

CURRICULUM VITAE

TONGHAI YANG
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Academic Affiliation:

- *University of Wisconsin at Madison*, Professor. 2007-present.
- *University of Wisconsin at Madison*, Associate Professor. 2003-2007.
- *University of Wisconsin at Madison*, Tenure Track Assistant Professor, 2000-2003.
- *Harvard University*, Amer. Math. Soc. Centennial Fellow, 1999-2000.
- *SUNY at Stony Brook*, Tenure Track Assistant Professor, 1998-2001.
- *University of Michigan at Ann Arbor*,
Hildebrandt Research Assistant Professor, 1996-98.
- *Institute for Advanced Study*, Membership, 1995-1996.
- *The University of Science and Technology of China*,
Hefei, China, 1987-1990.

Visiting Research Positions:

- *The Morningside Center of Mathematics, and the AMSS in CAS*, Beijing, China,
 - June 2-Aug. 7, 2008.
 - June 20-Aug. 20, 2007, Dec. 9-27, 2007.
 - Summer, 2000, 2002, 2004, July 1-16, 2006,

- Research Professor, *MSRI*, Berkeley, Spring, 2007.
- *University of Toronto*, Canada, Nov. 28-Dec. 22, 2006.
- *Max-Planck Institute for Mathematics*, Visitor,
May 1-Aug. 31, 1997 and 1998, May 27-Aug. 11, 2003,
and Oct. 24 -Nov. 21, 2006.
- *Newton Institute of Mathematical Research*, Cambridge, UK,
June 12-30, 1998.
- *Univ. of Sci. and Tech. of Hong Kong*, May 22 to June 15, 2002.
- *National Center for Theoretical Research*,
Taiwan, Dec. 17, 2003—Jan. 14, 2004.

Education:

- *University of Maryland*, College Park, MD, 1991-95, Ph.D. in Math.
- Dissertation: “Theta liftings and L -functions of Elliptic Curves”.
- Thesis advisor: Stephen Kudla
- *Anhui Normal University*, Anhui, China, 1984-87, M.S. in Math..
- *Huizhou Teacher’s Academy*, Anhui, China, 1978-80,
Math. Education.

Research Interests: Number Theory, Arithmetic Geometry,
Representation Theory.

Membership: Member of the American Mathematical Society, since 1992

Editors

- **Quarterly Journal of Pure and Applied Mathematics**, Editor
(2004–)
- **Abhandlungen aus dem mathematischen Seminar der Universi-
taet Hamburg**, Member of Advisory Board (2007–).

Grants and Awards:

- National Science Foundation Grant DMS-0555503, July 2006-June 2009.

- Outstanding overseas youth grant (aka Premier's grant), NSFC-10628103, China, 2007-10.
- Vilas Life Cycle Professorship, UW-Madison, 2006-07.
- National Science Foundation Focused Research Group grant (with Steve Kudla, Ken Ono, and Shou-Wu Zhang), DMS-0354353,
- National Science Foundation Grant DMS-0302043, July 2003—July 2006.
- National Science Foundation Grant DMS-0070476, July 2000—July 2003.
- National Science Foundation Grant DMS-9700777, July 1997—July 2000.
- **Amer. Math. Soc. Centennial Fellowship**, 1999-2000.
- National Security Agent grant, Feb. 2004-Jan. 2006,
- Shanghai Bai Yu Lan Fellowship, 2002.
- Special Amer. Math. Soc. ICM Travel Grant, Aug. 18-27, 1998.
- Rackham Faculty Fellowship (U. Michigan at Ann Arbor), 1997.

Publications and Preprints:

Books:

1. (with S. Kudla and M. Rapoport), Modular forms and special cycles on Shimura curves, *Annals of Mathematics Studies Series 161*, Princeton University Press, 2006.

Papers:

1. Cocritical modules and finiteness relative to a module, *Comm. Algebra* (1989), 217-235.
2. (with H. Tang and J. Chen) Flat modules and ML modules relative to an hereditary torsion theory, *J. Math* (Chinese) 12 (1992), 213-220.
3. On the algebraic structure of group rings, *J. University of Science and Technology of China*, (1990) 1-8.
4. On noncommutative semicoherent rings, *Chinese Ann. Math. Ser.A* 10 (1989), 148-152.
5. (with H. Tang and J. Chen) Fp^* -injective, fp -flat modules and coherent rings, *J. Anhui Normal Univ.* 1(1988), 1-7.
6. (with H. Tang and J. Chen) Fp^* -injective dimension,

- and FPQ ring, *J. Anhui Normal Univ.* 2(1987), 11-16.
7. (with J. Chen) Weakly globally homological dimension and direct(inverse) limits, *J. Anhui Normal Univ.* 4(1986), 79-85.
 8. (with J. Chen) Some results on coherent rings, *J. Anhui Normal Univ.* 4(1986), 73-78.
 9. Cusp forms of weight 1 associated to the Fermat curves, *Duke Math. Jour.*, 83(1996) 141-156.
 10. Theta liftings and Hecke L-functions, *J. Reine Angew. Math.*, 485(1997) 25-53.
 11. (with F. Rodriguez Villegas) Central values of Hecke L-functions of CM number fields, *Duke Math. J.*, 98(1999), 541-564.
 12. Nonvanishing of central Hecke L-value and rank of certain elliptic curves, *Compositio Math.*, 117(1999)337-359.
 13. Eigenfunctions of Weil representation of unitary groups of one variable, *Trans. Amer. Math. Soc.*, 350(1998)2393-2407
 14. Common zeros of theta functions and central Hecke L-values of CM number fields of degree 4, *Proc. Amer. Math. Soc.*, 126(1998)999-1004
 15. An explicit formula for local densities of quadratic forms , *J. number theory* 72 (1998)309-356.
 16. (with S. Kudla and M. Rapoport) On the derivative of an Eisenstein series of weight one, *Intern. Math. Res. Notices* 7(1999) 347-385
 17. The Central Derivative of Hecke L-series, *J. number theory*, 85(2000) 130-157.
 18. (with S. Miller) Nonvanishing of the central derivative of canonical Hecke L-functions, *Math. Research letters* 7(2000)263-277
 19. On existence of algebraic Hecke characters, *C.R. Acad. Sci. Paris, Series I* 332(2001)1041-1046.
 20. Taylor expansion of Eisenstein series, *Trans. Amer. Math. Soc.*, 355 (2003)2663-2674.
 21. (with Jorge Jimenez-Urroz) The Heegner zeros of theta functions, *Trans. Amer. Math. Soc.*, 355 (2003) 4137-4149.
 22. (with M. Stoll) The L-value of the curves $y^2 = x^5 + A$,

- J. London Math. Soc.* 68 (2003), 273–287.
23. On CM abelian varieties over an imaginary quadratic field,
Math. Ann. 329(2004), 87-117.
24. (with S. Kudla and M. Rapoport) The derivative of Eisenstein series and the Faltings’s heights, *Compos. Math.*, 140 (2004), 887–951.
25. The derivative of Zagier’s Eisenstein series and Faltings height,
in Heegner points and Rankin L-series, MSRI Publ. 49
(*H. Darmon and S.W. Zhang eds.*), 271-284.
26. On 2-adic local density of quadratic forms, *J. Number Theory*, 108(2004), 287-345.
27. CM number fields and modular forms, *Quarterly Jour. Pure Appl. Math. special issue in memory of A. Borel* 1(2005), 305-340.
28. (with J. Bruinier) CM-values of Hilbert modular functions, *Invent. Math.* 163(2006), 229-288.
29. (with N. Elkies, K. Ono) Reduction of CM elliptic curves and modular function congruences, *Int. Math. Res. Not.* 44 (2005), 2695–2707.
30. (with J. Bruinier) Twisted Borcherds products on Hilbert modular surfaces and their CM values, *Amer. J. Math.*, **129**(2007), 807-841.
31. Hilbert modular functions and their CM values, to appear in *Proc. of the 3rd ICCM, AMS/IP Studies in Adv. Math.* 42(2008), 135-154.

Accepted for Publication:

32. (with K. Bringmann) On Jacobi Poincaré series of small weight, accepted to appear in *IMRN*, pp21. Already online.
33. The second term of an Eisenstein series, to appear in *Proceeding of the 2nd International Congress of Chinese Mathematicians.* pp 18.
34. Minimal CM liftings of supersingular elliptic curves, accepted to appear in *Pure and Applied Math. Quarterly.*
35. An arithmetic intersection formula on Hilbert modular surfaces, accepted to appear in *Amer. J. Math.*, pp30.
46. Chowla-Selberg Formula and Colmez’s Conjecture, Accepted to appear in *Canada J. Math.*, pp17.
37. Some interesting arithmetic intersection formulae in number theory, to appear in *Proceeding of the 4rd International Congress of Chinese Mathematicians.* pp 19.

Preprints:

38. (with R. Masri) Equidistribution of Heegner points and asymptotics for central values of canonical Hecke L -series, preprint, 2007, pp 21.
39. (with S. Kudla) The Taylor expansion of Eisenstein series and the integral of Borcherds modular forms, a rough draft, pp 50.
40. Arithmetic intersection and Faltings' height, preprint, pp 44, 2007.
41. (with J. Bruinier) CM values of automorphic Green functions, preprint, 2008, pp51.
42. (with S. Kudla), Pullback of arithmetic theta functions, in progress.
43. (with S. Kudla and M. Rapoport) The derivative of Eisenstein series and the Faltings's heights II, in preparation.
44. Special values of Hecke L-functions and symmetric power of CM elliptic curves: odd case, preprint, pp12.
45. Special values of Hecke L-functions and symmetric power of CM elliptic curves: even case, preprint, pp13.

Postdocs Advising

Riad Masri (graduated from U. Texas at Austin in 2005).

Yannan Qiu (graduated from Columbia University in 2005).

Former Graduate Students:

Taliesin Sutton, PhD. Spring 2006.

First Job: University of Arizona (Postdoc)

Benjamin Kane, PhD, Spring 2007.

First Job: Radboud University in Nijmegen, the Netherlands (postdoc)

Current Graduate Students :

Jie Ling, PhD student.

Michael Woodbury, PhD student.

Luanlei Zhao, PhD student.

Invited Talks:

2008:

· A series of 10 hour lectures, Department of Education (of China) graduate summer school, USTC, Hefei, China, July 20-July 26.

- A series of 4 hour lectures, Morningside Center of Mathematics, Beijing, June 29-July 2.
 - Colloquium, AMSS, Beijing, China, June 26.
 - Joint AMSS and Capital Normal University Number Theory Seminar, Beijing, China, June 18.
 - Colloquium, Wesleyan University, May 1.
 - Number theory seminar, McGill Univ. Canada, April 17.
 - Oberwolfach workshop on Automorphic Forms - Geometry and Arithmetic, Feb. 4-9.
 - AMS annual meeting number theory special session, Jan. 6-9 (declined).
- 2007:
- Number theory seminar, Shangdong University, China, Dec. 24.
 - The 4th ICCM (International Congress of Chinese Mathematicians) meeting, Hang Zhou, China, Dec. 17-Dec. 22.
 - Number theory seminar, Capital Normal University, Beijing, China, Dec. 11.
 - Number theory seminar, Clemson University, Nov. 29 (declined).
 - Number theory seminar, UIC, Oct. 3.
 - Number theory seminar, Shangdong University, China, Aug. 16 (declined).
 - Workshop on number theory, combinatorics and their interaction, Nanjing University, China, Aug. 10-12.
 - Lecture series (5) on Arithmetic Intersection, Morningside Center of Mathematics, Beijing, June July 2-July 23.
 - Colloquium, Math Institute, AMSS, Beijing, July 20.
 - Number Theory Workshop, Morningside Center of Mathematics, Beijing, June 24-27.
 - Workshop on L-function and arithmetic geometry, in honor of Golfeld's 60th birthday, Columbia University, May 18-23.
 - Number Theory Seminar, UC-Berkeley, May 2.
 - Number Theory Seminar, UCSD, April 30.
 - Number Theory Seminar, UCLA, April 27.
 - Number Theory Seminar, CalTech, April 26.
 - Siegel Modular Forms and Abelian Varieties Conf., Lake Hamana, Japan, Feb. 5-9, 2007 (declined).

2006:

- Number Theory Seminar, Univ. of Toronto, Canada, Dec. 19, 2006.
- Number Theory Seminar, Max Planck Institute für Mathematik at Bonn, Germany, Oct. 30, 2006.
- ARCC workshop on ‘Subconvexity bounds for L-functions’, Oct. 15-20, 2006, AIM.
- Colloquium, Iowa State University, Fall 2006 (declined).
- Arithmetic Geometry Seminar, Morningside Center of Mathematics, Beijing, China, July 14, 2006.
- Columbia University Number Theory Seminar, April 20, 2006.
- AMS meeting special session on Computational Arithmetic Geometry, San Francisco State Univ. April 29-30, 2006.
- Colloquium, UW-Madison, March 20, 2006.
- Workshop on Arithmetic Geometry, Erwin Schroedinger Institute in Vienna, January 22 - 28, 2006 (declined).

2005:

- McGill University Workshop in Arithmetic Geometry (declined), Dec. 12-16, 2005.
- University of Maryland FRG Conference on modular forms and arithmetic geometry (declined), Oct. 6-9, 2005.
- Oberwolfach Meeting on Modular Forms, Germany (declined), September, 2005.
- Shimura Variety Workshop in Hang Zhou China, July 1-14, 2005, a series of 6 lectures (declined).

2004:

- The 3rd International Congress of Chinese Mathematicians meeting, Hong Kong (declined)
- McGill University, Number Theory Workshop, Dec. 12-16, 2004 (declined).
- Purdue University Number Theory Seminar, Nov. 4, 2004.
- Number Theory FRG Conference at Madison, Sept. 16-19, 2004 (I am also a co-organizer).
- The Mathematics Institute at Beijing Colloquium, Aug. 13, 2004.
- Shandong University Colloquium, Aug. 5, 2004.
- Pohang Univ. of Sci. and Tech., Korea, June 27- June 31 (declined).

- Fudan University Number Theory Seminar, June 15, 2004.
- Anhui Normal University Colloquium, June 2, 2004.
- Morningside Center of Mathematics at Beijing, 3 number theory seminars during May 21-Aug. 17.
- UC-San Diego Number Theory Seminar, Mar. 26, 2004.
- Ohio-State U. Number theory seminar, Mar. 1, 2004.
- Conf. on Modular forms and related topics, Hamana Japan, Feb. 16-20.
- Number Theory Workshop, National Center for Theoretical Research, Taiwan, Jan. 6-8, 12-23, (a series of 5 talks).

2003:

- National Chiao Tung University Colloquium, Taiwan, Dec. 30.
- National Cheng Kung University, Taiwan, Arith. Geometry and Rep. Theory Day, Dec. 26.
- National Central University, Taiwan, Number Theory Seminar, Dec. 24.
- Annual Meeting of Taiwan Math. Soc., The National Central Univ., Taiwan, Dec. 19-21.
- MPIM number theory seminar, Aug. 6, 2003.
- MPIM number theory seminar, July 9, 2003.
- University of Illinois at Chicago, Midwest Number Theory Day, May 10, 2003.
- The Fields Institute Workshop on Shimura variety, Mar. 4-9, 2003.
- McMaster University number theory seminar, Mar. 4, 2003.
- McGill University number theory seminar, Feb. 14, 2003.

2002:

- Hakuba number theory conference, Japan, Nov. 5-9, 2002.
- Oberwolfach Conference on Modulformen, Oberwolfach, Germany, Sept. 15-21, 2002, (declined).
- The *Intern. Congress of Mathematicians* Satellite Conference on Number Theory and Arithmetic Geometry, Weihai, China, Aug. 13-17, 2002.
- The Morningside Center of Mathematics, Beijing, Number Theory Seminar, July 16 and 18, 2002 (two lectures).

- Tongji University, Shanghai, Number Theory Seminar, July 9, 2002.
- Hang Zhou workshop on automorphic forms, June 16-June 29, Hang Zhou,
A series of 8 lectures.
- Geometry and number theory seminar at Mathematical Institute,
the Chinese University of Hong Kong, June 1.
- *Hong Kong Geometry Colloquium*, The Chinese University of Hong Kong,
May 25, (This is a monthly colloquium co-organized by the
three main universities in Hong Kong).

2001:

- The 2nd *Intern. Congress of Chinese Mathematicians*,
Taiwan, Dec. 17-22.
- MSRI Rankin L-values workshop, MSRI, Berkeley, USA,
Dec. 10-14.
- The University of Maryland at College Park, Number Theory Seminar.
- Osaka University, Japan, Number Theory Seminar.
- International Conference on automorphic forms, Osaka, *Japan*,
Jan. 30-31, 2001, .
- Kyoto University, *Japan*, Number Theory Seminar.
- Penn State University, Number Theory Seminar.
- Michigan State University, Number Theory Seminar.
- The National Center for Theoretic Science, Taiwan, Dec. 22-29.
(declined)
- Number Theory Conference, Hsinchu, Taiwan, Dec. 28(declined).

2000:

- Harvard University, Number Theory Seminar.
- Princeton University, Number Theory Seminar.
- The Morningside Center of Mathematics, Beijing, China.
A series of 6 lectures.
- Anhui Normal University, China, Colloquium.
- The State University of New York at Stony Brook, Colloquium.
- The University of Iowa, Colloquium.
- The Johns Hopkins University, Number Theory Seminar.

- Representation theory workshop, Hongzhou, China,
(declined).
- University of Massachusetts at Amherst, Number Theory Seminar.
- University of Wisconsin at Madison, Colloquium.

1999:

- Harvard University, Number Theory Seminar.
- University of Minnesota, Number Theory Seminar.
- Amer. Math. Soc. Meeting, Urbana-Champaign, IL.

1998:

- Columbia University, Number Theory Seminar.
- SUNY at Stony Brook, Colloquium.
- Max-Planck Institut für Mathematik, Bonn, *Germany*,
Number Theory Seminar.
- Mannheim University, *Germany*, Number Theory Seminar.
- McGill University, Montreal, *Canada*, Colloquium.
- University of California at Santa Cruz, Colloquium.
- Rutgers at Newark, Colloquium.
- Boston College, Colloquium.
- Penn State University, Number Theory Seminar.
- Amer. Math. Soc. Meeting, Tucson, Arizona.
- Oberwolfach Meeting on Modular Forms, Germany.
- Amer. Math. Soc. Meeting, State College, PA.
- The 13th Automorphic forms workshop at Columbia, MO.
- Intern. Conf. on automorphic forms, Bambah, *India*, (declined).
- Intern. Conf. on quadratic forms, Seoul, *Korea*, (declined).

1997:

- The Ohio State University, Lie Theory Seminar.
- Max-Planck Institut für Mathematik, Bonn, *Germany*,
Number Theory Seminar (2 lectures).
- The Johns Hopkins University, Number Theory Seminar.
- The Missouri Algebra Weekend in Columbia.

1996:

- The University of Maryland at College Park, Lie Theory Seminar.
- The University of Michigan at Ann Arbor, Number Theory Seminar.
- Amer. Math. Soc. Meeting at Rider's University, New Jersey.
- Amer. Math. Soc. Meeting at the University of Iowa.

1995:

- The University of Pennsylvania, Number Theory Seminar.
- Columbia University, Number Theory Seminar.

Professional Services:

- **Focused Research Group Workshop.** Sept. 16-19, 2004, co-organized with S. Kudla, K. Ono, and S.W. Zhang.
- **National Science Foundation (NSF) Review Panel** (rank NSF grant proposals), Jan. 28-30, 2002.
- Co-organizer of International Conference on Number Theory and Related Topics, Hang Zhou, China, Aug. 10-12, 2002.
- Co-organizer of Amer. Math. Soc. Meeting Special Session on Arithmetic Geometry, Madison, Oct. 11-12, 2002.
- Advisor of incoming graduate students since 2001.
- Library Committee since 2001.
- Co-organizer of Weekly Number Theory Seminar since Fall 2001.
- Co-organizer of Weekly Student Number Theory Seminar, Spring 2002.
- Co-organizer of Amer. Math. Soc. Meeting Special Session in Kansas, March 28-30, 2001.
- Referee research papers for mathematical journals (6 a year).
- Reviewer of NSF and NSA grant proposals since 1996.
- Reviewer of **the Mathematical Review** since 1995.
- Reviewer of **Zentralblatt für Mathematik** since 1995.
- Organizer of Student Number Theory Seminar, Univ. of Michigan at Ann Arbor, Fall 1998.
- Co-organizer of 'Shimura Curve Seminar', Univ. of Michigan at Ann Arbor, Fall 1997.
- Co-organizer of 'L-function seminar', Univ. of Michigan

at Ann Arbor, Spring 1998.

- Co-organizer representation theory study seminar, Univ. of Michigan at Ann Arbor, Spring 1997.

Teaching at the University of Wisconsin-Madison:

Spring 2006:

- Math941— Number Theory Seminars.

Fall 2005:

- Math941— Number Theory Seminars.

Spring 2005:

- Math 847—Modular Forms.

Fall 2004:

- Math 211—Calculus.
- Math 340—Linear Algebra.

Spring 2004:

- Math 340—Linear algebra (2 classes).

Fall 2003:

- Math 845—Theta functions.
- Math 221—Calculus I.

Spring 2003:

- Math742—Graduate Algebra II.
- Math 475— Introduction to Combinatorics.

Fall 2002.

- Math741—Graduate Algebra I.
- Math 475— Introduction to Combinatorics.

Spring 2002.

- Math 221—Calculus I, about 220 students and 5 TAs.

Fall 2001.

- Math 845—Graduate course—class field theory.
- Math 475—Combinatorics.

Spring 2001.

- Math 221—Calculus I, about 90 students and 2 TAs.

Fall 2000.

- Math 475—Combinatorics.

Other Teaching Experience:

Graduate courses:

At SUNY at Stony Brook, Assistant Professor, 1998-1999

- Algebra I—graduate core course (Fall 98).
- Algebra II—graduate core course (Spring, 99).

Undergraduate courses:

At SUNY at Stony Brook, Assistant Professor, 1998-1999

- Calculus, course coordinator.

At University of Michigan, Hildebrandt Res. Ass. Professor, 1996-1998

- Freshman Calculus (Fall 96, Spring 97).
- Freshman Number Theory (Fall 1997).
- Probability (Winter 1998).

At University of Maryland at College Park, Teaching Assistant, 1991-1995.

- College Algebra (1 semester); Precalculus (1 semester, 1 summer);
- Calculus I (2 semesters, 1 summer); Calculus II (1 semester, 1 summer);
- Linear Algebra (1 semester); Tutoring (1 semester); Grading (1 semester).

At Univ. of Sci. and Tech. of China, Assistant Professor, 1987-1991.

- Calculus (2 semesters); Advanced Calculus (1 semester);
- Linear Algebra (2 semesters); Abstract Algebra (1 semester);
- Elementary Number Theory (1 semester).

Middle School: I taught middle school mathematics for 4 years during 1980-1984.