

Curriculum Vitae

University of Chicago
Department of Mathematics
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Personal

Born February 23rd, 1976 in Dallas, Texas

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Education

University of Texas in Austin. Ph.D., May 2006. Advisor: Alan W. Reid.

University of Texas in Arlington. B.S., May 2000. (1st in class).

Appointments

Dickson instructor and NSF postdoc, University of Chicago, 2007–2010.

Taussky-Todd instructor, California Institute of Technology, 2006–2007

University of Texas in Austin assistant instructor, Fall 2005

University of Texas in Austin teaching assistant, Fall 2000–Summer 2003

Awards and Honors

NSF *Postdoctoral fellowship*, 2007-2010.

Clay Mathematics Institute *Lift-off fellowship*, Summer 2006.

UT Austin *Continuing education fellowship*, 2004-2005

UT Austin *V.I.G.R.E. fellowship*, 2003-2004

UT Austin *Departmental fellowship*, Summer 2001

UT Arlington *Outstanding senior math major*, 2000

UT Arlington *Continuing education scholarship*, 1999-2000

UT Arlington *Outstanding junior math major*, 1999

Visiting positions

Université Paris-Sud 11, May 2009. Hosted by Emmanuel Breuillard.

Tokyo Metropolitan University, December 2006. Hosted by Yoshi Kamishima

Tokyo Metropolitan University, January 2006. Hosted by Yoshi Kamishima

University of Chicago, July 2005 and November 2005. Hosted by Benson Farb

University of Maryland, February-March 2005. Hosted by Bill Goldman and Richard E. Schwartz

Durham University, July 2004. Hosted by John Parker

Invited conferences lectures and colloquia

AMS Spectral problems on compact Riemannian manifolds special session, San Francisco, CA (20 minutes, January 2010).

AMS Lattices, Coxeter groups, and buildings special session, Boca Raton, FL (20 minutes, October 2009)

Dartmouth College colloquium, Hanover, NH (1 hour, September 2009).

Institut de Mathématiques de Bourgogne Colloquium, Dijon, France (1 hour, June 2009).

9th Panhellenic Geometry Conference, Crete (30 minutes, May 2009).

Université Paris-Sud 11 graduate student colloquium, Orsay, France (1 hour, May 2009).

G³ conference, South Padre, TX (50 minutes, April 2009).

AMS Geometric group theory special session, Urbana, IL (20 minutes, March 2009).

AMS Hyperbolic geometry and Teichmüller theory special session, Urbana, IL (20 minutes, March 2009).

University of Oklahoma colloquium, Norman, OK (1 hour, October 2008).

AMS Spectral geometry special session, San Diego, CA (20 minutes, January 2008).

Sixth Workshop on Lie Theory and Geometry, Cordoba, Argentina (45 minutes, October 2007).

Topology, Complex Analysis and Arithmetic of Hyperbolic Spaces, Kyoto, Japan (three 1 hour lectures, December 2006).

AMS Complex geometry special session, Salt Lake City, UT (40 minutes, October 2006).

Mapping class groups: Torelli-fest, Chicago, IL (45 minutes, August 2006).

Mathematical Institute of Gdansk University workshop, Gdansk, Poland (June 2006).

Tokyo Metropolitan University colloquium, Tokyo, Japan (1 hour, January 2006)

Osaka City University colloquium, Osaka, Japan (1 hour, January 2006).

Wasatch Topology Conference, Park City, UT (1 hour, December 2005).

Crystallographic groups and their generalization, IV, Oostende, Belgium (25 minutes, June 2005).

Géométrie hyperbolique complexe, Luminy, France (1 hour, July 2003).

Seminar lectures (past and future)

Yale University geometry (Spring 2010)
Michigan State geometry (Spring 2010)
University of Utah Max Dehn (Spring 2010)
Miami Ohio topology (Fall 2009)
University of Virginia algebra (Fall 2009)
University of Virginia topology (Fall 2009)
University of Chicago dynamics (Fall 2009)
Stoney Brook dynamics (Fall 2009)
Emory University algebraic groups (Fall 2009)
University of Muenster geometry (Spring 2009)
EPFL geometry (Spring 2009)
Université Paris-Sud 11 dynamics (Spring 2009)
Institut Fourier number theory (Spring 2009)
Dartmouth Geometry (Spring 2009)
Ohio State University Topology (Spring 2009)
Princeton University Topology (Spring 2009)
University of Wisconsin Geometry/Topology seminar (Fall 2008)
Stanford University Topology (Spring 2007)
University of Michigan Lie Groups (Spring 2007, Fall 2009)
Tokyo Metropolitan University Topology (Fall 2006)
Tokyo Institute of Technology Topology (Fall 2006)
University of California Santa Barbara Topology (Fall 2006)
Brown University Geometry (Fall 2006)
University of Southern California Topology (Fall 2006)
University of Illinois at Urbana-Champaign Geometry (Fall 2006)
California Institute of Technology Geometry (Spring 2006, Fall 2007)
University of Texas in Arlington GAGA (Spring 2006)
University of Texas in Arlington AGANT (Spring 2006)
Louisiana State University Geometry (Spring 2006)
Osaka City University Complex Dynamics (Spring 2006)

University of Illinois at Urbana-Champaign Group Theory (Fall 2005)

University of Chicago Topology/Geometry (Spring 2005, Fall 2006, Spring 2009, Fall 2009)

University of Illinois at Chicago Topology (Spring 2005, Fall 2008)

University of Maryland Geometry (2 talks Spring 2005)

University of Texas Algebra (2 talks Spring 2005)

Columbia University Topology (Fall 2004)

University of Texas Topology (Fall 2003, Fall 2004, Fall 2005, Spring 2006, Fall 2006)

University of Texas Analysis (Fall 2002)

Teaching: Courses taught

Math 305 (Pre-Calculus), University of Texas in Austin, Fall 2005.

Graduate Topics Course (Introduction to arithmetic constructions), Caltech, Fall 2007.

MA 109 B (Geometry of curves and surfaces), Caltech, Winter 2007.

Math 204 (Real Analysis, 2nd term), University of Chicago, Spring 2008.

Math 275 (Introduction to Partial Differential Equations), University of Chicago, Spring 2008.

REU lecturer (with B. Schmidt). (Geometric group theory, convex geometry, and dynamics). Summer 2008.

Math 199 (Introduction to linear algebra and analysis), University of Chicago, Fall 2009.

Math 199 (Introduction to linear algebra and analysis), University of Chicago, Fall 2009.

Teaching: Awards

Invited speaker for College of Natural Science TA orientation, 2003

Department of Mathematics award for undergraduate teaching, 2002

Office of Graduate Studies, *Outstanding Teaching Assistant* Nomination, 2002

Graduate Students

- Justin Malestein, University of Chicago. Research mentor (with B. Farb). Second reader of thesis. Graduated Spring 2009. Postdoc at Temple.
- Ian Biringer, University of Chicago. Research mentor (with J. Souto). Graduated Spring 2009. NSF postdoc at Yale.
- Khalid Bou-Rabee, University of Chicago. Co-advisor (with B. Farb). Expected graduation Spring 2010.
- Justin Sinz, University of Chicago. Research mentor (with B. Farb and M. Kisin). Expected graduation Spring 2010.
- Vaibhav Gadre, Caltech. Committee member for candidacy exam, 2007.

- Asaf Hadari, University of Chicago. Research mentor (with B. Farb); Teichmüller theory, polygonal dynamics.
- Alex Wright, University of Chicago. Reading courses, Summer 2008; Lie theory and algebraic groups.
- Eugene Eyeson, University of Chicago. Reading courses, Summer 2008, Fall 2008; analytic and algebraic number theory.

Undergraduate Students

- Lucas Culler, University of Chicago. Reading course, Spring 2008; elliptic operators on manifolds and Hodge theory. MIT graduate student.
- David Rosen, Caltech. SURF research advisor, Summer of 2007; arithmetic Fuchsian groups. Texas graduate student.
- James Berglund, Caltech. Mentor for MA 11, Spring 2007. Algebraic geometry. UC San Diego graduate student.
- Sukhada Fadnavis, Caltech. Mentor for MA 11, Spring 2007. Mapping class groups. Stanford graduate student.

Miscellaneous

Coorganizer (w/ Jeff Brock) of the conference *Tameness in Texas*, June 2004

Topology seminar organizer, Caltech 2006-2007.

Geometry and Topology seminar organizer, University of Chicago 2007-2010.

Dynamics seminar organizer, University of Chicago 2007-2010.

Referee for *Geometriae Dedicata*, *LMS Bulletin*, *Proc. LMS*, *Proc. Symp. Pure and Applied Math*, *Glasgow Mathematical Journal*, *American Journal of Math*, *Geometry and Topology*, *Pacific Journal of Math*.

Reviewer for *Zentralblatt Math*.

Mathematical Writing

Published

1. *Peripheral separability and cusps of arithmetic hyperbolic orbifolds*. *Algebr. and Geom. Topol.* **4** (2004), 721-755.
2. *Finite subgroups of arithmetic lattices in $U(2,1)$* , *Geom. Dedicata*. **122** (2006) 135-144.
3. (w/ C. J. Leininger) *Separable subgroups of mapping class groups*, *Topology Appl.* **154** (2007), 1-10.
4. *Arithmetic cusp shapes are dense*, *Geom. Dedicata* **129** (2007), 47-55.
5. (w/ C. J. Leininger, W. D. Neumann, and A. W. Reid) *Length and eigenvalue equivalence*, *Int. Math. Res. Not.* **24** (2007), 24 pp.
6. *Cusps of Hilbert modular varieties*, *Math. Proc. Cambridge Philos. Soc.* **144** (2008), no. 3, 749-759.
7. *Controlling manifold covers of orbifolds*, *Math. Res. Lett.* **16** (2009), 651-662.
8. (with L. Louder) *Graphs of subgroups of free groups*, *Algebr. and Geom. Topol.* **9** (2009), 327-335.

Submitted

9. *Isospectral locally symmetric manifolds*, submitted.
10. (w/ A. W. Reid) *The genus spectrum of a hyperbolic 3-manifold*, submitted.
11. *Congruence subgroup problem for braid groups: Thurston's proof*, submitted.
12. (w/ K. Bou-Rabee) *Asymptotic growth and least common multiples in groups*, submitted.
13. (w/ J. Ellenberg) *Every curve is a Teichmüller curve*, submitted.
14. (w/ K. Bou-Rabee) *Bertrand's postulate and subgroup growth*, submitted.

In preparation

15. (w/ B. Schmidt) *On the dynamics of Hammer's X-ray problem*, in preparation.
16. (w/ J. Ellenberg) *Group actions on varieties and isometry groups of hyperbolic manifolds*, in preparation.
17. (w/ M. Belolipetsky and B. Farb) *Irreducible lattices in linear algebraic groups*, in preparation.

Books and monographs

Arithmetic lattices in $SU(n, 1)$, partial working draft, 79 pages.

Conference proceedings

Arithmetic lattices and weak spectral geometry, Topology, complex analysis, and arithmetic of hyperbolic spaces, RIMS **1571** (2007), 59–81.

References

Alan W. Reid, University of Texas (Ph.D. advisor)
Benson Farb, University of Chicago (NSF mentor)
Carolyn Gordon, Dartmouth College
Alex Lubotzky, Hebrew University
Walter Neumann, Columbia University
Rich Schwartz, Brown University
Bruce Palka, NSF (teaching)