

# Timo Richarz

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## Research Interests

Affine Grassmannians, Geometrization of the Langlands Program, Shimura varieties, Moduli spaces of bundles, Geometric Representation Theory

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## Employment

- 2019–25 **Assistant professorship**, *Technische Universität Darmstadt*, Darmstadt, Germany.
- 2018–19 **Postdoc**, *Sorbonne Université*, Paris, France.  
Research group of Laurent Fargues
- 2016–18 **Wiss. Mitarbeiter**, *University of Duisburg-Essen*, Essen, Germany.  
Research group of Jochen Heinloth
- 2014–16 **Fellow for Teach First Deutschland**, *Dreikönigsgymnasium*, Köln, Germany.  
Teaching mathematics and philosophy
- 2014 **Wiss. Mitarbeiter**, *Bonn University*, Bonn, Germany.  
Research group of Michael Rapoport

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## Education

- 2010–14 **PhD Studies Mathematics**, *Bonn University*, Bonn, Germany.  
Advisor: Michael Rapoport, defended on 30.01.2014 (summa cum laude)  
Title: *Affine Grassmannians and Geometric Satake Equivalences*
- 2006–10 **Diploma in Mathematics**, *Bonn University*, Bonn, Germany.  
Advisor: Michael Rapoport, defended on 21.07.2010

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## Research Visits

- Jun 2018 **École normale supérieure de Lyon**, *Groupes algébriques et géométrisation du programme de Langlands*, Lyon, France.
- Mar 2018 **University of Maryland**, *Invitation of T. J. Haines*, College Park MD, USA.
- Aug–Sep 2016 **Max-Planck Institut für Mathematik**, *Gastaufenthalt*, Bonn, Germany.
- Jul 2013 **Mathematical Sciences Research Institute**, *Fellow visitor of Peter Scholze*, Berkeley CA, USA.
- Feb–Mar 2012 **Fields Institute**, *Thematic Program on Galois Representations*, Toronto, Canada.
- Sep–Dec 2010 **Harvard University**, *Fellow visitor of Michael Rapoport*, Cambridge MA, USA.
- Jan–Mar 2010 **Institut Henri Poincaré**, *Galois trimester*, Paris, France.

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## Funds

- 2018 Scholarship, *Deutsche Forschungsgemeinschaft*, Forschungsstipendium: *Lokale Modelle für Modulräume von Shtukas*.
- 2010–13 Scholarship, *Max-Planck Gesellschaft*, Promotionsstipendium.
- 2008–10 Scholarship, *Studienstiftung des Deutschen Volkes*.

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## Publications

Timo Richarz, *Spaces with  $\mathbb{G}_m$ -action, hyperbolic localization and nearby cycles*, to appear in Journal of Algebraic Geometry.

Timo Richarz, *On the Iwahori-Weyl Group*, Bulletin de la SMF 144, fascicule 1 (2016), 117-124.

Timo Richarz, *Affine Grassmannians and Geometric Satake Equivalences*, Int. Math. Res. Not. 12 (2016), 3717-3767.

Timo Richarz, Xinwen Zhu, Appendix to Xinwen Zhu: *The Geometrical Satake Correspondence for Ramified Groups*, Annales scientifiques de l'ENS 48, fascicule 2 (2015), 409-451.

Timo Richarz, *A new approach to the Geometric Satake Equivalence*, Documenta Mathematica 19 (2014), 209-246.

Timo Richarz, *Schubert Varieties in Twisted Affine Flag Varieties and Local Models*, Journal of Algebra 375 (2013), 121-147.

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## Preprints

Thomas J. Haines, Timo Richarz, *Smoothness of Schubert varieties in twisted affine Grassmannians*, arXiv:1809.08464.

Thomas J. Haines, Timo Richarz, *On the normality of Schubert varieties: Remaining cases of positive characteristic*, arXiv:1806.11001.

Thomas J. Haines, Timo Richarz, *The Test Function Conjecture for Local Models of Weil-restricted groups*, arXiv:1805.07081.

Thomas J. Haines, Timo Richarz, *The Test Function Conjecture for Parahoric Local Models*, arXiv:1801.07094.

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## Lectures

Sep 2019 *Introduction to affine Grassmannians*, Research School on Buildings and affine Grassmannians, CIRM, Luminy.

Oct 2018 *The geometric Satake isomorphism*, 3h, London Number Theory Study group, Imperial College, London.

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## Conference Talks

Jul 2019 *t.b.a.*, Shimura varieties, representation theory and related topics, Hokkaido University, Japan.

Oct 2018 *Smoothness of Schubert varieties in twisted affine Grassmannians*, Conference on the occasion of Michael Rapoport's 70th birthday, Bonn University.

Jun 2018 *The test function conjecture for parahoric local models*, Groupes algébriques et géométrisation du programme de Langlands, ENS Lyon.

Mar 2018 *Spaces with  $\mathbb{G}_m$ -actions and applications*, DMV Tagung, University of Paderborn.

Apr 2017 *The stack Bun and Hecke stacks*, Arbeitsgemeinschaft Higher Gross-Zagier formulas, MFO.

Feb 2014 *Ramified geometric Satake isomorphisms*, Workshop Langlands correspondence and constructive Galois theory, MFO.

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## Seminar Talks

Dec 2018 *t.b.a.*, Séminaire, Université Clermont Auvergne.

Nov 2018 *The test function conjecture for parahoric local models*, Séminaire de théorie des nombres, Université de Caen.

Oct 2018 *Motivic Satake Equivalence*, Seminar, Universität Heidelberg.

May 2018 *The geometric Satake isomorphism over non-algebraically closed fields*, Séminaire Quantique, Université de Strasbourg.

Sep 2017 *The test function conjecture for parahoric local models*, Séminaire d'arithmétique à Lyon, ENS Lyon.

- Feb 2017 *Spaces with  $G_m$ -actions and applications*, Seminar des Sonderforschungsbereichs “Higher Invariants”, University of Regensburg.
- Jan 2017 *Spaces with  $G_m$ -actions and applications*, Mittagsseminar zur Arithmetik, University of Münster.
- May 2014 *The geometric Satake isomorphism*, Oberseminar zur Arithmetischen Geometrie, University of Bayreuth.
- Nov 2012 *On the geometric Satake isomorphism*, Arbeitsgemeinschaft Arithmetische Geometrie, University of Paderborn.
- Nov 2012 *On the geometric Satake isomorphism*, Forschungsseminar Arithmetische Geometrie, University of Duisburg-Essen.
- Nov 2012 *Schubert varieties in twisted affine flag varieties*, Oberseminar Darstellungstheorie, Bergische Universität Wuppertal.
- Mar 2012 *On the geometric Satake isomorphism*, Thematic Program on Galois Representations, Fields Institute Toronto.

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## Teaching Experience

### Lecture Courses

Prepared, organized and held lectures; prepared problem sheets; administered final written and oral exam.

- WS 18 *Pro-étale cohomology*, Technische Universität Darmstadt, joint with Torsten Wedhorn.
- WS 17 *Didaktik der Linearen Algebra und Analytischen Geometrie*, University of Duisburg-Essen.
- SS 17 *Figuren und Abbildungen im Geometrieunterricht*, University of Duisburg-Essen.
- WS 16 *Didaktik der Linearen Algebra und Analytischen Geometrie*, University of Duisburg-Essen.

### Seminars

Prepared the program, and organized the seminars.

- WS 18 *Prismatic cohomology*, Institut de Mathématiques de Jussieu, joint with Ariane Mezard.
- WS 17 *The Fargues-Fontaine curve*, University of Duisburg-Essen.
- WS 17 *Seminar on Stacks*, University of Duisburg-Essen, joint with Jochen Heinloth.
- WS 16–WS17 *Forschungsseminar Arithmetische Geometrie*, University of Duisburg-Essen, WS16 joint with Michael Wong.
- SS 11 *The unramified Drinfeld-Langlands Correspondence*, University of Bonn.

### Assistency

Prepared and organized tutorials for students; prepared exercise sheets; prepared and administered final exam; substituted professor when needed.

- WS 13 Michael Rapoport, *Algebra II*, University of Bonn.
- SS 13 Michael Rapoport, *Algebra I*, University of Bonn.
- WS 12 Michael Rapoport, *Einführung in die Algebra*, University of Bonn.

### Tutorials

Prepared and held tutorials for students.

- SS 07–WS 10 Courses in *Topology, Algebra, Complex Geometry, Linear Algebra and Analysis*.

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## Other Publications

Timo Richarz, *The stack Bun and Hecke stacks*, Arbeitsgemeinschaft: Higher Gross-Zagier Formulas, Oberwolfach Reports 18 (2017).

Ulf Grebe, Timo Richarz, *Brennpunkt Rechenschwäche*, Mathematik lehren 201 (2017), Themenheft Inklusion.

Timo Richarz, *Affine Grassmannians and Geometric Satake Equivalences*, Langlands correspondence and constructive Galois theory, Oberwolfach Reports 11 (2014).

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## Further Activities

Languages German (Native), English (Fluent), French (Basic), Latinum  
Referee Selecta, Compositio, IMRN

Update: November 25, 2018