Sam Raskin

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Education

Harvard University, Cambridge, MA, Ph.D., Mathematics, 2014. Thesis supervised by Dennis Gaitsgory.

University of Chicago, Chicago, IL, B.A., Mathematics, 2009.

Employment

Yale University, James E. English Professor of Mathematics, 2023-present.

University of Texas at Austin, Assistant Professor, 2018-2023.

University of Chicago, L.E. Dickson Instructor, 2017-2018.

MIT, C.L.E. Moore Instructor, 2014-2017.

Awards

Sloan Research Fellowship, September 2023 to September 2025.

NSF Division Of Mathematical Sciences Standard Grant (Award No. 2101984), July 2021 to June 2024.

NSF Mathematical Sciences Postdoctoral Research Fellowship (Award No. 1402003). July 2014 to June 2018.

Publications and Preprints

"An arithmetic application of geometric Langlands," 2023.

"Affine Beilinson-Bernstein localization at the critical level." Joint with David Yang, 2022.

"Non-vanishing of geometric Whittaker coefficients for reductive groups." Joint with Joakim Færgeman, 2022.

"Coulomb branches of noncotangent type." Joint with Sasha Braverman, Misha Finkelberg, Gurbir Dhillon, and Roman Travkin, with appendices by Gurbir Dhillon and Theo Johnson-Freyd, 2022.

"The Arinkin-Gaitsgory temperedness conjecture." Joint with Joakim Færgeman, 2021.

"Tate's thesis in the de Rham setting." Joint with Justin Hilburn, to appear, *Journal of the American Mathematical Society*, 2022.

"Exceptional loci in Lefschetz theory." Joint with Geoff Smith, *Bulletin of the London Mathematical Society* 54 (5 2022): 1898–1903.

"Automorphic functions as the trace of Frobenius." Joint with Dima Arinkin, David Kazhdan, Dennis Gaitsgory, Nick Rozenblyum, and Yakov Varshavsky, 2021.

"Duality for automorphic sheaves with nilpotent singular support." Joint with Dima Arinkin, David Kazhdan, Dennis Gaitsgory, Nick Rozenblyum, and Yakov Varshavsky, 2020.

"Beilinson-Bernstein localization for affine W-algebras." Joint with Gurbir Dhillon, to appear, *Advances in Mathematics*, 2023.

"The stack of local systems with restricted variation and geometric Langlands theory with nilpotent singular support." Joint with Dima Arinkin, David Kazhdan, Dennis Gaitsgory, Nick Rozenblyum, and Yakov Varshavsky, 2020.

"Projective generation for equivariant D-modules." Joint with Gwyn Bellamy and Sam Gunningham, *Transformation Groups*, 2021, 1–13.

"Fundamental local equivalences in quantum geometric Langlands." Joint with Justin Campbell and Gurbir Dhillon. *Compositio Mathematica*, 2021. 2020.

"Affine Beilinson-Bernstein localization at the critical level for GL_2." *Annals of Mathematics* 195, no. 1 (2022): 251–335.

"Homological methods in semi-infinite contexts," 2019.

"On the Dundas-Goodwillie-McCarthy theorem," 2018.

"Chiral principal series categories II: the factorizable Whittaker category," 2016.

"W-algebras and Whittaker categories." *Selecta Mathematica* 27, no. 3 (2021): 1–114.

Raskin, Sam. "A generalization of the b-function lemma." *Compositio Mathematica* 157, no. 10 (2021): 2199–2214.

"Acyclic complexes and 1-affineness." Joint with Dennis Gaitsgory, 2015.

"On the notion of spectral decomposition in local geometric Langlands," 2015.

"Chiral principal series categories I: finite dimensional calculations." *Advances in Mathematics* 388 (2021): 107856.

"Chiral categories," 2015.

"D-modules on infinite dimensional varieties," 2015.

"Coherent sheaves on formal complete intersections via DG Lie algebras." *Mathematical Research Letters* 21, no. 1 (2014): 207–223.

"A geometric proof of the Feigin-Frenkel theorem." *Representation Theory* 16 (2012): 489–512.

Conferences organized

Winter school on local geometric Langlands theory, University Paris 7, January 15-19, 2018.

Invited lectures

Western Hemisphere Colloquium on Geometry and Physics, May 8, 2023, "Recent progress in the geometric Langlands program."

University of Chicago/Max Planck Institute (online seminar), Geometric Langlands seminar, January 31, February 21, February 28, April 4, April 18, and April 25, 2023; various talks on global geometric Langlands.

Yale University, January 18, 2023, "Some advances in the geometric Langlands program."

Johns Hopkins University, December 1, 2022, "Some advances in the geometric Langlands program."

IHES, 2022 Summer School on the Langlands Program, July 20, 2022 (two talks), "What does geometric Langlands mean to a number theorist?"

University of Warsaw, String Math 2022 (conference), July 15, 2022, "Quantum duality and Morita theory for chiral algebras."

Universität Hamburg, Colloquium of the Center for Mathematical Physics, May 12, 2022, "Quantum duality and Morita theory for chiral algebras."

University of Texas at Austin, Geometry Seminar, April 14, 2022, "Non-vanishing of Whittaker coefficients for reductive groups."

University of Chicago/Harvard University (online seminar), Geometric Langlands seminar, April 4, April 11, April 18, and May 2, 2022, "Non-vanishing of Whittaker coefficients for reductive groups."

IMPA, Thematic Program on Vertex and Chiral Algebras (conference), March 21, 2022, "Non-vanishing of Whittaker coefficients for reductive groups."

Mathematisches Forschungsinstitut Oberwolfach, Automorphic Forms, Geometry and Arithmetic (conference), August 24th, 2021, "Geometric Langlands and unramified automorphic forms."

Tate Institute of Fundamental Research - International Centre for Theoretical Sciences, Quantum Fields, Geometry and Representation Theory 2021, July 13th, 14th, and 16th, 2021, "Geometric Langlands and $3d$ mirror symmetry" (minicourse).

Sorbonne Université (Campus Pierre et Marie Curie), Automorphic forms seminar, May 27th, June 3rd and June 17th, 2021, "Geometric Langlands for ℓ-adic sheaves."

University of Edinburgh, Hodge Seminar, March 10th, 2021, "Geometric Langlands for ℓ-adic sheaves."

University of Texas at Austin, Geometry Seminar, February 4th, 2021, "Geometric Langlands for ℓ-adic sheaves."

Yale University, Representation Theory Seminar, February 1st, 2021, "Tate's thesis in the de Rham setting."

Arithmetic Geometry and Quantum Field Theory, Online Mini-Conference on the Geometric Langlands Correspondence, January 13th, 2021, "Geometric Langlands for ℓ-adic sheaves."

University of Chicago/Harvard University (online seminar), Geometric Langlands seminar, December 16th and 23rd, 2020, "Proof of the Trace Conjecture."

Johns Hopkins University, Algebra and Number Theory Day, November 7, 2020, "Geometric Langlands for ℓ-adic sheaves."

University of Massachusetts Amherst, Representation Theory Seminar, November 2nd, 2020, "Geometric Langlands for ℓ-adic sheaves."

University of Toronto, Geometric representation theory seminar, October 23rd, 2020, "Geometric Langlands for ℓ-adic sheaves."

Sydney Mathematical Research Institute, Algebra and Geometry Online seminar, August 4th, 2020, "Tate's thesis in the de Rham setting."

Geometric Representation Theory, Conference held jointly between Perimeter Institute and Max Planck Institute, June 22nd, 2020, "Tate's thesis in the de Rham setting."

University of Chicago/Harvard University (online seminar), Geometric Langlands seminar, May 19, 26, and June 9th, 2020, "Tate's thesis in the de Rham setting" and "$3d$ $\mathcal{N} = 4$ quantum field theories."

Perimeter Institute, Mathematical Physics Seminar, March 5th, 2020, "Affine Beilinson-Bernstein localization at the critical level for GL_2."

L-Functions and Geometric Representation Theory, 4th Nisyros Conference on Automorphic Representations & Related Topics, July 26, 2019, "The categorical Weil representation."

MSRI, Hot Topics: Recent progress in Langlands Program, April 11, 2019, Conference, "The moduli space of restricted shtukas and the category of sheaves on it" (two lectures).

MSRI, Derived algebraic geometry and its applications, Conference, March 26, 2019, "Affine Beilinson-Bernstein at the critical level for GL_2."

MSRI, Introductory Workshop: Derived Algebraic Geometry and Birational Geometry and Moduli Spaces, February 4, 5, and 7, 2019, "The notion of singular support in DAG and its applications."

University of Texas at Austin, Geometry seminar, September 6, 2018, "Lecture on the work of the 2018 Fields Medalists: Peter Scholze."

Kavli Institute for the Physics and Mathematics of the Universe, Conference, Vertex algebras, factorization algebras and applications, July 19, 2018, "Affine Beilinson-Bernstein at the critical level for GL_2."

Mathematisches Forschungsinstitut Oberwolfach, Arbeitsgemeinschaft: Topological Cyclic Homology, "The theorem of Dundas-Goodwillie-McCarthy," April 4, 2018.

University of Chicago, Geometric Langlands seminar, February 8, 12 and 19, 2018, Series of talks on Whittaker models and affine Beilinson-Bernstein for GL_2.

University Paris 7, Winter school on local geometric Langlands theory, "Jacquet functors for actions of loops groups on categories," "The functor of weak $G(K)$-invariants," and "Quantum Langlands for a torus," January 16-17, 2018.

University of Melbourne, Pure mathematics colloquium, September 15, 2017, "Tempered local geometric Langlands."

University of Texas at Austin, Ben-Zvi seminar, November 2, 2016, "$\mathcal{W}$-algebras and Whittaker categories."

University of Texas at Austin, Geometry seminar, January 26, 2017, "Tempered local geometric Langlands."

University of Wisconsin-Madison, Colloquium, January 20, 2017, "Tempered local geometric Langlands."

University of Wisconsin-Madison, Algebraic geometry seminar, January 20, 2017, "$\mathcal{W}$-algebras and Whittaker categories."

University of Toronto, Colloquium, January 16, 2017, "Tempered local geometric Langlands."

University of Oregon, Colloquium, January 9, 2017, "Tempered local geometric Langlands."

University of Massachusetts Amherst, Colloquium, December 23, 2016, "Tempered local geometric Langlands."

MIT, Geometric representation theory seminar, November 2, 2016, "$\mathcal{W}$-algebras and Whittaker categories."

University of Chicago, Geometric Langlands Seminar, May 26, 2016, "$\mathcal{W}$-algebras and Whittaker categories."

University of Michigan, Conference, Advances in geometric representation theory, May 9, 2016, "$\mathcal{W}$-algebras and Whittaker categories."

University of Chicago, Geometric Langlands Seminar, May 23, 2016, "Single variable calculus and local geometric Langlands."

University of Massachusetts Amherst, April 27, 2016, "$\mathcal{W}$-algebras and Whittaker categories."

IHES, March 23, 2016, "Single variable calculus and local geometric Langlands."

Caltech, Algebraic geometry seminar, December 8, 2015, "Single variable calculus and local geometric Langlands."

MIT, Infinite-dimensional algebra seminar, October 2, 2015, "Single variable calculus and local geometric Langlands."

Oxford, Conference, Derived structures in geometry and representation theory, September 3, 2015, "On the notion of spectral decomposition in local geometric Langlands."

BIRS, Conference, Factorizable Structures in Topology and Algebraic Geometry, August 13, 2015, "Equivalences of factorization categories in geometric Langlands."

CIRM, Conference, Geometric Langlands and derived algebraic geometry, April 1, 2015, "Spectral decomposition of the principal series category."

Paris, Réseau d'Étudiants en Géométrie Algébrique, March 27, 2015, "Twisted cohomology of Zastava spaces and the semi-infinite flag variety."

Rice University, Algebraic geometry seminar, March 10th, 2015, "Twisted cohomology of Zastava spaces and the semi-infinite flag variety."

University of Chicago, Geometric Langlands seminar, November 10 and 13, 2014, "Chiral principal series categories" (two lectures).

Seattle, Conference, Algebraic geometry: new connections for recent Ph.D.'s, August 2014.

Nantes University, Conference, GRIFGA/Lebesgue Summer school on derived categories, June 2014.

Hebrew University of Jerusalem, Conference, Categorical geometric Langlands correspondence, March 2014 (four lectures).

University of Chicago, Geometric Langlands seminar, April 16, 19, and 24, 2012, "A geometric approach to the Feigin-Frenkel theorem" (three lectures).

MIT, Infinite-dimensional algebra seminar, Sep. 30, 2011, "A geometric approach to the Feigin-Frenkel theorem."

University of Michigan, Algebraic geometry seminar, Feb. 25, 2010. "Geometric class field theory."

Service

Referee work.

Graduate advisor for Tom Gannon, Kenny Schefers (joint w/David Ben-Zvi), Tynan Ochese, and Joakim Færgeman.

Teaching

Course leader, UT Austin Math 375T: Calculus on Manifolds, Spring 2022.

Course leader, UT Austin Math 380C: Algebra I, Fall 2021.

Course leader, UT Austin Math 380D: Algebra II, Spring 2021.

Course leader, UT Austin Math 427J: Differential equations with linear algebra, Fall 2020.

Course leader, UT Austin Math 408L: Integral calculus, Spring 2020.

Course leader, UT Austin Math 392C: p-adic Hodge theory, Fall 2019.

Course leader, UT Austin Math 392C: Algebraic geometry, Fall 2018.

Recitation leader, MIT Math 18.03: Differential equations (three sections), Spring 2017.

Course leader, MIT Math 18.786: Number theory II, Spring 2016. Materials distributed on MIT OCW.

Recitation leader, MIT Math 18.06: Linear algebra, Fall 2015.

Recitation leader, MIT Math 18.03: Differential equations (three sections), Spring 2015.

Awarded Certificate of Distinction in Teaching from the Bok Center for Teaching and Learning, Fall 2014.

Led introductory course on arithmetic of quadratic forms ("tutorial" at Harvard), Spring 2014.

Section leader, Harvard Math 21b: Linear algebra and differential equations, Fall 2011 and Fall 2012.

Led introductory course on representation theory of finite groups ("tutorial" at Harvard), Summer 2011.