

# Tom Bachmann

## Contact Information

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**Nationality** German

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## Research Interests

Motivic homotopy theory, motivic cohomology, algebraic geometry  
Algebraic and hermitian K-theory, higher category theory, tt-categories

## Employment

- 2018–20 **C.L.E. Moore Instructor**, *Massachusetts Institute of Technology*, Cambridge, MA, USA.
- 2017–18 **Wiss. Mitarbeiter**, *University Duisburg-Essen*, Essen, Germany.  
Research group of Marc Levine.
- 2016–17 **Wiss. Mitarbeiter**, *LMU Munich*, Munich, Germany.  
Research group of Fabien Morel.

## Education

- 2013–16 **Dr. rer. nat.**, *LMU Munich*.  
Adviser: Fabien Morel
- 2012–13 **MMath**, *Girton College, Cambridge University*.  
Adviser: Ian Grojnowski
- 2009–12 **BA Hons Mathematics**, *Girton College, Cambridge University*.

## Publications

Tom Bachmann and Alexander Vishik. Motivic equivalence of affine quadrics. *Mathematische Annalen*, 371(1):741–751, Jun 2018.

Tom Bachmann. Motivic and real étale stable homotopy theory. *Compositio Mathematica*, 154(5):883–917, 2018. arXiv:1608.08855.

Tom Bachmann. On the conservativity of the functor assigning to a motivic spectrum its motive. *Duke Math. J.*, 167(8):1525–1571, 06 2018. arXiv:1506.07375.

Tom Bachmann. Some remarks on units in Grothendieck–Witt rings. *Journal of Algebra*, 499:229 – 271, 2018. arXiv:1707.08087.

Tom Bachmann. The generalized slices of Hermitian K-theory. *Journal of Topology*, 10(4):1124–1144, 2017. arXiv:1610.01346.

Tom Bachmann. On the Invertibility of Motives of Affine Quadrics. *Documenta Math.*, 22:363–395, 2017. arXiv:1506.07377.

## Preprints

Tom Bachmann. Affine Grassmannians in  $\mathbb{A}^1$ -algebraic topology. 2018. arXiv:1801.08471.

Tom Bachmann. Motivic Tambara Functors. 2018. arXiv:1807.02981.

Tom Bachmann and Jean Fasel. On the effectivity of spectra representing motivic cohomology theories. 2017. arXiv:1710.00594.

Tom Bachmann and Marc Hoyois. Norms in Motivic Homotopy Theory. 2017. arXiv:1711.03061.

## Honors and Awards

Apr 2018 *Caratheodory-Preis*, awarded by the Department of Mathematics at LMU Munich for the best doctoral thesis

## Conference Talks

Sep 2018 *From Strictly Homotopy Invariant Sheaves to Effective Homotopy Modules*, Conference on Motives and their applications, Euler International Mathematical Institute St. Petersburg, Russia

Aug 2018 *Motivic Tambara Functors*, Workshop on Equivariant and motivic homotopy theory, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK

Jun 2018 *Affine Grassmannians in Motivic Homotopy Theory*, International Workshop on Algebraic Topology, Southern University of Science and Technology, Shenzhen, China

Feb 2018 *Rational Contractibility as an Effectivity Criterion*, Conference on K-theory,  $\mathbb{A}^1$ -Homotopy and Quadratic Forms, University of Warwick, Coventry, UK

Nov 2017 *Normed Motivic Spectra*, 28th NRW Topology Meeting, University of Bielefeld, Bielefeld, Germany

Jul 2017 *Multiplicative Transfer in Motivic Homotopy Theory*, Motives: arithmetic, algebraic geometry and topology under the white-blue sky, LMU Munich, Munich, Germany

May 2017 *The Generalized Slices of Hermitian K-Theory*, Workshop on K-theory and related fields, HIM, Bonn, Germany

Aug 2016 *On the invertibility of motives of affine quadrics*, The international conference in K-Theory WSU 2016, Western Sydney University, Sydney, Australia.

Jun 2016 *The Invertibility of Quadrics in Motivic Homotopy Theory*, Second Workshop on Motivic homotopy groups of spheres, University of Duisburg-Essen, Essen, Germany.

Feb 2016 *The Hurewicz and Conservativity Theorems for  $\mathbf{SH}(k) \rightarrow \mathbf{DM}(k)$* , Workshop on Algebraic Cobordism and Projective Homogeneous Varieties, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany.

## Seminar Talks

- Dec 7, 2018 *TBA*, Topology Seminar, University of Minnesota, Minneapolis, MN, USA
- Nov 29, 2018 *TBA*, Electronic Computational Homotopy Theory Seminar
- Nov 20, 2018 *TBA*, Topology Seminar, University of Chicago, Chicago, IL, USA
- Nov 12, 2018 *TBA*, Geometry and Topology Seminar, Georgia Institute of Technology, Atlanta, GA, USA
- Nov 5, 2018 *TBA*, Algebra Seminar, University of Southern California, Los Angeles, CA, USA
- Oct 2, 2018 *Affine Grassmannians in Motivic Homotopy Theory*, Algebraic Geometry Seminar, Harvard/MIT, Cambridge, MA, USA
- Sep 24, 2018 *Power Operations in Normed Motivic Spectra*, Topology Seminar, Massachusetts Institute of Technology, Cambridge, MA, USA
- May 3, 2018 *Loop Groups in  $\mathbb{A}^1$ -Algebraic Topology*, Oberseminar Motivische Algebraische Topologie, LMU Munich, Munich, Germany
- Mar 2, 2018 *Motivic and Real Étale Stable Homotopy Theory*, Journées réelles du CHL, Université de Rennes 2, Rennes, France
- Aug 1, 2017 *Motivic Normed Spectra*, SFB-Seminar, University of Regensburg, Regensburg, Germany
- Jul 27, 2017 *Highly Commutative Objects in Motivic Homotopy Theory*, Kepler-Kolloquium, University of Regensburg, Regensburg, Germany
- Jul 11, 2017 *Real Realisation in Motivic Stable Homotopy Theory*, University of Münster, Münster, Germany
- May 11, 2017 *Units in Grothendieck-Witt rings and dreams of multiplicative motivic infinite loop space theory*, Research Seminar Arithmetic Geometry 2017, University Duisburg-Essen, Essen, Germany
- Nov 22, 2016 *The Generalized Slices of Hermitian K-Theory*, UiO Topology Seminar 2016, University of Oslo, Oslo, Norway
- Nov 2, 2016 *Real Realisation in Motivic Homotopy Theory*, Oberseminar Topologie, University of Wuppertal, Wuppertal, Germany
- Oct 25, 2016 *Geometric Fixed Point Functors for Motives*, SFB-Seminar, University of Regensburg, Regensburg, Germany
- Jun 7, 2016  $\mathrm{SH}(k)_2^-$  and the Real Étale Topology, Topology Seminar, University of Osnabrück, Osnabrück, Germany.

## Teaching Experience

**Instructor**, *Massachusetts Institute of Technology*.

- Fall 2018 Course: multivariable calculus (18.02); Lecturer: Prof. William Minicozzi; role: TA; prepared and held recitations (problem sessions) and midterm review sessions; graded exams.

**Dozent**, *University Duisburg-Essen*.

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- SS 2018 Course: Algebraic Topology 2; Prepared, organized and held lectures; prepared problem sheets; administered final oral exam. (Joint with Daniel Harrer and Fangzhou Jin.)
- WS 2017 Course: Algebraic Topology 1; Prepared, organized and held lectures; prepared problem sheets; administered final oral exam. (Joint with Daniel Harrer.)
- SS 2017 Course: Algebraic Geometry 4; Prepared, organized and held lectures; prepared problem sheets; administered final oral exam. (Joint with Daniel Harrer and Marc Levine.)
- Lehrassistent**, *LMU Munich*.
- WS 2013 Course: Analysis für Informatiker und Statistiker; Lecturer: Prof Dr. Peter Otte; Prepared and organized tutorials for students; prepared and administered final exam. (Joint position with Sebastian Gottwald.)

### Service

- Jul 2018 Referee report for *Compositio Mathematica*.
- Mar 2018 Referee report for *Advances in Mathematics*.
- Nov 2017 Referee report for *Compositio Mathematica*.

### Further Information

- Natural Languages English (fluent), German (native), Spanish (basic), French (basic written)
- Programming Languages C, C++, Python, Java

Updated: Sep 27, 2018