

# Marc Hoyois

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CONTACT INFORMATION	Prof. Dr. Marc Hoyois Fakultät für Mathematik Universität Regensburg 93040 Regensburg, Germany	marc.hoyois@ur.de <a href="https://hoyois.app.uni-regensburg.de">https://hoyois.app.uni-regensburg.de</a>
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 (W3)</i> Universität Regensburg, Germany  <i>Assistant Professor</i> University of Southern California, Los Angeles, CA, USA  <i>C.L.E. Moore Instructor</i> Massachusetts Institute of Technology, Cambridge, MA, USA  <i>Visiting researcher</i> Universität Duisburg–Essen, Germany	October 2019–present  August 2017–July 2019  September 2014–June 2017  April–July 2014
EDUCATION	<i>Doctor of Philosophy in Mathematics</i> Northwestern University, Evanston, IL, USA Advisor: Paul Goerss  <i>Master of Science in Mathematics</i> École Polytechnique Fédérale de Lausanne, Switzerland Advisor: Kathryn Hess Bellwald  <i>Bachelor of Science in Mathematics</i> École Polytechnique Fédérale de Lausanne, Switzerland	March 2014  February 2009  July 2007
PUBLICATIONS AND PREPRINTS	<ul style="list-style-type: none"><li>Hoyois M., Jelisiejew J., Nardin D., Yakerson M., <i>Hermitian K-theory via oriented Gorenstein algebras</i>, preprint, 27 pages, 2021, arXiv:2103.15474</li><li>Elmanto E., Hoyois M., Iwasa R., Kelly S., <i>Milnor excision for motivic spectra</i>, J. reine angew. Math. <b>772</b> (2021), pp. 223–235, arXiv:2004.12098</li><li>Hoyois 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:2002.11439</li><li>Elmanto E., Hoyois M., Iwasa R., Kelly S., <i>Cdh descent, cdarc descent, and Milnor excision</i>, Math. Ann. <b>379</b> (2021), pp. 1011–1045, arXiv:2002.11647</li><li>Bachmann 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 <b>5</b> (2021), arXiv:1911.02262</li><li>Elmanto E., Hoyois M., Khan A. A., Sosnilo V., Yakerson M., <i>Modules over algebraic cobordism</i>, Forum Math. Pi <b>8</b> (2020), p. E14, arXiv:1908.02162</li><li>Elmanto E., Hoyois M., Khan A. A., Sosnilo V., Yakerson M., <i>Framed transfers and motivic fundamental classes</i>, J. Topol. <b>13</b> (2020), no. 2, pp. 460–500, arXiv:1809.10666</li><li>Asok A., Hoyois M., Wendt M., <i>Affine representability results in <math>\mathbb{A}^1</math>-homotopy theory III: finite fields and complements</i>, Algebr. Geom. <b>7</b> (2020), no. 5, pp. 634–644, arXiv:1807.03365</li><li>Hoyois M., <i>The localization theorem for framed motivic spaces</i>, Compos. Math. <b>157</b> (2021), no. 1, pp. 1–11, arXiv:1807.04253</li><li>Hoyois M., Safronov P., Scherrotzke S., Sibilla N., <i>The categorified Grothendieck–Riemann–Roch theorem</i>, Compos. Math. <b>157</b> (2021), no. 1, pp. 154–214, arXiv:1804.00879</li><li>Elmanto E., Hoyois M., Khan A. A., Sosnilo V., Yakerson M., <i>Motivic infinite loop spaces</i>, Cambridge J. Math. <b>9</b> (2021), no. 2, pp. 431–549, arXiv:1711.05248</li></ul>	

- 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*, preprint, 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*, preprint, 19 pages, 2018, 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

- *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
- *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  $\infty$ -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  
 $\infty$ -Categories,  $\infty$ -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, 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	• Seminar on topological Hochschild homology (with Aravind Asok) University of Southern California	Fall 2018
	• Seminar on motivic cohomology (with Clark Barwick) Massachusetts Institute of Technology	Fall 2016
	• USC K-theory Summer School (with Aravind Asok and Brad Drew) University of Southern California	August 4–7, 2015
	• Graduate Student Seminar (with Boris Hanin) Department of Mathematics, Northwestern University	Fall 2011–Winter 2013
TEACHING EXPERIENCE	<i>Professor, Universität Regensburg</i>	
	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 $\infty$ -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
	<i>Assistant Professor, USC</i>	
	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
<i>Instructor, MIT</i>		
18.901 Introduction to Topology	Fall 2016	
18.906 Algebraic Topology II	Spring 2016	
18.901 Introduction to Topology	Fall 2015	
<i>Recitation Instructor, MIT</i>		
18.03 Differential Equations	Spring 2017	
18.03 Differential Equations	Spring 2015	
18.01 Calculus	Fall 2014	
<i>Teaching Assistant, Northwestern University</i>		
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	
<i>Teaching Assistant, EPFL</i>		
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 May 21, 2022