Groningen, the Netherlands, and IMPA, Rio de Janeiro, Brazil

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Born: February 8, 1978 in Cologne

Nationality: German

Family status: Partnership with two kids (born in 2011 and 2013)

## Research Interests

*Algebraic geometry*: moduli spaces; vector bundles; elliptic curves; algebraic groups;

*Combinatorics*: graphs; matroids; buildings; game theory;

*Generalized scheme theory*:  $\mathbb{F}_1$ -geometry; tropical geometry; non-archimedean geometry;

*K-theory*: generalization to  $\mathbb{F}_1$ -geometry; relation to stable homotopy theory and arithmetic;

*Number theory*:  $L$ -series and zeta functions; periods of automorphic forms;

*Representation theory*: Hall algebras; quiver Grassmannians.

## Employment history

2021–now	Professor at the University of Groningen
2019	Sabbatical at the Max Planck Institute for Mathematik (MPIM) in Bonn
2014–now	Professor at IMPA in Rio de Janeiro (tenured since 2018, on leave since 2021)
2012–2014	Postdoc at IMPA in Rio de Janeiro
2010–2011	Postdoc at the City University of New York (CUNY), funded by the Humboldt foundation
2010	Substitute professor at the University of Frankfurt
2010	Postdoc at the Hausdorff Institute for Mathematics (HIM) in Bonn
2009–2012	Postdoc at the University of Wuppertal (suspended in 2010 and 2011)
2008–2009	Postdoc at the MPIM in Bonn
2004–2008	Graduate student and teaching assistant at Utrecht University,
2000–2003	Teaching assistant at the University of Bonn
1997–1998	Civil Service

## Education

2008	PhD in Mathematics at Utrecht University; advisor: Gunther Cornelissen
2004	Master in Mathematics (Diplom) at the University of Bonn; advisor: Florian Pop
2001	Undergraduate degree in Physics (Vordiplom) at the University of Bonn
2000	Undergraduate degree in Mathematics (Vordiplom) at the University of Bonn
1997	High school degree (Abitur) in Cologne

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## Grants

- 2021–2023 Marie Curie Fellowship from the European Union  
2019–2022 Scientist of the State from FAPERJ  
2018 Grants from CAPES, Compositio, ICTP and NSF for the workshop Tropical Geometry and Moduli Spaces in Cabo Frio (joint with Nicaise, Melo and Payne)  
2018–2021 Universal B from CNPq  
2018–2021 Productivity Grant from CNPq  
2016–2019 Emergente from FAPERJ (joint with Cotterill, Hassanzadeh, Heluani, Massarenti, Pacini, Salgado)  
2016–2019 Young Scientist of the State from FAPERJ  
2015 Grants from CNPq, FAPERJ and CAPES for the workshop Rational Points at IMPA (joint with Auer, Salgado, Varilly-Alvarado)  
2015 Grants from CNPq, FAPERJ and CAPES for the workshop Tropical Geometry in the Tropics at IMPA (joint with Cotterill, Dickenstein and Puignau)  
2015–2018 Productivity Grant from CNPq  
2014–2017 Universal A from CNPq  
since 2013 Multiple grants from CAPES, CNPq and FAPERJ for the Colloquium in Geometry and Arithmetic in Rio de Janeiro (joint with Araujo, Esteves, Medeiros and Salgado)

## Fellowships

- 2019 Stipend for one year at the MPI in Bonn  
2018 Stipend for two month at the MPIM/HIM in Bonn  
2014 Stipend for one month at the MPIM in Bonn  
2013 Stipend for two months at the HIM in Bonn  
2012–2014 Excellence Stipend for three years at IMPA in Rio de Janeiro  
2011 Stipend for one month at IMPA in Rio de Janeiro  
2010–2011 Feodor-Lynen Fellowship from the Humboldt Foundation for a postdoc at CUNY in New York  
2010 Stipend for four months at the HIM in Bonn  
2008–2009 Stipend for one year at the MPIM in Bonn

## Honors

- since 2011 Alumni of the Humboldt Foundation

## Editorial activities

- since 2017 Editor of Innovations in Incidence Geometry (editor in chief since 2021)

## Research programs and research visits

- Nov 2019 Visit of Harald Helfgott (Göttingen)
- Oct 2019 Visit of Matthew Baker (Atlanta)
- Oct 2019 Visit of Akian, Amini and Gaubert (Paris)
- May 2019 Visit of Marianne Akian and Stephane Gaubert (Paris)
- May 2019 Visit of Louis Rowen (Tel Aviv)
- Jan 2019 Visit of Omid Amini (Paris)
- Jan–Feb 2018 Program Periods in Number Theory, Algebraic Geometry and Physics (HIM, Bonn)
- Nov 2016 Visit to Matt Baker (Atlanta)
- Jan–Feb 2016 Visit to Jan Schröer (Bonn)
- Jun 2014 Research stay at the MPIM (Bonn)
- Jan 2013 Program Arithmetic and Geometry (HIM, Bonn)
- Jan 2011 Research stay at IMPA (Rio de Janeiro)
- July 2010 Research stay at the MFO with Shabnam Akhtari, funded by a Leibniz fellowship
- Jan–Mar 2010 Program Algebra and Number Theory (HIM, Bonn)
- Jun 2007 Research stay at Paris 11, funded by a Van Gogh fellowship

## Organization of scientific activities

- since 2022 Algebra Seminar Groningen  
(joint with Steffen Müller)
- since 2022 F1 World Seminar (online seminar)  
(joint with Jaiung Jun, Yuri Manin, Matt Szczesny, Koen Thas and Matt Young)
- 2020-2021 LAGARTOS (online seminar)  
(joint with Dickenstein, Cotterill, Pacini, Rau, Aroca and Garay López)
- 2019 A Tropical Day at the MPIM (Bonn)  
(joint with Cecília Salgado)
- 2018 Tropical Geometry and Moduli Spaces (Cabo Frio)  
Satellite conference of the ICM 2018 in Rio de Janeiro  
(joint with Johannes Nicaise, Margarida Melo and Sam Payne)
- 2017 Algebraic Geometry Session of the Brazilian Colloquium (Rio de Janeiro)  
(joint with Marco Pacini and Cecília Salgado)
- 2017 Workshop on Quiver Grassmannians (Wuppertal)  
(joint with Markus Reineke and Thorsten Weist)
- 2016 Number Theory Session at the Brazilian Algebra School (Diamantina)  
(joint with André Bueno and Hemar Godinho)
- 2015 Study group on tropical moduli spaces (Rio de Janeiro)  
(joint with Ethan Cotterill and Marco Pacini)
- 2015 Workshop Rational Points (Rio de Janeiro)  
(joint with Asher Auel, Cecília Salgado and Antony Várilly-Alvarado)
- 2015 Workshop Tropical Geometry in the Tropics (Rio de Janeiro)  
(joint with Yuri Manin, Matt Szczesny, Koen Thas and Matt Young, Ethan Cotterill, Alicia Dickenstein and Nicolas Puignau)
- since 2014 Algebra Seminar of IMPA (Rio de Janeiro)  
(ongoing weekly seminar, joint with C. Araújo, E. Esteves and R. Heluani)

- since 2012 Colóquio de Geometria e Aritmética (Rio de Janeiro)  
(ongoing monthly seminar, joint with C. Araújo, E. Esteves, N. Medeiros and C. Salgado)
- 2010 Mini talks at CUNY (New York)
- 2007 Kleine Arbeitsgemeinschaft “Simultaneous resolution of singularities” (Bonn),  
(joint with Christian Liedtke)

## Conferences and Seminars

- 2023 Algebraic Aspects of Matroid Theory (Banff)
- 2022 Göran Gustafsson Symposium (Mittag-Leffler)
- 2021 Collaborate@ICERM (online)
- 2020–2021 —most workshops are cancelled due to the pandemic—
- 2019 Weihnachtsworkshop on Geometry and Number Theory (Karlsruhe)  
F1-Geometry and Motives (Augsburg)  
Riemann-Roch in Characteristic One and Related Topics (Baltimore)  
Toric Geometry (Oberwolfach)  
Network Games, Tropical Geometry, and Quantum Communication (Berlin)
- 2018 Problem Solving in Group Theory (Florence)  
Geometry in Algebra and Algebra in Geometry 4 (São Paulo)  
Tropical Geometry and Moduli Spaces (Cabo Frio)  
Periods and Regulators (HIM Bonn)
- 2017 Geometry at the Frontier II (Pucón)  
Arithmetic of Function Fields (Münster)  
Foundation of tropical schemes (San Jose)  
Quiver Grassmannians and their applications (Wuppertal)  
Commutative Algebra and Algebraic Geometry (Rio de Janeiro)
- 2016 Algebraic, Tropical, and Nonarchimedean Analytic Geometry of Moduli Spaces (Oaxaca)  
Brazilian Algebra School (Diamantina)
- 2015 30 Colóquio Brasileiro de Matemática (IMPA)  
International Conference in Number Theory and Physics (IMPA)  
II ELGA - Latin American School of Algebraic Geometry (Cabo Frio)  
Rational Points (IMPA)  
Workshop on Higher Dimensional Algebraic Geometry (IMPA)  
Tropical Geometry in the Tropics (IMPA)  
Moduli Spaces and Enumerative Geometry (IMPA)
- 2014 Non-commutative Geometry and Number Theory (HIM)  
Algebraic Foundations of Tropical Geometry (YALE)
- 2013 Álgebra Comutativa e Geometria Algébrica (Teresopolis)
- 2012 Jornadas de Geometria Algébrica (Niteroi)  
Álgebra Comutativa e Geometria Algébrica (Rio de Janeiro)  
6th European Congress of Mathematics (Kraków)  
Witt Vectors in Arithmetic, Geometry, and Topology (Albuquerque)  
Noncommutative Geometry: Multiple Connections (Columbus)  
Incidence Geometry and Buildings (Ghent)
- 2011 Lie Algebras, Algebraic Transformation Groups and Representation Theory (Las Vegas)  
Noncommutative Geometry and Arithmetic (Baltimore)

	Arithmetic of Modular Forms and Elliptic Curves (Rio de Janeiro)
2010	Noncommutative Geometry and Applications to Number Theory (Columbus)
	Arithmetic Aspects of Elliptic Surfaces (Bonn)
2009	Focused Workshop on $\mathbb{F}_1$ -geometry (Granada)
	Frobenius Lifts (Leiden)
	Analytic Theory of Automorphic Forms (Woudschoten)
	Mathematische Arbeitstagung (Bonn)
	Noncommutative Geometry and Operator Algebras (Nashville)
2008	Rapoport's 60th birthday conference (Bonn)
	Summer School on p-adic Cohomology (Mainz)
	Summer School on Affine Buildings (Münster)
2007	Arithmetically Defined Hyperbolic Manifolds (Oberwolfach)
	Galois Theory and Explicit Methods (Leiden)
	Classical and Modular Approaches to Exponential Diophantine Equations (Bonn)
2006	Rings of Low Rank (Leiden)
	Abelian Varieties (Amsterdam)
	Spring school on Abelian Varieties (Utrecht)
	20th Annual Workshop on Automorphic Forms and Related Topics (Boulder)
2005	Arithmetic Geometry and Automorphic Forms (Tianjin)
	Summer school on Arithmetic Geometry and Automorphic Forms (Beijing)
	Géométrie Algébrique en Liberté XIII (Luminy)
	Yuri Manin's Emeritierung Conference (Bonn)
2004	Automorphisms of Curves (Leiden)
	Spring school on Lie Groups in Analysis, Geometry and Mechanics (Utrecht)

## Research talks <sup>1</sup>

2023	Dutch Mathematical Congress (Utrecht)	[1.6]
	Algebraic Aspects of Matroid Theory (Banff)	[1.6]
2022	Göran Gustafsson Symposium (Mittag-Leffler)	[1.6]
	Algebra Seminar (Groningen)	[1.6]
2021	Floris Taken Seminar (Groningen)	[1.5]
	Sheffield Colloquium	[1.6]
	USP Algebra Seminar (São Paulo)	[3.1]
	Groningen	[1.5]
2020	The Matroid Union	[1.6]
	LAGARTOS (Latin American Real and Tropical Geometry Seminar)	[1.5]
	BRAG (Brazilian Algebraic Geometry Seminar)	[1.6]
	Tropical Geometry in Frankfurt (Frankfurt)	[1.5]
2019	Weihnachtsworkshop on Geometry and Number Theory (Karlsruhe)	[1.5]
	Colloquium (Bern)	[1.6]
	Group Theory Seminar (Göttingen)	[1.2]

<sup>1</sup>The numbers in the right column indicate the topic of the talk: 1.1 Blueprints. 1.2 Algebraic groups over  $\mathbb{F}_1$ . 1.3  $K$ -theory of  $\mathbb{F}_1$ -schemes. 1.4 Comparison of  $\mathbb{F}_1$ -theories. 1.5 Tropical scheme theory. 1.6 Geometric matroid theory. 2.1 Toroidal automorphic forms. 2.2 Non-vanishing  $L$ -series in quadratic twists. 2.3 Graphs of Hecke operators. 3.1 Quiver Grassmannians. 4.1 Completeness and compactness of varieties over a local field. 5.1 Descartes, Newton and hyperfields.

	F1-geometry and Motives (Augsburg)	[1.5]
	Séminaire de Géométrie (École Polytechnique, Paris)	[5.1]
	Riemann Roch in Characteristic One (Baltimore)	[1.5]
	Algebra Seminar (Atlanta)	[1.6]
	Toric Geometry (Oberwolfach)	[1.1]
	Seminar Tropical Geometry (Leipzig)	[1.5]
	Seminar in Real & Complex Geometry (Tel Aviv)	[1.5]
	Algebra Seminar (Bar Ilan)	[1.6]
	Colloquium (Tübingen)	[1.6]
	Number Theory Lunch Seminar (MPI Bonn)	[5.1]
	Séminaire de Géométrie Énumérative (Paris 6)	[1.5]
	Séminaire de Géométrie (École Polytechnique, Paris)	[1.6]
	Learning seminar (École Polytechnique, Paris)	[1.1]
2018	Model theory working group (Düsseldorf)	[5.1]
	Seminar of Algebra and Number Theory (Saarbrücken)	[1.5]
	Oberseminar Algebra und Geometrie (Münster)	[3.1]
	Number Theory Lunch Seminar (MPI Bonn)	[2.3]
	Colloquium (Regensburg)	[1.5]
2017	BIREP Seminar (Bielefeld)	[3.1]
	Arithmetic of Function Fields (Münster)	[2.3]
	Foundations of tropical schemes (AIM workshop, San Jose)	[1.5]
	Commutative Algebra and Algebraic Geometry (IMPA)	[1.6]
2016	Algebra Seminar (Atlanta)	[1.5]
	Algebra and Geometry Seminar (Roma 1)	[3.1]
	Algebraic Geometry Seminar (Warwick)	[1.5]
	SFB-Seminar (Regensburg)	[1.5]
	Oberseminar Algebra (Wuppertal)	[3.1]
2015	30 Colóquio Brasileiro de Matemática (IMPA)	[1.5]
2014	Noncommutative Geometry and Number Theorie (HIM)	[1.5]
	Oberseminar Algebra und Zahlentheorie (Wuppertal)	[3.1]
	Seminar Algebraic Geometry (Utrecht)	[1.5]
2013	Álgebra Comutativa e Geometria Algébrica (Teresopolis)	[1.4]
	Köln-Bonn Algebra Seminar (Cologne)	[2.3]
	Seminar in Representation Theory (Bonn)	[3.1]
	Colloquium of the Hausdorff Institute (Bonn)	[1.1]
2012	Seminar on Mathematics and String Theory at IPMU (Tokyo)	[1.2]
	Geometry Seminar of UNICAMP (Campinas)	[3.1]
	Algebra Seminar of UFRJ (Rio de Janeiro)	[3.1]
	Jornadas de Geometria Algébrica (Niteroi)	[1.1]
	6th European Congress of Mathematics (Kraków)	[1.1]
	Witt Vectors in Arithmetic, Geometry and Topology (Albuquerque)	[1.1]
	Noncommutative Geometry: Multiple Connections (Columbus)	[1.2]
	Algebra seminar of IMPA (Rio de Janeiro)	[1.1]
	Seminar on Algebra, Geometry and Physics MPIM (Bonn)	[1.1]
	Algebra and Number Theory Seminar (Utrecht)	[1.1]
	Incidence Geometry and Buildings (Ghent)	[1.2]
2011	Algebra Seminar of IMPA (Rio de Janeiro)	[2.3]

	Lie Algebras, Transformation Groups and Representation Theory (Las Vegas)	[1.2]
	Algebra Seminar of UPenn (Philadelphia)	[1.1]
	Noncommutative Geometry and Arithmetic (Baltimore)	[1.3]
	CUNY Impromptu Seminar (New York)	[1.1]
	Arithmetic of Modular Forms and Elliptic Curves (Rio de Janeiro)	[2.1]
2010	BU Geometry seminar (Boston)	[1.3]
	Collaborative Number Theory Seminar (New York)	[2.2]
	Algebra seminar of IMPA (Rio de Janeiro)	[1.2]
	Noncommutative Geometry and Arithmetics (Columbus)	[1.3]
	Algebraic Geometry and Number Theory Seminar (Baltimore)	[1.2]
	Intercity seminar (Utrecht)	[1.2]
	Colloquium of HIM (Bonn)	[2.3]
2009	Focused Workshop on $\mathbb{F}_1$ -geometry (Granada)	[1.4]
	Intercity Number Theory Seminar (Nijmegen)	[2.2]
	Mathematische Arbeitstagung (Bonn)	[1.2]
	Seminar on Algebra, Geometry and Physics MPIM (Bonn)	[1.2]
	Noncommutative Geometry and Operator Algebra (Nashville)	[1.4]
	Oberseminar MPIM (Bonn)	[2.1]
	Graduiertenkolleg (Wuppertal)	[1.4]
	Joint Seminar K.U.Leuven-UGent (Gent)	[2.1]
2008	Graduiertenkolleg (Göttingen)	[2.3]
	Geometry Seminar (Leiden)	[2.3]
	Mathematical Colloquium (Utrecht)	[2.1]
	Séminaire Groupes Réductifs et Formes Automorphes (Paris)	[2.1]
2007	Number Theory Lunch Seminar MPIM (Bonn)	[2.1]
2006	Intercity Number Theory Seminar (Utrecht)	[2.1]
	Lecture series (10 lectures) on my PhD project (Utrecht)	[2.1, 2.3]
2005	Intercity Number Theory Seminar (Nijmegen)	[4.1]
2004	Algebra and Number Theory Seminar (Utrecht)	[4.1]

## Mini courses

2023	Generalized schemes (Groningen)
2016	Scheme theoretic tropicalization (Rome)
2016	Scheme theoretic tropicalization (Bonn)
2015	Introduction to tropical geometry (IMPA)
2014	On the geometry of blueprints and applications to tropical schemes (YALE)
2014	Lectures on $\mathbb{F}_1$ (IMPA)

## Languages

German (mother tongue)  
 English (fluent)  
 Dutch (good)  
 Portuguese (good)  
 French (basic reading skills)

## Postdocs and students

### Postdocs

since 2022 Eduardo dos Santos Silva

### PhD

since 2023 Alejandro Martinez Mendez  
since 2020 Manoel Zanoelo Jarra  
since 2020 Tianyi Zhang (co-supervised with Matthew Baker)  
since 2016 Emílio Peixoto Assemany  
2016–2020 Valdir José Pereira Júnior  
2014–2018 Roberto Alvarengo Jr.

### Master

since 2022 Ruben Mud  
2021–2022 Robert Modderman  
2017–2018 Mitul Verma  
2017–2018 Luis Henrique Nasi Ravettino  
2016–2017 Eduardo dos Santos Silva  
2016–2017 João Paulo Lindquist Figueredo  
2016–2017 Esteban Jose Arreaga Ambeliz  
2015–2016 Valdir José Pereira Júnior

## Teaching

2022 Complex Analysis  
Riemann Surfaces  
Algebraic Topology  
First Year Projects  
Bachelor Workgroup  
2021 Complex Analysis  
Algebraic Geometry  
First Year Projects  
Bachelor Workgroup  
2020 Algebra 1  
Algebra 2  
Seminar on  $\mathbb{F}_1$ -geometry  
2018 Blueprints and Tropical Scheme Theory  
Algebra 2  
2017 Algebraic Number Theory  
Commutative Algebra  
Seminar on Geometric Invariant Theory  
Seminar on Tropical Scheme Theory  
2016 Tropical Geometry and Berkovich Spaces  
Algebra 1  
Seminar on the Langland's Programme



2015	Seminar on Elliptic Curves Algebra 2 Algebraic Number Theory Seminar on Topos Theory Seminar on Class Field Theory Seminar on Toric Varieties Seminar on Moduli Spaces of Tropical Curves
2014	Algebra 2 Seminar on Classical Topics in Algebraic Geometry Seminar on Moduli Spaces of Vector Bundles
2013	Algebraic Geometry 1 Seminar on Arakelov Geometry
2010	Calculus (Frankfurt) Linear Algebra (Frankfurt) Seminar on Ramanujan Graphs (HIM)
2009	Seminar on Tilting Theory (Wuppertal)
2005	Seminar on Class Field Theory (Utrecht)

All courses in the period 2013–2020 took place at IMPA. All courses from 2021 on took place in Groningen. Before I started lecturing, I have organized and taught exercise classes for more than eight years.

## Publications

- [1] Oliver Lorscheid. Completeness and compactness for varieties over a local field. *Arch. Math. (Basel)*, 88(4):344–348, 2007.
- [2] Gunther Cornelissen, Oliver Lorscheid, and Matilde Marcolli. On the  $K$ -theory of graph  $C^*$ -algebras. *Acta Appl. Math.*, 102(1):57–69, 2008.
- [3] Gunther Cornelissen and Oliver Lorscheid. Toroidal automorphic forms for some function fields. *J. Number Theory*, 129(6):1456–1463, 2009.
- [4] Oliver Lorscheid. Functional equations for zeta functions of  $\mathbb{F}_1$ -schemes. *C. R. Math. Acad. Sci. Paris*, 348(21-22):1143–1146, 2010.
- [5] Javier López Peña and Oliver Lorscheid. Torified varieties and their geometries over  $\mathbb{F}_1$ . *Math. Z.*, 267(3-4):605–643, 2011.
- [6] Javier López Peña and Oliver Lorscheid. Mapping  $\mathbb{F}_1$ -land: an overview of geometries over the field with one element. In *Noncommutative geometry, arithmetic, and related topics*, pages 241–265. Johns Hopkins Univ. Press, Baltimore, MD, 2011.
- [7] Chenghao Chu, Oliver Lorscheid, and Rekha Santhanam. Sheaves and  $K$ -theory for  $\mathbb{F}_1$ -schemes. *Adv. Math.*, 229(4):2239–2286, 2012.
- [8] Oliver Lorscheid. The geometry of blueprints: Part I: Algebraic background and scheme theory. *Adv. Math.*, 229(3):1804–1846, 2012.

- [9] Javier López Peña and Oliver Lorscheid. Projective geometry for blueprints. *C. R. Math. Acad. Sci. Paris*, 350(9-10):455–458, 2012.
- [10] Gunther Cornelissen and Oliver Lorscheid. Toroidal automorphic forms, Waldspurger periods and double Dirichlet series. In *Multiple Dirichlet series, L-functions and automorphic forms*, volume 300 of *Progr. Math.*, pages 131–146. Birkhäuser/Springer, New York, 2012.
- [11] Oliver Lorscheid. Algebraic groups over the field with one element. *Math. Z.*, 271(1-2):117–138, 2012.
- [12] Oliver Lorscheid. Automorphic forms for elliptic function fields. *Math. Z.*, 272(3-4):885–911, 2012.
- [13] Oliver Lorscheid. Graphs of Hecke operators. *Algebra Number Theory*, 7(1):19–61, 2013.
- [14] Oliver Lorscheid. Toroidal automorphic forms for function fields. *Israel J. Math.*, 194(2):555–596, 2013.
- [15] Oliver Lorscheid. Blueprints—towards absolute arithmetic? *J. Number Theory*, 144:408–421, 2014.
- [16] Oliver Lorscheid. On Schubert decompositions of quiver Grassmannians. *J. Geom. Phys.*, 76:169–191, 2014.
- [17] Oliver Lorscheid. Schubert decompositions for quiver Grassmannians of tree modules. *Algebra Number Theory*, 9(6):1337–1362, 2015. With an appendix by Thorsten Weist.
- [18] Oliver Lorscheid and Cecília Salgado. A remark on topologies for rational point sets. *J. Number Theory*, 159:193–201, 2016.
- [19] Oliver Lorscheid. A blueprinted view on  $\mathbb{F}_1$ -geometry. In *Absolute arithmetic and  $\mathbb{F}_1$ -geometry (edited by Koen Thas)*. European Mathematical Society Publishing House, 2016.
- [20] Oliver Lorscheid. Blue schemes, semiring schemes, and relative schemes after Toën and Vaquié. *J. Algebra*, 482:264–302, 2017.
- [21] Jaret Flores, Oliver Lorscheid, and Matt Szczesny. Čech cohomology over  $\mathbb{F}_{1^2}$ . *J. Algebra*, 485:269–287, 2017.
- [22] Jeffrey Giansiracusa, Jaiung Jun, and Oliver Lorscheid. On the relation between hyperrings and fuzzy rings. *Beitr. Algebra Geom.*, 58(4):735–764, 2017.
- [23] Oliver Lorscheid.  $\mathbb{F}_1$  for everyone. *Jahresber. Dtsch. Math.-Ver.*, 120(2):83–116, 2018.
- [24] Oliver Lorscheid. The geometry of blueprints: Part II: Tits-Weyl models of algebraic groups. *Forum Math. Sigma*, 6:Paper No. e20, 90, 2018.
- [25] Oliver Lorscheid and Matt Szczesny. Quasicoherent sheaves on projective schemes over  $\mathbb{F}_1$ . *J. Pure Appl. Algebra*, 222(6):1337–1354, 2018.

- [26] Oliver Lorscheid and Thorsten Weist. Plücker relations for quiver Grassmannians. *newblock Algebr. Represent. Theory*, 22(1):211–218, 2019.
- [27] Oliver Lorscheid and Thorsten Weist. Representation type via Euler characteristics and singularities of quiver Grassmannians. *Bull. Lond. Math. Soc.*, 51(5):815–835, 2019.
- [28] Oliver Lorscheid and Thorsten Weist. Quiver Grassmannians of extended Dynkin type  $D$ : Part 1: Schubert systems and decompositions into affine spaces. *Mem. Amer. Math. Soc.*, 261(1258):v+78, 2019.
- [29] Matthew Baker and Oliver Lorscheid. Descartes’ rule of signs, Newton polygons, and polynomials over hyperfields. *J. Algebra*, 569:416–441, 2021.
- [30] Matthew Baker and Oliver Lorscheid. The moduli space of matroids. *Adv. Math.*, 390:Paper No. 107883, 118, 2021.
- [31] Alexander Agudelo and Oliver Lorscheid. Factorizations of tropical and sign polynomials. *Indag. Math. (N.S.)*, 32(4):797–812, 2021.
- [32] Oliver Lorscheid. Tropical geometry over the tropical hyperfield. *Rocky Mountain J. Math.*, 52(1):189–222, 2022.
- [33] Jens Niklas Eberhardt, Oliver Lorscheid, and Matthew B. Young. Algebraic  $K$ -theory and Grothendieck-Witt theory of monoid schemes. *Math. Z.*, 301(2):1407–1445, 2022.
- [34] Jens Niklas Eberhardt, Oliver Lorscheid, and Matthew B. Young. Group completion in the  $K$ -theory and Grothendieck-Witt theory of proto-exact categories. *J. Pure Appl. Algebra*, 226(8):Paper No. 107018, 32, 2022.

## Preprints

- [35] Oliver Lorscheid. A unifying approach to tropicalization. To appear in *Trans. Amer. Math. Soc.*, [arXiv:1508.07949](https://arxiv.org/abs/1508.07949), 2015.
- [36] Matthew Baker and Oliver Lorscheid. Foundations of matroids I: Matroids without large uniform minors. To appear in *Memoirs Amer. Math. Soc.*, [arXiv:2008.00014](https://arxiv.org/abs/2008.00014), 2020.
- [37] Oliver Lorscheid and Thorsten Weist. Quiver Grassmannians of extended Dynkin type  $D$ . Part 2: Schubert decompositions and  $F$ -polynomials. To appear in *Algebras and Representation Theory*, [arXiv:1507.00395](https://arxiv.org/abs/1507.00395), 2021.
- [38] Emilio Assemany and Oliver Lorscheid. Higher balancing for locally tropically convex tropical varieties. To appear in *Manuscripta Mathematica*, [arXiv:1903.07640](https://arxiv.org/abs/1903.07640), 2019.
- [39] Matthew Baker and Oliver Lorscheid. Lift theorems for representations of matroids over pastures. Preprint, [arXiv:2107.00981](https://arxiv.org/abs/2107.00981), 2021.

- [40] Roberto Alvarenga, Oliver Lorscheid, and Valdir Pereira Júnior. Automorphic forms for  $\mathrm{PGL}(3)$  over elliptic function fields. Part 1: Graphs of Hecke operators. Preprint, [arXiv:2107.08375](https://arxiv.org/abs/2107.08375), 2021.
- [41] Manoel Jarra and Oliver Lorscheid. Flag matroids with coefficients. Preprint, [arXiv:2204.04658](https://arxiv.org/abs/2204.04658), 2022.

### **Thesis, lecture notes, appendices**

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