

Curriculum vitae of Oliver Lorscheid

Institute: Instituto Nacional de Matemática Pura e Aplicada (IMPA)

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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 of 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: connections of \mathbb{F}_1 -geometry 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

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| 2019 | Sabbatical at the Max Planck Institute for Mathematik (MPIM) in Bonn |
| 2014–now | Professor at IMPA in Rio de Janeiro (tenured since 2018) |
| 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

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| 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 |

Last updated: December 9, 2020

Grants¹

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| 2019–2022 | Scientist of the State from FAPERJ | <i>28k</i> |
| 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) | <i>45k</i> |
| 2018–2021 | Universal B from CNPq | <i>12k</i> |
| 2018–2021 | Productivity Grant from CNPq | <i>12k</i> |
| 2016–2019 | Emergente from FAPERJ (joint with Cotterill, Hassanzadeh, Heluani, Massarenti, Pacini, Salgado) | <i>80k</i> |
| 2016–2019 | Young Scientist of the State from FAPERJ | <i>20k</i> |
| 2015 | Grants from CNPq, FAPERJ and CAPES for the workshop Rational Points at IMPA (joint with Auer, Salgado, Varilly-Alvarado) | <i>15k</i> |
| 2015 | Grants from CNPq, FAPERJ and CAPES for the workshop Tropical Geometry in the Tropics at IMPA (joint with Cotterill, Dickenstein and Puignau) | <i>15k</i> |
| 2015–2018 | Productivity Grant from CNPq | <i>12k</i> |
| 2014–2017 | Universal A from CNPq | <i>7k</i> |
| 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) | <i>15k</i> |

Stipends

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| 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 Stipend 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

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| since 2011 | Alumni of the Humboldt Foundation |
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Editorial activities

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| since 2017 | Editor of Innovations in Incidence Geometry |
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¹The grant values are converted into Euro: 1k corresponds to 1000 Euro.

Research programs and research visits

- Nov 2019 Visit of Harald Helfgott (Göttingen) (upcoming)
- 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

- 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 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

- 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)

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| 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 ²

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|------|--|-------|
| 2020 | 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] |
| | 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] |

²The 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 Matroid bundles. 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

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| 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] |

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| | 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

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|------|---|
| 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)

Students

PhD

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|------------|----------------------------|
| since 2020 | Manoel Zanoelo Jarra |
| since 2017 | Alexander Argudelo Velez |
| since 2016 | Valdir José Pereira Júnior |
| since 2015 | Emílio Peixoto Assemany |
| 2014–2018 | Roberto Alvarengo Jr. |

Master

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| 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

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| 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 Seminar on Elliptic Curves |
| 2015 | 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 from 2013 on took place at IMPA. Before I started lecturing, I have organized and taught exercise classes for more than eight years.

Publications

- [1] *Completeness and compactness for varieties over a local field*. Arch. Math. 88 (4), 344–348, 2007.
- [2] *On the K -theory of graph C^* -algebras* (with Gunther Cornelissen and Matilde Marcolli). Acta Appl. Math. 102 (1), 57–69, 2008.
- [3] *Toroidal automorphic forms for some function fields* (with Gunther Cornelissen). J. Number Theory 129 (6), 1456–1463, 2009.
- [4] *Functional equations for zeta functions of \mathbb{F}_1 -schemes*. C. R. Acad. Sci. Paris, Ser. I 348, 1143–1146, 2010.
- [5] *Torified varieties and their geometries over \mathbb{F}_1* (with Javier López Peña). Math. Z. 267, no. 3-4, 605–643, 2011.
- [6] *Mapping \mathbb{F}_1 -land: An overview of geometries over the field with one element* (with Javier López Peña). Noncommutative geometry, arithmetic, and related topics, 241–265, Johns Hopkins Univ. Press, Baltimore, MD, 2011.
- [7] *Algebraic groups over the field with one element*. Math. Z. 271, no. 1-2, 117–138, 2012.
- [8] *Toroidal automorphic forms, Waldspurger periods and double Dirichlet series* (with Gunther Cornelissen). Multiple Dirichlet series, L-functions and automorphic forms, 131–146, Progr. Math., 300, Birkhäuser/Springer, New York, 2012.
- [9] *The geometry of blueprints. Part I*. Adv. Math. 229, no. 3, 1804–1846, 2012.
- [10] *Sheaves and K -theory for \mathbb{F}_1 -schemes* (with Chenghao Chu and Rekha Santhanam). Adv. Math. 229, no. 4, 2239–2286, 2012.
- [11] *Automorphic forms for elliptic function fields*. Math. Z. 272, no. 3-4, 885–911, 2012.
- [12] *Projective Geometry for blueprints* (with Javier López Peña). C. R. Math. Acad. Sci. Paris 350, no. 9-10, 455–458, 2012.
- [13] *Graphs of Hecke operators*. Algebra Number Theory 7, no. 1, 19–61, 2013.
- [14] *Toroidal automorphic forms for function fields*. Israel J. Math. 194, no. 2, 555–596, 2013.
- [15] *On Schubert decompositions of quiver Grassmannians*. J. Geom. Phys. 76, 169–191, 2014.
- [16] *Blueprints—towards absolute arithmetic?* J. Number Theory 144, 408–421, 2014.
- [17] *Schubert decompositions of quiver Grassmannians for tree modules*. Algebra Number Theory 9(6), 1337–1362, 2015.
- [18] *A remark on adelic topologies* (with Cecília Salgado). J. Number Theory 159, 193–201, 2016.

- [19] *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] *Blue schemes, semiring schemes and relative schemes after Toen and Vaquié*. J. Algebra 482:264–302, 2017.
- [21] *Cech cohomology over \mathbb{F}_{1^2}* (with Jaret Flores and Matt Szczesny). J. Algebra 485:269–287, 2017.
- [22] *On the relation between hyperrings and fuzzy rings* (with Jeffrey Giansiracusa and Jaiung Jun). Beitr. Algebra Geom. 58(4):735–764, 2017.
- [23] *Quasicoherent sheaves on projective schemes over \mathbb{F}_1* (with Matt Szczesny). J. Pure Appl. Algebra 222(6):1337–1354, 2018.
- [24] \mathbb{F}_1 for everyone. Jahresber. Dtsch. Math.-Ver. 120(2), 83-116, 2018.
- [25] *The geometry of blueprints. Part II*. Forum Math. Sigma 6, e20, 90pp., 2018.
- [26] *Plücker relations for quiver Grassmannians* (with Thorsten Weist). Algebr. Represent. Theory 22(1):211–218, 2019.
- [27] *Quiver Grassmannians of type \tilde{D}_n , Part 1: Schubert systems and decompositions into affine spaces* (with Thorsten Weist). Mem. Amer. Math. Soc. 261(1258), v+78pp., 2019.
- [28] *Representation type via Euler characteristics and singularities of quiver Grassmannians* (with Thorsten Weist). Bull. Lond. Math. Soc. 51(5):815–835, 2019.

Preprints

- [29] *Newton polygons, Descartes’ rule of signs, and polynomials over hyperfields* (with Matthew Baker). Preprint, [arXiv:1811.04966](https://arxiv.org/abs/1811.04966), 16pp, to appear in J. Algebra.
- [30] *Quiver Grassmannians of type \tilde{D}_n , Part 2: Schubert decompositions and F -polynomials* (with Thorsten Weist). Preprint, [arXiv:1507.00395](https://arxiv.org/abs/1507.00395), 53pp.
- [31] *Scheme theoretic tropicalization*. Preprint, [arXiv:1508.07949](https://arxiv.org/abs/1508.07949), 66pp.
- [32] *Moduli spaces of matroids* (with Matthew Baker). Preprint, [arXiv:1809.03542](https://arxiv.org/abs/1809.03542), 83pp.
- [33] *Higher balancing for locally convex tropical varieties* (with Emilio Peixoto). Preprint, [arXiv:1903.07640](https://arxiv.org/abs/1903.07640), 7pp.
- [34] *Tropical geometry over the tropical hyperfield*. Preprint, [arXiv:1907.01037](https://arxiv.org/abs/1907.01037), 32pp.
- [35] *Factorizations of tropical and sign polynomials* (with Alexander Agudelo). Preprint, [arXiv:2005.12882](https://arxiv.org/abs/2005.12882), 14pp.
- [36] *Foundations of matroids without large uniform minors* (with Matthew Baker). Preprint, [arXiv:2008.00014](https://arxiv.org/abs/2008.00014), 78pp.

- [37] *Group completion in the K-theory and Grothendieck-Witt theory of proto-exact categories* (with Jens Niklas Eberhardt and Matthew B. Young). Preprint, [arXiv:2009.12635](https://arxiv.org/abs/2009.12635), 27pp.
- [38] *Algebraic K-theory and Grothendieck-Witt theory of monoid schemes* (with Jens Niklas Eberhardt and Matthew B. Young). Preprint, [arXiv:2009.12636](https://arxiv.org/abs/2009.12636), 37pp.

Thesis, lecture notes, appendices

- [39] *Toroidal automorphic forms for function fields*. Thesis at the University of Utrecht, ISBN: 978-90-393-4825-3, 2008. Online available at <http://igitur-archive.library.uu.nl>.
- [40] *Algebraic groups over the field with one element*. Resumé in the conference proceedings of the Mathematische Arbeitstagung 2009.
- [41] *Blueprints and tropical scheme theory*. Lecture notes accompanying a course at IMPA in March–June 2018. Online available at <http://oliver.impa.br/2018-Blueprints/lecturenotes.html>.
- [42] *Galois theory*. Lecture notes accompanying a course at IMPA in August–November 2018. Online available at <http://oliver.impa.br/galoistheory.pdf>.
- [43] *Algebra I*. Lecture notes accompanying a course at IMPA in March–June 2020. Online available at <http://oliver.impa.br/algebra1.pdf>.
- [44] Appendix to *Matroids over partial hyperstructures* by Matthew Baker and Nathan Bowler. *Adv. Math.* 343:821–863, 2019.