

# Curriculum Vitae

DAVID HELM

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## Education/Employment:

- 2007 – Assistant Professor, University of Texas
- 2003 – 2007 Benjamin Pierce Assistant Professor, Harvard University
- 2003 Ph.D. University of California, Berkeley, Mathematics (advisor: Ken Ribet)
- 1995 A.B. Harvard University, Cambridge, MA, Mathematics. (Magna cum laude, with highest honors in field.)

## Scientific/Academic Honors and Grants:

- 2003 – 2005 National Science Foundation Postdoctoral Research Fellowship
- 1999 – 2002 National Science Foundation Graduate Research Fellowship
- 2001 Charles B. Morrey, Jr. Award (Berkeley Math Department)

## Research Interests:

Number theory, particularly the geometry of Shimura varieties and its application to the Langlands correspondence.

## Publications and Preprints:

1. (with Eric Katz) *Tropicalization and Berkovich skeleta*, in preparation.
2. (with Matthew Emerton) *The local Langlands correspondence for  $GL_n$  in families*, in preparation.
3. *On  $l$ -adic families of admissible representations of  $GL_2(\mathbb{Q}_p)$* , in preparation.
4. *On  $l$ -adic families of cuspidal representations of  $GL_2(\mathbb{Q}_p)$* , submitted, available at [arxiv:0909.2569](https://arxiv.org/abs/0909.2569).
5. (with Eric Katz) *Monodromy filtrations and the topology of tropical varieties*, submitted, available at [arxiv:0804.3651](https://arxiv.org/abs/0804.3651)
6. *Towards a geometric Jacquet-Langlands correspondence for unitary Shimura varieties*, preprint, available at [arxiv:math/0511146](https://arxiv.org/abs/math/0511146)
7. *Mazur's principle for  $U(2,1)$  Shimura varieties*, preprint, available at [arxiv:math/0606731](https://arxiv.org/abs/math/0606731)
8. *A geometric Jacquet-Langlands correspondence for  $U(2)$  Shimura varieties*, submitted, available at [arxiv:math/0409458](https://arxiv.org/abs/math/0409458)
9. *On maps between modular Jacobians and Jacobians of Shimura curves*, Israel J. Math **160**, 61–117. [arxiv:math.NT/0401265](https://arxiv.org/abs/math.NT/0401265)
10. (with Brian Osserman) *Flatness of the linked Grassmannian*, Proc. Amer. Math. Soc **136** (2008), no. 10, 3383–3390. [arxiv:math.AG/0605373](https://arxiv.org/abs/math.AG/0605373)
11. (with Ezra Miller) *Algorithms for graded injective resolutions and local cohomology over semigroup rings*, Journal of Symbolic Computation **39**, 373–395. [arXiv:math.AC/0309256](https://arxiv.org/abs/math.AC/0309256)
12. (with Ezra Miller) *Bass numbers of semigroup-graded local cohomology*, Pacific Journal of Mathematics **209**, no. 1, 41–66. [arXiv:math.AG/0010003](https://arxiv.org/abs/math.AG/0010003)

## Recent Talks:

- 2009 Oct. UT: On families of admissible representations of  $\mathbf{GL}_n(\mathbb{Q}_p)$ .  
 Feb. Caltech (Southern California number theory day): On  $l$ -adic families of admissible representations of  $\mathbf{GL}_2(\mathbb{Q}_p)$ .
- 2008 Dec. Northwestern: On  $l$ -adic families of admissible representations of  $\mathbf{GL}_2(\mathbb{Q}_p)$ .  
 Oct. UT: The local Langlands correspondence for  $\mathbf{GL}_2$  in  $l$ -adic families  
 Jun. MSRI (Workshop on modular forms and arithmetic): On  $l$ -adic families of cuspidal representations of  $\mathbf{GL}_2(\mathbb{Q}_p)$ .
- 2007 Nov. Michigan State University: Towards a geometric Jacquet-Langlands correspondence for unitary Shimura varieties
- 2006 Oct. Harvard Number Theory Seminar: Towards a geometric Jacquet-Langlands correspondence for unitary Shimura varieties  
 Feb. Harvard Number Theory Seminar: Mazur's Principle for  $U(2,1)$  Shimura varieties
- 2005 Dec. Montreal (CRM workshop on intersection of arithmetic cycles and automorphic forms): A Deligne-Rapoport Model for  $U(2)$  Shimura varieties.  
 Dec. UC Berkeley Number Theory Seminar: A Deligne-Rapoport Model for  $U(2)$  Shimura varieties.  
 Nov. University of Utah Number Theory Seminar: A Geometric Jacquet-Langlands correspondence for  $U(2)$  Shimura varieties.  
 Feb. Harvard Number Theory Seminar: Geometric Jacquet-Langlands correspondences for unitary Shimura varieties

### Professional Activities:

- Journals refereed:
  - Mathematical Research Letters
  - International Mathematics Research Notices
  - Mathematics of Computation
- Departmental committees served:
  - Preliminary Exam (2008-9, University of Texas at Austin)
  - Qualifying Exam (2006-7, Harvard University)
  - Qualifying Exam (2004-5, Harvard University)
  - Graduate Admissions (2003-4, Harvard University)

### Teaching Experience:

- 2009 Fall Theory of Schemes (topics course) University of Texas  
 2009 Spring Algebra (graduate) University of Texas  
 2008 Fall Calculus II (undergraduate) University of Texas  
 2008 Spring Vector Calculus (undergraduate) University of Texas  
 2007 Fall Number Theory (undergraduate) University of Texas  
 2007 Spring Algebraic Geometry (graduate, first semester); Linear Algebra (undergraduate) Harvard University  
 2006 Fall Algebraic Geometry (graduate, first semester) Harvard University  
 2005 Spring Algebraic Geometry (undergraduate) Harvard University  
 2004 Spring Algebraic Geometry (graduate, second semester) Harvard University  
 2003 Fall Algebraic Geometry (graduate, first semester) Harvard University  
 2003 Spring Course Assistant, Algebraic Geometry (graduate, second semester) UC Berkeley  
 2002 Fall Graduate Student Instructor, Math 1A (calculus) UC Berkeley

**References:**

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