

CURRICULUM VITAE

Tong Liu

Current Address:

Department of Mathematics
Purdue University
150 N. University Street,
West Lafayette, IN 47907-2067

E-Mail: tongliu@math.purdue.edu

Phone (O): 1-765-494-1946

Webpage: <http://www.math.purdue.edu/~tongliu>

Research Interests: Arithmetic geometry, algebraic number theory, p -adic Galois representations, and p -adic Hodge theory.

Academic Positions:

Associate Professor
Purdue University
Fall 2012-

Assistant Professor
Purdue University
Fall 2008-Summer 2012

Member
Institute for Advanced Study
Spring 2011

Lecturer in Mathematics
University of Pennsylvania
Fall 2005- Spring 2008

Visiting Postdoc
Université de Paris-Sud 11
January 2006- July 2006.

Academic Degree:

Ph. D. in Mathematics
University of Michigan, Ann Arbor, MI, USA
Fall 2001-Summer 2005
Thesis Advisor: Brian Conrad

M. A. in Mathematics
Tsinghua University, Beijing, China
Fall 1995-Summer 1998
Thesis Advisor: Xianke Zhang

B. S. in *Mathematics*
Ocean University of Qingdao, Qingdao, China
Fall 1991-Summer 1995

Publications and Preprints:

- [17] Toby Gee, Tong Liu and David Savitt, *The weight part of Serre's conjecture for $GL(2)$* , to appear, Forum of Mathematics, π .
- [16] Tong Liu, *Compatibility of Kisin modules for different uniformizers*, preprint.
- [15] Hui Gao, Tong Liu, *A Note on Potential Diagonalizability of Crystalline Representations*, to appear, Mathematische Annalen.
- [14] Toby Gee, Tong Liu and David Savitt, *The Buzzard-Diamond-Jarvis conjecture for unitary groups*, J. Amer. Math. Soc. **27** (2014), no. 2, 389--435.
- [13] Toby Gee, Tong Liu and David Savitt, *Crystalline extensions and the weight part of Serre's conjecture*, Algebra & Number Theory, Vol. 6 (2012), No. 7, 1537--1559.
- [12] Tong Liu, *Filtrations associated to torsion semi-stable representations*, to appear, Annales de l'Institut Fourier.
- [11] Tong Liu, *The correspondence between Barsotti-Tate groups and Kisin modules when $p=2$* , to appear, Journal de Théorie des Nombres de Bordeaux.
- [10] A.O.L. Atkin, W.C. Li, T. Liu and L. Long, *Galois representations with quaternion multiplications associated to noncongruence modular Forms*, Transactions of AMS, **365** (2013), no 12, 6217--6242.
- [9] Tong Liu, *Lattices in filtered (φ, N) -modules*, Journal of the Institute of Mathematics of Jussieu, **11**, (2012), Issue 3, 659--693.
- [8] Xavier Caruso and Tong Liu, *Some bounds for ramification of p^n -torsion semi-stable representations*, Journal of Algebra, **325**, (2011), Issue 1, 70--96.
- [7] Tong Liu, *A note on lattices in semi-stable representations*, Mathematische Annalen, **346**, (2010), No. 1, 117--138.
- [6] Xavier Caruso and Tong Liu, *Quasi-semi-stable representations*, Bull. Soc. math. de France. **137** (2), 2009, 185--223.
- [5] Tong Liu, *On lattices in semi-stable representations: a proof of a conjecture of Breuil*, Compositio Mathematica, **144**, (2008), No. 1, 61--88.

- [4] Tong Liu, *Torsion p -adic Galois representations and a conjecture of Fontaine*, Ann. Scient. École Norm. Sup. (4), **40**, (2007), 633--674.
- [3] Tong Liu, *Potentially good reduction of Barsotti-Tate groups*, Journal of Number Theory, **126**, (2007), No. 2, 115--184.
- [2] Tong Liu and Xianke Zhang, *Steinitz class of Mordell-Weil groups of elliptic curves with complex multiplication*, Pacific J. Math. **193**, (2000), No. 2, 371--379.
- [1] Tong Liu, *Congruences for the class numbers of real cyclic sextic number fields*, Sci. China Ser. A **42**, (1999), No.10, 1009--1018.

Draft:

- [18] Tong Liu and Jiu-Kang Yu, *Automorphy of certain p -adic Galois representations of GO_4 -type*.

Award and Grant:

Purdue University Faculty Scholars 2015.

NSF Grant 1406926: *Integral p -adic Hodge Theory and Its Application to Automorphic Galois representations*. 2014/9/1--2017/8/31.

Sloan Fellowship 2012-2014.

NSF Grant 0901360: *Integral p -adic Hodge Theory and Its Application to Automorphic Forms*, 2009/7/1--2013/6/30.

Startup Fund from Purdue University.

Services:

Referee for *Algebra & Number Theory*, *Journal of Mathematical Sciences*, *University of Tokyo*, *Duke Mathematical Journal*, *Compositio Mathematica*, *Journal of Number Theory*, *Proceedings of American Mathematics Society*, *Annales de l'institut Fourier*, *International Mathematics Research Notices*

Organizer of the special session of 2015 AMS San Antonio Meeting: *Recent Developments in Algebraic Number Theory*, San Antonio, Jan 10 to Jan 13, 2015.

Organizer of the workshop: *Noncongruence modular forms and modularity*, American Institute of Mathematics, August 17 to August 21, 2009.

Organizer of the special session of 2008 AMS San Diego Meeting: *Modular Forms and Modularity*, San Diego, January 7 to January 8, 2008.

Math 266 coordinator, Purdue University, Fall 2013, Fall 2104

Organizer of Automorphic form seminar, Purdue University, 2013--

Preliminary Exam Committee, department of mathematics, University of Pennsylvania, 2006-2007.

AP/Make-Up Exam Committee, department of mathematics, University of Pennsylvania, 2007-2008.

Ph. D. Students:

Hui Gao (completed in 2013).

Invited Talks and Mini Courses:

Upstate New York Number Theory Conference, April 26-27, 2014

The weight part of Serre's conjecture for $GL(2)$,

Conference in honor of Wen-Ching Winnie Li: Applications of Automorphic Forms in Number Theory and Combinatorics, April 12-15, 2014.

Noncongruence Modular Forms and Automorphy of Scholl's Representation

Number Theory Seminar, Chicago, January 2013

Compatibility of Kisin modules for different uniformizers.

Number Theory Seminar, University of Arizona, November 2012

Compatibility of Kisin modules for different uniformizers.

Number Theory Seminar, California Institute of Technology, November 2012

The Buzzard-Diamond-Jarvis conjecture for unitary groups.

2011 NCTS International Conference on Galois Representations, Automorphic Forms and Shimura Varieties, June 2011

Filtration Associated to Torsion Semi-stable Representations.

Atkin Memorial Lecture and Conference, May 2011

Automorphy of certain Galois representations of $GO(4)$ type.

Arithmetic Seminar, Binghamton University, March 2011

Automorphy of certain Galois representations of $GO(4)$ type.

Member Seminar, Institute for Advanced Study, February 2011

Automorphy of certain Galois representations of $GO(4)$ type.

Algebra Seminar, University of Pennsylvania, February 2011

Automorphy of certain Galois representations of $GO(4)$ type.

International Congress of Chinese Mathematicians, December 2010

p -divisible groups and Kisin modules.

Number Theory Seminar, University of Chicago, June 2010
Automorphy of Galois representation of $\text{Gal}(\overline{Q}/Q)$ to $GO_4(Q_p)$.

Morningside mathematics center, July 2009
Lattices in semi-stable representations.

Journées de Géométrie Arithmétique de Rennes, July 2009
Filtered (φ, N) -modules associated to torsion semi-stable representations.

Number Theory Seminar, University of Wisconsin at Madison, April 2009
Lattices in semi-stable representations.

Number Theory Seminar, Stanford University, March 2009
Lattices in semi-stable representations.

Number Theory Seminar, California Institute of Technology, February 2009
Lattices in semi-stable representations.

Number Theory Seminar, Northwestern University, October 2008
Lattices in semi-stable representations.

Algebra Seminar, SUNY at Buffalo, September 2008
Weil-Deligne representations attached to torsion semi-stable representations.

Quebec-Vermont Number Theory Seminar, Concordia University, May 2008
Ramification bound for p^n -torsion semi-stable representations.

Algebra and Number Theory Seminar, University of Arizona, May 2008
Ramification bound for p^n -torsion semi-stable representations.

Number Theory Seminar, University of Utah, March 2008
Ramification bound for p -torsion semi-stable representations.

GLNT Seminar, University of Michigan, March 2008
Ramification bound for p -torsion semi-stable representations.
Algebra and Number Theory Seminar, Pennsylvania State University, February 2008
Galois lattices in semi-stable representations.

Number Theory Seminar, John Hopkins University, October 2007
Lattices in semi-stable representations.

Morningside Center, Beijing, China, May-June 2007
Mini course: *Introduction to p -adic Hodge theory.*

Morningside Center, Beijing, China, May 2007
 \mathbb{Z}_p -lattices in semi-stable Galois representations.

Number Theory Seminar, Iowa State University, February 2007
Finite flat group schemes and finite flat representations.

Special Colloquium, University of Toronto, January 2007
Limits of torsion semi-stable Galois representations.

Algebraic Seminar, University of Pennsylvania, November 2006
 p -adic Galois representations and a conjecture of Fontaine.

Number Theory Seminar, Tsinghua University, December 2005
Main conjecture of integral p -adic Hodge theory.

Arithmetic Seminar, University of Michigan, November, 2005
Main conjecture of integral p -adic Hodge theory.

Arithmetic Seminar, University of Michigan, April, 2005
Potentially good reduction of Barsotti-Tate groups.

Algebraic Seminar, University of Pennsylvania, February, 2005
Potentially good reduction of Barsotti-Tate group.