

JORDAN S. ELLENBERG

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Employment Associate Professor, University of Wisconsin (2007-)
Assistant Professor, University of Wisconsin (2005-)
Assistant Professor, Princeton University (2001-2005)
Instructor, Princeton University (1998-2001)
MSRI Postdoctoral Fellow (Fall 1999)

Education **Harvard University**, Cambridge, MA.
Ph.D. in Mathematics, June, 1998. Dissertation under the supervision of Prof. Barry Mazur: *Hilbert modular forms and the Galois representations associated to Hilbert-Blumenthal abelian varieties*.
Harvard University, Cambridge, MA.
A.B. summa cum laude in Mathematics, June, 1993.

Research Interests Arithmetic algebraic geometry, number theory.

Research Publications “Homological stability for Hurwitz spaces and the Cohen-Lenstra conjecture over function fields,” with A. Venkatesh and C. Westerland, in preparation.
“Random pro- p groups, braid groups, and random tame Galois groups,” with N. Boston, submitted.
“Linnik’s ergodic method and the distribution of integer points on spheres,” with P. Michel and A. Venkatesh, submitted.
“Every curve is a Teichmüller curve,” with D.B. McReynolds, submitted.
“Positive motivic measures are counting measures,” with M. Larsen, to appear, *Algebra and Number Theory*
“The Kakeya set and maximal conjectures for algebraic varieties over finite fields,” with R. Oberlin and T. Tao, to appear, *Mathematika* (2010)
“The Diophantine equation $A^4 + 2^d B^2 = C^n$ ” (with M.A. Bennett and N.C. Ng,) to appear, *Int. J. Number Theory*.
“Non-simple abelian varieties in a family: geometric and analytic approaches,” (with C. Elsholtz, C. Hall, and E. Kowalski,) to appear, *J. Lond. Math. Soc.* (2) 80, no.1, 135–154 (2009)
“Points of low height on \mathbf{P}^1 over number fields and bounds for torsion in class groups,” in *Computational Arithmetic Geometry*, K. Lauter and K. Ribet, eds., AMS Contemp. Math. 463 (2008)
“Local-global principles for representations of quadratic forms,” (with A. Venkatesh,) *Invent. Math.* 171, no. 2, 257–279 (2008)
“Reflection principles and bounds for class group torsion,” (with A. Venkatesh,) *Int. Math. Res. Not.* no.1, Art. ID rnm002 (2007)
“Asymptotics of coinvariants of Iwasawa modules under non-normal subgroups,” (with A. Logan,) *Math. Res. Lett.* 14, no.5, 769–773 (2007)
Appendix to “Counting maximal arithmetic subgroups,” by M. Belolipetsky, (with A. Venkatesh,) *Duke Math. J.* 140, no. 1, 1-33 (2007)

“Selmer groups and Mordell-Weil groups of elliptic curves over towers of function fields,” *Compos. Math.* 142, no. 5, 1215–1230 (2006)

“The number of extensions of a number field with fixed degree and bounded discriminant,” (with A. Venkatesh,) *Ann. of Math.* 163 (2), 723–741 (2006)

“Pro- p groups and towers of rational homology spheres,” (with N. Boston) *Geometry and Topology* 10, 331–334 (2006)

“Serre’s conjecture over \mathbf{F}_9 ,” *Ann. of Math.* 161 (3), 1111–1142 (2005)

“Uniform bounds for rational points on non-rational curves,” (with A. Venkatesh,) *Int. Math. Res. Not.* 35, 2163–2181 (2005)

“A sharp diameter bound for unipotent groups of classical type over $\mathbf{Z}/p\mathbf{Z}$ ” (with J.Tymoczko,) to appear, *Forum Math.*

“Counting extensions of function fields with bounded discriminant and specified Galois group,” (with A. Venkatesh,) in *Geometric Methods in Algebra and Number Theory*, F. Bogomolov and Y. Tschinkel, eds. (2005)

“On the error term in Duke’s estimate for the average special value of L -functions,” *Canad. Math. Bull.* 48, no.4, 535–546 (2005)

“Galois representations attached to \mathbf{Q} -curves and the generalized Fermat equation $A^4 + B^2 = C^p$,” *Amer. J. Math* 126(4), 763–787 (2004)

“K3 surfaces over number fields with geometric Picard number one,” in *Arithmetic of Higher Dimensional Algebraic Varieties*, B. Poonen and Y. Tschinkel, eds. (2004)

“ \mathbf{Q} -curves and Galois representations,” in *Modular Curves and Abelian Varieties*, J. Cremona, J.-C. Lario, J. Quer, K. Ribet, eds. (2004)

“On the average number of octahedral modular forms,” *Math. Res. Lett* 10, 269–273 (2003)

“Galois invariants of dessins d’enfants,” in *Arithmetic Fundamental Groups and Noncommutative Algebra*, M. Fried and Y.Ihara, eds. (2002)

“Endomorphism algebras of Jacobians”, *Adv. Math.* 162, 243–271 (2001)

“On the modularity of \mathbf{Q} -curves” (w. C. Skinner), *Duke Math. J.* 109, no. 1, 97–122 (2001)

“Finiteness of torsion subschemes of Hilbert-Blumenthal abelian varieties,” *J. Reine Angew. Math.* 532, 1–32 (2001)

“Congruence ABC implies ABC,” *Indag. Math.*, N.S., 11 (2), 197–200 (2000)

“The combinatorics of rewritability in finite groups,” *Group theory (Granville, OH, 1992)*, 250–261, World Sci. Publishing, River Edge, NJ, 1993 (with G. Sherman, L. Smithline, C. Sugar, E. Wepsic)

Expository Publications

General-interest articles on mathematical topics for various publications, including *The New York Times Magazine*, *Slate*, *The New York Times Book Review*, *Wired*, *Seed*, the *Washington Post*, and the *Believer*.

“Arithmetic algebraic geometry,” and “Elliptic curves,” articles for lay readers, in *The Princeton Companion to Mathematics*, T. Gowers, ed.

“The idea of a moduli space,” article for high school students, published in *Imagine*, May/June 1998, reprinted in *Math Horizons*, November 1998.

Awards, Prizes, Grants

NSF Research Training Grant, “Algebraic Geometry and Number Theory at the University of Wisconsin,” \$1.6m, held 2009–14, co-PI with Prof. Ken Ono.

NSF-CAREER Grant DMS-0448750, “Rational points on varieties and non-abelian Galois groups” Held 2005–2010

Alfred P. Sloan Research Fellowship Awarded 2005

NSF Grant DMS-0401616 Held 2004–2005

NSA Young Investigator Grant Held 2001–2004

National Science Foundation Graduate Fellow (1994–1997)

Department of Mathematics, Harvard University.

Barry M. Goldwater Scholarship (1991–92)

Received national scholarship for undergraduate study of mathematics.

William Lowell Putnam Competition (1989–92)

Placed in top six on national competition in 1990 and 1992, top ten in 1989 and 1991.

U.S.A. Mathematical Olympiad (1989)

Received first place.

International Mathematical Olympiad (1987–89)

One of six members of U.S. team; received gold medal in 1987 and 1989, silver medal in 1988.

**Professional
Service**

Organizer, miniconference on pseudo-Anosovs with low dilatation, April 2010

Organizer, “Math And...” interdisciplinary seminar series, U. of Wisconsin

Editorial Board, Journal de Théorie des Nombres de Bordeaux

Organizer, Miniconference on pro-p groups and pro-p algebras in number theory, April 2007

Organizer, Midwest Algebraic Number Theory Day, October 2005 and November 2009

Organizer, Graduate Student Conference In Number Theory, October 2005, November 2007, November 2009

Organizer, AIM workshop on the Birch-Swinnerton-Dyer Conjecture, Fall 2003

**Recent
Given**

Talks Invited Address, AMS Central Section Meeting, Notre Dame, October 2010

Plenary Lecture, Canadian Number Theory Association XI, July 2010

Invited Lecture, “The Arithmetic of Fundamental Groups,” Heidelberg, February 2010

University of Georgia Colloquium, November 2009

Duke Algebraic Geometry Seminar, November 2009

University of Illinois Urbana-Champaign Colloquium, September 2009

Invited Lecture, “Anabelian Geometry,” Newton Institute, August 2009

Invited Lecture, “Spaces of curves and their interaction with diophantine problems,” Columbia FRG conference, June 2009

Northwestern U. Colloquium, May 2009

Princeton Number Theory Seminar, April 2009

Invited Lecture, Western Algebraic Geometry Seminar, Berkeley, April 2009

Invited Lecture, Southern California Number Theory Day, October 2008

Quebec-Vermont Number Theory Seminar, October 2008

Brandeis-Harvard-MIT-Northeastern Joint Colloquium, September 2008

Conference on current developments in the Langlands program, Northwestern, May 2008

U. Texas Number Theory Seminar, April 2008

Ohio State Colloquium, January 2008

UI-Chicago Number Theory Seminar, December 2007

Penn Galois Theory Seminar, November 2007

Oberwolfach workshop on explicit methods in number theory, July 2007

Brown Colloquium, February 2007

BIRS conference on “Explicit Methods for Rational Points”, February 2007

University of Michigan Arithmetic Seminar, February 2007

AMS Special Session on Arithmetic Geometry, January 2007

University of Minnesota Colloquium, October 2006

University of Chicago Colloquium, October 2006

Canadian Number Theory Association IX, Vancouver, July 2006

Invited lecture, Mini-conference on ergodic theory and diophantine problems, New York, May 2006

Oberwolfach workshop on pro-p extensions of global fields and pro-p groups, May 2006
 BIRS workshop on analytic methods for diophantine equations, May 2006
 AMS special session on computational arithmetic geometry, April 2006
 Invited lecture, Western Algebraic Geometry Seminar, March 2006
 Stanford dessins d'enfants seminar, March 2006
 Introductory Workshop on Rational and Integral Points, MSRI, January 2006
 Invited lecture, 2005 AMS Summer Institute on Algebraic Geometry, Seattle, August 2005
 Invited lecture, Coates 60th Birthday Conference, Beijing, August 2005
 Penn Algebra Seminar, May 2005
 New York Number Theory Seminar, April 2005
 Duke Algebraic Geometry Seminar, March 2005
 Harvard Number Theory Seminar, February 2005
 Brown Algebra Seminar, February 2005
 DePrima Memorial Undergraduate Mathematics Lecture, Cal Tech, January 2005
 UCLA Number Theory Seminar, January 2005
 Cal Tech Number Theory Seminar, January 2005
 CMS special session on Arithmetic Geometry, December 2004
 Quebec-Vermont Number Theory Seminar, December 2004
 BIRS workshop: Diophantine approximation and analytic number theory, November 2004
 Canadian Number Theory Association VIII, invited speaker, June 2004
 University of Bordeaux Algorithmic Number Theory Seminar, June 2004
 AMS special session on Elliptic Surfaces and Elliptic Fibrations, April 2004
 University of Pennsylvania Galois Seminar, April 2004
 Johns Hopkins Number Theory Seminar, April 2004
 University of Utah, February 2004
 Ohio State University, February 2004
 Cornell University, February 2004
 Boston University, February 2004
 University of Toronto, February 2004
 Columbia University Special Seminar, February 2004
 Cal Tech Number Theory Seminar, January 2004
 University of Southern California Number Theory Seminar, January 2004
 University of Texas Number Theory Seminar, January 2004
 Rice University Colloquium, January 2004
 Pittsburgh Algebra Seminar, January 2004
 AMS special session on Arithmetical Algebraic Geometry, January 2004

Ph.D. advising

Seyfi Türkelli

(Ph.D. 2009) Assistant Professor, U. Georgia.

Patrick Rault

(Ph.D. 2008) Assistant Professor, SUNY-Geneseo.

Derek Garton, Guillermo Mantilla-Soler, Ekin Ozman, Yongqiang Zhao

Ph.D. in progress.

**Teaching
Experience**

Collaborative Undergraduate Research Lab, University of Wisconsin (2005)

Supervised four undergraduates and two high school students in collaborative research in number theory.

Course development (2001)

Developed a new course in elementary number theory, Math 214 (Numbers, Equations, and Proofs) for undergraduates interested in majoring in mathematics. Average student rating 4.8/5.

Princeton University (1998-2005)

Taught Math 104 (Calculus) and Math 204 (Advanced Linear Algebra) to Princeton undergraduates. Taught Math 509 (Algebraic Number Theory) to Princeton graduate students. Advised three senior theses.

Freshman Advisor, Princeton University (2000-05)

Advised incoming freshmen with strong mathematical interests.