

Marc Hoyois

CONTACT INFORMATION	Prof. Dr. Marc Hoyois Fakultät für Mathematik Universität Regensburg 93040 Regensburg, Germany	marc.hoyois@ur.de https://hoyois.app.uni-regensburg.de
PERSONAL DETAILS	Date of birth: March 26, 1987 Citizenship: Switzerland, Germany	
RESEARCH INTERESTS	Algebraic geometry, motivic homotopy theory, motivic cohomology Homotopy theory, higher category theory, algebraic K-theory	
EMPLOYMENT	<i>Professor</i> Universität Regensburg, Germany	October 2019–present
	<i>Assistant Professor</i> University of Southern California, Los Angeles, CA, USA	August 2017–July 2019
	<i>C.L.E. Moore Instructor</i> Massachusetts Institute of Technology, Cambridge, MA, USA	September 2014–June 2017
	<i>Visiting researcher</i> Universität Duisburg–Essen, Germany	April–July 2014
EDUCATION	<i>Doctor of Philosophy in Mathematics</i> Northwestern University, Evanston, IL, USA Advisor: Paul Goerss	March 2014
	<i>Master of Science in Mathematics</i> École Polytechnique Fédérale de Lausanne, Switzerland Advisor: Kathryn Hess Bellwald	February 2009
	<i>Bachelor of Science in Mathematics</i> École Polytechnique Fédérale de Lausanne, Switzerland	July 2007
PUBLICATIONS AND PREPRINTS	<ul style="list-style-type: none">Annala T., Hoyois M., Iwasa R., <i>Algebraic cobordism and a Conner–Floyd isomorphism for algebraic K-theory</i>, preprint, 32 pages, 2023, arXiv:2303.02051Hoyois M., Opdan N., <i>Introduction to framed correspondences</i>, to appear in Open Book Series, 20 pages, 2022, arXiv:2207.02276Hoyois M., Jelisiejew J., Nardin D., Yakerson M., <i>Hermitian K-theory via oriented Gorenstein algebras</i>, J. reine angew. Math. 793 (2022), arXiv:2103.15474Elmanto E., Hoyois M., Iwasa R., Kelly S., <i>Milnor excision for motivic spectra</i>, J. reine angew. Math. 772 (2021), pp. 223–235, arXiv:2004.12098Hoyois M., Jelisiejew J., Nardin D., Totaro B., Yakerson M., <i>The Hilbert scheme of infinite affine space and algebraic K-theory</i>, to appear in J. Eur. Math. Soc., 27 pages, 2021, arXiv:2002.11439Elmanto E., Hoyois M., Iwasa R., Kelly S., <i>Cdh descent, cdarc descent, and Milnor excision</i>, Math. Ann. 379 (2021), pp. 1011–1045, arXiv:2002.11647Bachmann T., Elmanto E., Hoyois M., Khan A. A., Sosnilo V., Yakerson M., <i>On the infinite loop spaces of algebraic cobordism and the motivic sphere</i>, Épijournal Géom. Algébrique 5 (2021), arXiv:1911.02262Elmanto E., Hoyois M., Khan A. A., Sosnilo V., Yakerson M., <i>Modules over algebraic cobordism</i>, Forum Math. Pi 8 (2020), E14, arXiv:1908.02162Elmanto E., Hoyois M., Khan A. A., Sosnilo V., Yakerson M., <i>Framed transfers and motivic fundamental classes</i>, J. Topol. 13 (2020), no. 2, pp. 460–500, arXiv:1809.10666Asok A., Hoyois M., Wendt M., <i>Affine representability results in \mathbb{A}^1-homotopy theory III: finite fields and complements</i>, Algebr. Geom. 7 (2020), no. 5, pp. 634–644, arXiv:1807.03365Hoyois M., <i>The localization theorem for framed motivic spaces</i>, Compos. Math. 157 (2021), no. 1, pp. 1–11, arXiv:1807.04253	

- Hoyois M., Safronov P., Scherotzke S., Sibilla N., *The categorified Grothendieck–Riemann–Roch theorem*, *Compos. Math.* **157** (2021), no. 1, pp. 154–214, arXiv:1804.00879
- Elmanto E., Hoyois M., Khan A. A., Sosnilo V., Yakerson M., *Motivic infinite loop spaces*, *Cambridge J. Math.* **9** (2021), no. 2, pp. 431–549, arXiv:1711.05248
- Bachmann T., Hoyois M., *Norms in motivic homotopy theory*, *Astérisque* **425**, 120 pages, 2021, arXiv:1711.03061
- Hoyois M., Krishna A., *Vanishing theorems for the negative K-theory of stacks*, *Ann. K-Theory* **4** (2019), no. 3, pp. 439–472, arXiv:1705.02295
- Asok A., Hoyois M., Wendt M., *Generically split octonion algebras and \mathbb{A}^1 -homotopy theory*, *Algebra Number Theory* **13** (2019), no. 3, pp. 695–747, arXiv:1704.03657
- Hoyois M., *Topoi of parametrized objects*, *Theory Appl. Categ.* **34** (2019), no. 9, pp. 243–248, arXiv:1611.02267
- Barwick C., Glasman S., Hoyois M., Nardin D., Shah J., *Categorifying rationalization*, *Forum Math. Sigma* **7** (2019), E42, arXiv:1610.07162
- Hoyois M., *Cdh descent in equivariant homotopy K-theory*, *Doc. Math.* **25** (2020), pp. 219–244, arXiv:1604.06410
- Hoyois M., Scherotzke S., Sibilla N., *Higher traces, noncommutative motives, and the categorified Chern character*, *Adv. Math.* **309** (2017), pp. 97–154, arXiv:1511.03589
- Hoyois M., *The six operations in equivariant motivic homotopy theory*, *Adv. Math.* **305** (2017), pp. 197–279, arXiv:1509.02145
- Asok A., Hoyois M., Wendt M., *Affine representability results in \mathbb{A}^1 -homotopy theory II: principal bundles and homogeneous spaces*, *Geom. Topol.* **22** (2018), pp. 1181–1225, arXiv:1507.08020
- Asok A., Hoyois M., Wendt M., *Affine representability results in \mathbb{A}^1 -homotopy theory I: vector bundles*, *Duke Math. J.* **166** (2017), no. 10, pp. 1923–1953, arXiv:1506.07093
- Hoyois M., *The homotopy fixed points of the circle action on Hochschild homology*, unpublished note, 9 pages, 2018, arXiv:1506.07123
- Hoyois M., *Higher Galois theory*, *J. Pure Appl. Algebra* **222** (2018), no. 7, pp. 1859–1877, 2018, arXiv:1506.07155
- Hoyois M., Krishna A., Østvær P. A., *\mathbb{A}^1 -contractibility of Koras–Russell threefolds*, *Algebr. Geom.* **3** (2016), no. 4, pp. 407–423, arXiv:1409.1293
- Hoyois M., *A quadratic refinement of the Grothendieck–Lefschetz–Verdier trace formula*, *Algebr. Geom. Topol.* **14** (2014), no. 6, pp. 3608–3658, arXiv:1309.6147
- Hoyois M., Kelly S., Østvær P. A., *The motivic Steenrod algebra in positive characteristic*, *J. Eur. Math. Soc.* **19** (2017), no. 12, pp. 3813–3849, arXiv:1305.5690
- Hoyois M., *From algebraic cobordism to motivic cohomology*, *J. reine angew. Math.* **702** (2015), pp. 173–226, arXiv:1210.7182
- Hoyois M., *The étale symmetric Künneth theorem*, *Math. Z.* **304** (2023), Article 1, arXiv:1810.00351

HONORS AND AWARDS

- Principal Investigator of the SFB 1085 “Higher Invariants”, 2022–2025
- K-Theory Prize awarded by the K-Theory Foundation, 2018
- National Science Foundation Award DMS-1508096/DMS-1761718 “Equivariance and Higher Algebra in Motivic Homotopy Theory”, 2015–2019
- Best Doctoral Thesis Award, awarded by the Department of Mathematics of Northwestern University, 2014
- Gelfand Prize, awarded by the Department of Mathematics of Northwestern University to “a returning student who has achieved outstanding progress in his or her own research”, 2013
- Prix Douchet, awarded by EPFL for the best Master average in the Mathematics section, 2009

INVITED TALKS

- *Lectures on six functor formalisms and motivic homotopy theory* July 24–28, 2023
Young Topologists Meeting 2023, École Polytechnique Fédérale de Lausanne, Switzerland
- *Non- \mathbb{A}^1 -invariant motivic spectra* July 3, 2023
Motivic and non-commutative aspects of enumerative geometry, Nijmegen, Netherlands
- *Shapes and locally constant sheaves* June 22, 2023
Arbeitsgruppenseminar Bunke, Universität Regensburg, Germany

- *Non- \mathbb{A}^1 -homotopy theory* March 22, 2023
Homotopy theory in honor of Paul Goerss, Northwestern University, Evanston, USA
- *Milnor excision for motivic spectra* May 13, 2022
Algebraic K-theory, Oberwolfach, Germany
- *Hermitian K-theory via oriented Gorenstein algebras* January 19, 2022
Topology Seminar, Universität Münster, Germany
- *Hilbert schemes in motivic homotopy theory* September 29, 2021
Representation theory's hidden motives, Münster, Germany
- *Excision for motivic cohomology theories* September 17, 2021
Summer School on Derived and Triangulated Categories, Wuppertal, Germany
- *The Hilbert scheme of affine space* December 4, 2020
Bavarian Geometry & Topology Meeting
- *Milnor excision for motivic spectra* September 29, 2020
Electronic Algebraic K-theory Seminar
- *Lectures on framed correspondences* August 27–31, 2020
Motivic Geometry, Centre for Advanced Study, Oslo, Norway
- *Milnor excision for motivic spectra* August 18, 2020
MIT Topology Seminar, Massachusetts Institute of Technology, USA
- *Milnor excision for motivic spectra* April 15, 2020
Motives and What Not
- *Milnor excision for motivic spectra* March 24, 2020
Algebraic K-theory, motivic cohomology and motivic homotopy theory
Isaac Newton Institute, Cambridge, UK
- *Milnor excision for motivic cohomology* January 20, 2020
Arbeitsgruppenseminar Kerz, Universität Regensburg, Germany
- *Towards higher algebraic cobordism* November 4, 2019
Algebra/Topology Seminar, Københavns Universitet, Denmark
- *Lectures on motivic infinite loop spaces* September 16–20, 2019
Computations in motivic homotopy theory, Universität Regensburg, Germany
- *Moduli stacks of varieties and algebraic bordism* May 19, 2019
Midwest Topology Seminar, Michigan State University, USA
- *Moduli stacks of varieties and algebraic bordism* November 17, 2018
SoCalAGS, University of California, Los Angeles, USA
- *Moduli stacks of varieties and algebraic cobordism* October 1, 2018
CATS5, Lisbon, Portugal
- *The ∞ -category of framed correspondences* September 12, 2018
Motives in St. Petersburg, Euler Mathematical Institute, Russia
- *Motivic infinite loop spaces and Hilbert schemes* August 14, 2018
Equivariant and motivic homotopy theory, Isaac Newton Institute, Cambridge, UK
- *Motivic infinite loop spaces* June 27, 2018
Motivic Homotopy Groups of Spheres III, Freie Universität Berlin, Germany
- *Normed motivic spectra* May 7, 2018
 ∞ -Categories, ∞ -Operads, and their Applications, Casa Matemática Oaxaca, Mexico
- *Motivic infinite loop spaces* April 14 2018
AMS Sectional Meeting, Portland State University, USA
- *Vector bundles and \mathbb{A}^1 -homotopy theory* March 12, 2018
Geometry and Topology Seminar, University of California, Irvine, USA
- *Multiplicative transfers in the cohomology of algebraic varieties* January 23, 2018
Topology Seminar, University of Chicago, USA
- *Algebraic vector bundles and \mathbb{A}^1 -homotopy theory* January 12, 2018
Colloquium, Universität Regensburg, Germany
- *Multiplicative transfers in the cohomology of algebraic varieties* November 17, 2017
Algebra Seminar, University of California, Los Angeles, USA
- *Norms in motivic homotopy theory* October 18, 2017
Algebraic K-Theory Seminar, University of Illinois at Chicago, USA

- *Motivic infinite loop spaces* July 20, 2017
Homotopy theory: tools and applications, University of Illinois at Urbana–Champaign, USA
- *Vector bundles on algebraic varieties* February 27, 2017
Colloquium, École Polytechnique Fédérale de Lausanne, Switzerland
- *Multiplicative transfers in the cohomology of algebraic varieties* January 26, 2017
Institut Mittag-Leffler, Stockholm, Sweden
- *Minicourse in homotopy theory for algebraic varieties* December 16, 2016
Stony Brook University, USA
- *Motivic cohomology and Steenrod operations* December 15, 2016
Colloquium, Stony Brook University, USA
- *The motivic Steenrod algebra* December 2, 2016
Colloquium, University of Southern California, USA
- *Naive versus motivic \mathbb{A}^1 -homotopy classes* September 12, 2016
MIT Topology Seminar, Massachusetts Institute of Technology, USA
- *On the vanishing of negative equivariant K-theory* August 17, 2016
Alpine Algebraic and Applied Topology Conference, Saas-Almagell, Switzerland
- *On the vanishing of negative equivariant K-theory* August 1, 2016
International Conference in K-theory, Western Sydney University, Australia
- *Naive versus genuine \mathbb{A}^1 -homotopy classes* June 24, 2016
Motivic Homotopy Groups of Spheres II, Universität Duisburg–Essen, Germany
- *\mathbb{A}^1 -homotopical classification of principal G -bundles* April 19, 2016
Topology Seminar, University of Illinois at Urbana–Champaign, USA
- *\mathbb{A}^1 -homotopical classification of principal G -bundles* February 29, 2016
Topology Seminar, Northwestern University, Evanston, USA
- *\mathbb{A}^1 -homotopical classification of principal G -bundles* February 23, 2016
Harvard/MIT Algebraic Geometry Seminar, Massachusetts Institute of Technology, USA
- *\mathbb{A}^1 -homotopical classification of principal G -bundles* February 3, 2016
Algebraic cobordism and projective homogeneous varieties, Oberwolfach, Germany
- *Cdh descent for the homotopy K-theory of tame stacks* January 8, 2016
International Colloquium on K-theory, Tata Institute of Fundamental Research, Mumbai, India
- *Secondary K-theory and the categorified Chern character* October 26, 2015
MIT Topology Seminar, Massachusetts Institute of Technology, USA
- *A quadratic refinement of the Grothendieck–Lefschetz–Verdier trace formula* December 18, 2014
International Workshop on Motives, University of Tokyo, Japan
- *The six operations of Grothendieck in equivariant motivic homotopy theory* November 26, 2014
PIMS Topology Seminar, Vancouver, Canada
- *The motivic Lefschetz fixed-point theorem* October 6, 2014
MIT Topology Seminar, Massachusetts Institute of Technology, USA
- *The six operations in equivariant motivic homotopy theory* August 8, 2014
International Conference on K-Theory and Related Topics,
Chinese Academy of Sciences, Beijing, China
- *A quadratic refinement of the Grothendieck–Lefschetz trace formula* July 1, 2014
Max Planck Institute for Mathematics, Bonn, Germany
- *A quadratic refinement of the Grothendieck–Lefschetz trace formula* May 9, 2014
21st NRW Topology Meeting, Bergische Universität Wuppertal, Germany
- *A quadratic refinement of the Grothendieck–Lefschetz trace formula* February 11, 2014
UCLA/USC joint seminar, University of Southern California, USA
- *Quillen’s theorem for algebraic cobordism* February 10, 2014
Algebra Seminar, University of Southern California, USA
- *A fixed-point theorem in motivic homotopy theory* January 21, 2014
Topology Seminar, University of Chicago, USA
- *Traces and fixed points in stable motivic homotopy theory* November 12, 2013
K-theory and motivic homotopy theory seminar, Ohio State University, USA
- *Traces and fixed points in stable motivic homotopy theory* November 7, 2013
Topology Seminar, Purdue University, USA

- *Quillen's theorem for algebraic cobordism* June 18, 2013
Algebra and Topology Seminar, Universität Osnabrück, Germany
- *Quillen's theorem for algebraic cobordism* June 6, 2013
Oberseminar, Universität Duisburg–Essen, Germany
- *Quillen's theorem for algebraic cobordism* May 24, 2013
Topology Seminar, Universitetet i Oslo, Norway
- *The motivic Quillen theorem* May 8, 2013
Topology Seminar, Bergische Universität Wuppertal, Germany
- *The motivic Quillen theorem* March 29, 2013
Equivariant, Chromatic, and Motivic Homotopy Theory, Northwestern University, USA
- *From algebraic cobordism to motivic cohomology* October 9, 2012
Topology Seminar, University of Illinois at Urbana–Champaign, USA

ORGANIZED
EVENTS

- Motives in Ratisbona (with Stefan Gille, Pavel Sechin, Nikita Semenov) September 12–16, 2022
Universität Regensburg
- Seminar on topological Hochschild homology (with Aravind Asok) Fall 2018
University of Southern California
- Seminar on motivic cohomology (with Clark Barwick) Fall 2016
Massachusetts Institute of Technology
- USC K-theory Summer School (with Aravind Asok and Brad Drew) August 4–7, 2015
University of Southern California
- Graduate Student Seminar (with Boris Hanin) Fall 2011–Winter 2013
Department of Mathematics, Northwestern University

TEACHING
EXPERIENCE

- Professor, Universität Regensburg*
- Algebraic Topology I Winter 2023–24
 - Oberseminar: The \mathbb{P}^1 -Freudenthal suspension theorem Winter 2023–24
 - Kommutative Algebra Summer 2023
 - Seminar: Introduction to stable homotopy theory Summer 2023
 - Oberseminar: Selmer K-theory Summer 2023
 - Algebra Winter 2022–23
 - Motivic homotopy theory Winter 2022–23
 - Oberseminar: Absolute prismatic cohomology Winter 2022–23
 - Lineare Algebra II Summer 2022
 - Oberseminar: Tempered cohomology and equivariant elliptic cohomology Summer 2022
 - Lineare Algebra I Winter 2021–22
 - Seminar: Introduction to stable homotopy theory Winter 2021–22
 - Oberseminar: Derived algebraic cobordism Winter 2021–22
 - Riemannsche Flächen Summer 2021
 - Seminar: Topological K-theory Summer 2021
 - Oberseminar: Hermitian K-theory of rings Summer 2021
 - Algebraic Topology I Winter 2020–21
 - Seminar: de Rham cohomology Winter 2020–21
 - Oberseminar: Hermitian K-theory for stable ∞ -categories Winter 2020–21
 - Algebraic K-theory Summer 2020
 - Seminar: \mathbb{A}^1 -invariance in algebraic geometry Summer 2020
 - Oberseminar: Integral homotopy theory Summer 2020

Assistant Professor, USC

- Math 225 Linear algebra and linear differential equations Spring 2019
- Math 641 Algebraic K-theory Fall 2018
- Math 510b Algebra Spring 2018
- Math 127 Enhanced Calculus II Fall 2017

Instructor, MIT

- 18.901 Introduction to Topology Fall 2016
- 18.906 Algebraic Topology II Spring 2016
- 18.901 Introduction to Topology Fall 2015

Recitation Instructor, MIT

- 18.03 Differential Equations Spring 2017

18.03 Differential Equations Spring 2015
18.01 Calculus Fall 2014

Teaching Assistant, Northwestern University

Math 234 Multiple Integration and Vector Calculus Fall 2012
Math 230 Differential Calculus of Multivariable Functions Winter 2012
Math 330 Abstract Algebra Winter 2012
Math 300 Foundations of Higher Mathematics Fall 2011
Math 330 Abstract Algebra Fall 2011
Math 202 Finite Mathematics Winter 2011
Math 330 Abstract Algebra Winter 2011
Math 230 Differential Calculus of Multivariable Functions Fall 2010

Teaching Assistant, EPFL

Algebra for 2nd-year mathematicians Fall 2006–Fall 2008
Analysis for 1st-year mathematicians Spring 2006

LANGUAGES English (fluent), French (native), German (basic)

Updated on August 5, 2023