

# CURRICULUM VITAE

Y.-P. LEE

## ACADEMIC POSITIONS

- Associate Professor of Mathematics, University of Utah, 2006-present.
- Assistant Professor of Mathematics, University of Utah, 2003-6.
- Visiting Research Mathematician, Princeton University, 2002-3.
- Junior Fellow, *Conformal Field Theory and Applications*, IPAM, Fall 2001.
- Hedrick Assistant Professor, UCLA, 1999-2002.

## CONTACT INFORMATION

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## EDUCATION

- Ph.D. in mathematics: May 1999, University of California at Berkeley.  
Thesis advisor: Alexander Givental.

## CURRENT RESEARCH INTERESTS

My current research interests are in the general areas of *algebraic geometry* and *mathematical physics*. More specifically I am working on *Gromov–Witten theory* and its relations with and applications to birational geometry,  $K$ -theory, symplectic topology, integrable systems, representation theory, and mirror symmetry.

## GRANTS AND AWARDS

- NSF grant DMS-0072547 (2000-3).
- NSF grant DMS-0305895 (2003-6).
- AMS Centennial Research Fellowship (2005-7).
- NSF grant DMS-0600688 (2006-9).
- NSF grant PHY-0652421 (2007).

## PRESENTATIONS

**Seminar/Colloquium talks (in the U.S.).** University of **Arizona**, **Boston** University, **CalTech**, University of **Chicago**, **Columbia** University, **Georgia Tech**, **UIUC**, **IPAM**, University of **Minnesota**, **MSRI**, University of **Michigan**, **Northwestern** University, University of **Notre Dame**, **Park City Mathematical Institute**, **Princeton** University, **Stony Brook** University, **Texas A&M** University, **UCLA**, University of **Utah**, University of **Wisconsin-Madison**

**Seminar/Colloquium talks (abroad).** **Academia Sinica** (Taiwan), Institute of **Mathematical Science** (Hong Kong), **Chinese University of Hong Kong**, **Korean Institute of Advanced Study** (Korea), **National Center for Theoretical Sciences** (Taiwan), **National Central University** (Taiwan), **National Cheng Kung University** (Taiwan), **National Taiwan University** (Taiwan), **National Tsing Hua University** (Taiwan), **Pohang University of Science and Technology** (Korea), University of **Toronto** (Canada)

### Conferences.

- Invited talk in AMS meeting: special session on *symplectic topology and quantum cohomology*, 24-25 October 1997.
- Invited talk in the conference *Mathematical Aspects of Orbifold String Theory*, 4-8 May 2001.
- Invited talk in the workshop *Frobenius manifolds, singularities, and quantum cohomology*, Max-Planck-Institut für Mathematik in Bonn, 8-19 July 2002.
- Invited talk in the *conference on intersection theory and moduli*, ICTP, 23-27 Sep 2002.
- Invited talk in the ICM satellite conference *Stringy Orbifolds*, Sichuan, China, 14-18 August 2002.
- Invited talk in WAGS, *Western Algebraic Geometry Seminar*, Salt Lake City, Utah, 26-27 October 2002.
- Invited talk in AMS meeting: special session on *Gromov-Witten Theory of Spin Curves and Orbifolds*, San Francisco, 3-4 May 2003.
- Invited talk in WAGS, *Western Algebraic Geometry Seminar*, 27-29 March 2004.
- Invited talk in *NCTS Workshop in Algebraic Geometry*, 22 June – 9 July, 2004.
- Invited talk in *Workshop on Topological Strings*, Fields Institute, 10-14 January 2005.
- Invited talk in the ARCC conference *Topology and geometry of the moduli space of curves*, 28 March – 1 April, 2005 at the American Institute of Mathematics, Palo Alto, California.

- Invited talk in the first *Texas Algebraic Geometry Seminar*, Rice University, 20-22 May 2005.
- Invited talk in *Summer Institute in Algebraic Geometry*, Seattle, 25 July – 12 August 2005.
- Invited to the conference *Progress in algebraic geometry inspired by physics*, BIRS, 8-13 October 2005.
- Invited talk in the *Thematic Period in Algebraic Geometry and Topological Strings*, IST, Lisbon, 10 Oct – 11 Nov, 2005.
- Invited talk in the *AMS Joint International Meeting*, special session in algebraic geometry, 14-18 December 2005.
- Invited talk in *Moduli Space of Curves and Gromov-Witten Theory*, University of Michigan, 24-26 Apr 2006.
- Invited talk in *New developments in the geometry and physics of Gromov-Witten theory*, MSRI, 22-26 May 2006.
- Invited to the conference *Moduli spaces and combinatorics*, BIRS, 22-27 July 2006. BIRS, 8-13 October 2005.
- Invited to Program *Moduli Spaces*, Institut Mittag-Leffler, 1 Sep 2006 – 15 Jun 2007.
- Invited talk in *Great Lakes Geometry Conference*, University of Minnesota, 15-16 September 2007.
- Invited talk in *Bellingham Algebraic Geometry Seminar*, 8 March 2008.
- Invited lecture series in *Recent Progress on the Moduli Space of Curves*, BIRS, 16-21 March 2008.
- Invited to *Affine manifolds and Mirror Symmetry Workshop*, University of Michigan, 25-27 April 2008.
- Invited talk in *Workshop on Gromov-Witten Theory and Related Topics*, KIAS, 9-13 June 2008.

#### CONFERENCES/SEMINARS ORGANIZATION

- *Seminar in Conformal Field Theory*, IPAM, Fall 2001.
- *String Geometry seminar*, joint seminar of Utah math and physics departments, Fall, 2003 – 2005.
- *NCTS Workshop in Algebraic Geometry*, 22 June – 9 July, 2004.
- *WAGS Fall 2005*, University of Utah, 3-4 Dec 2005.
- *NCTS Workshop in Algebraic Geometry*, NCTS, Hsinchu, Taiwan, 7-12 July 2006.
- *Special Session on Mathematics Motivated by Physics*, 2006 Fall AMS Western Section Meeting, Salt Lake City, UT, 7-8 October 2006.
- *WAGS Fall 2006* University of Utah, 11-12 Nov 2006.
- *Derived Categories*, a Vigre minicourse, University of Utah, 4-15 June 2007.

- *Derived Categories in Mathematics and Physics*, AMS Summer Research Conferences, Snowbird Resort, 16-22 June 2007.

## TEACHING EXPERIENCE

### UCLA.

- 1999-2000: *Calculus and Analytic Geometry I and II, Ordinary Differential Equations, Linear Algebra.*
- 2000-2001: *Calculus of Several Variables I and II, Foundations of Geometry, Complex Analysis for Applications.*
- 2001-2002: Advanced course in *Geometry and Physics, Linear Algebra and Applications, Combinatorics.*

### Princeton University.

- 2002-2003: Advanced course in *Frobenius Manifolds and Gromov–Witten Theory*, co-taught with Prof. Pandharipande.

### University of Utah.

- 2003-4: *Calculus I, Complex Geometry.*
- 2004-5: *Algebraic Geometry I & II.*
- 2005-6: *Topics in Algebraic Geometry.*
- 2006-7 *Algebraic Geometry I, Quantitative Analysis.*
- 2007-8 *Topics in Algebraic Geometry, Complex Geometry.*

### Publication.

- (1) *A formula for Euler characteristics of tautological line bundles on the Deligne–Mumford spaces*, IMRN **1997** No. 8.
- (2) *Quantum Lefschetz hyperplane theorem*, Invent. Math. **145** (2001), no. 1, 121–149.
- (3) *Virtual fundamental classes of zero loci*, (**with D. Cox and S. Katz**), Advances in algebraic geometry motivated by physics (Lowell, MA, 2000), 157–166, Contemp. Math., **276**, Amer. Math. Soc., Providence, RI, 2001.
- (4) *Quantum K-theory on flag manifolds, finite-difference Toda lattices and quantum groups*, (**with A. Givental**), Invent. Math. **151**, (2003) 193–219.
- (5) *Quantum K-Theory I: Foundations*, Duke Math. J. **121** (2004), no. 3, 389–424.
- (6) *Orbifold Euler characteristics of universal cotangent line bundles on  $\overline{M}_{1,n}$* , preprint, math.AG/0005217.
- (7) *A reconstruction theorem in quantum cohomology and quantum K-theory*, (**with R. Pandharipande**), Amer. J. Math. **126** (2004), no. 6, 1367–1379.
- (8) *Witten’s conjecture and Virasoro conjecture up to genus two*, in Gromov–Witten theory of spin curves and orbifolds, 31–42, Contemp. Math., 403, Amer. Math. Soc., Providence, RI, 2006.

- (9) *Tautological equations in genus 2 via invariance conjectures*, (**with D. Arcara**), Bull. Inst. Math. Acad. Sin. (N.S.) 2 (2007), no. 1, 1–27.
- (10) *Invariance of tautological equations I: conjectures and applications*, J. Eur. Math. Soc. (JEMS) 10 (2008), no. 2, 399–413.
- (11) *Tautological equation in  $\overline{M}_{3,1}$  via invariance conjectures*, (**with D. Arcara**), math.AG/0503184, to appear in Canadian Mathematical Bulletin.
- (12) *On independence of generators of the tautological rings*, (**with D. Arcara**), math.AG/0605488, to appear in Compositio Math.
- (13) *Notes on axiomatic Gromov–Witten theory and applications*, arXiv:0710.4349, to appear in Seattle Proceedings of the Summer Research Institute in Algebraic Geometry.
- (14) *Invariance of tautological equations II: Gromov–Witten theory*, math.AG/0605708, to appear in J. Amer. Math. Soc.
- (15) *Flops, motives and invariance of quantum rings* (**with H.-W. Lin and C.-L. Wang**), math.AG/0608370, to appear in Ann. of Math.
- (16) *The quantum orbifold cohomology of weighted projective space* (**with T. Coates, A. Corti, and H.-H. Tseng**), math.AG/0608481, to appear in Acta Mathematica.

#### Theses.

- (1) *Quantum K-theory*, PhD thesis in mathematics, Berkeley, 1999.
- (2) *The quadrupole moment of Delta and Hyperion calculated on the constituent quark shell model in large oscillator basis* (**with W.-C. Chang**), Bachelor thesis in physics, reported in the annual meeting of Taiwanese physical society, 1991.

#### Preprints.

- (1) *Orbifold Euler characteristics of universal cotangent line bundles on  $\overline{M}_{1,n}$* , preprint, math.AG/0005217.
- (2) *Invariance of tautological relations at genus one*, (**with A. Givental**), preprint.
- (3) *Witten’s conjecture, Virasoro conjecture, and invariance of tautological relations*, math.AG/0311100.
- (4) *Invariance of Gromov–Witten theory under a simple flop*, (**with Y. Iwao, H.-W. Lin and C.-L. Wang**), preprint.
- (5) *Invariance of quantum rings under  $\mathbb{P}^r$  flops* (**with H.-W. Lin and C.-L. Wang**), preprint.

#### Work in preparation.

- (1) *Frobenius manifolds, Gromov–Witten theory, and Virasoro constraints* (**with R. Pandharipande**), a book in preparation.