

CURRICULUM VITAE

Y.-P. LEE

ACADEMIC POSITIONS

- Professor of Mathematics, University of Utah, 2011-present.
- Associate Professor of Mathematics, University of Utah, 2006-2011.
- 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).
- NSF grant DMS-0901098 (2009-12).

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 since 2006.

- 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.
- 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.
- Invited to *Geometry and Physics of the Landau-Ginzburg Model*, Clay Mathematics Institute, 12-16 Jan 2009.
- Invited talk in MSRI Workshop *Modern Moduli Theory*, Algebraic Geometry 2009, 23-27 Feb 2009.
- Invited talk in *Workshop on Equivariant Gromov-Witten theory and symplectic vortices*, 6-10 July 2009, CIRM, Luminy, France.
- Invited talk in *Moduli Spaces in Algebraic Geometry*, Oberwolfach, 10-16 January 2010.
- Invited talk in *Geometric applications of motivic homotopy theory*, Bonn, 6-10 Sep 2010. (Declined due to a visa problem)
- Invited talk in WAGS, Tucson, 6-7 Nov 2010.

- Invited talk in *ICCM 2010*, 17-22 Dec 2010, Tsinghua University, Beijing. (Declined)
- Invited talk in *Symplectic Geometry and Related Topics 2011*, Sichuan University 22-27 May 2011. (Declined)
- Invited talk in *Moduli of Curves and Gromov–Witten Theory*, Institut Fourier, 20th June - 8th July 2011.
- Invited talk in *Recent developments on Orbifolds*, Chern Institute of Mathematics in Tianjin, China on July 25-29, 2011.
- Invited lecture series in *2011 TIMS Summer School on Mirror Symmetry*, TIMS, Taipei, 7-10 June 2011.
- Invited lecture series in *Summer School on Moduli of curves and Gromov–Witten theory*, Institut Fourier, 20 June - 1 July 2011.
- Invited talk in *Conference on Gromov–Witten theory*, Institut Fourier, 4-8 July 2011.

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.
- *2011 TIMS Summer School on Mirror Symmetry*, TIMS, Taipei, 7-10 June 2011

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 and II.*
- 2005-6: *Topics in Algebraic Geometry.*
- 2006-7 *Algebraic Geometry I, Quantitative Analysis.*
- 2007-8 *Topics in Algebraic Geometry, Complex Geometry.*
- 2008-9 *Calculus I, Linear Algebra*
- 2009-2010 *Algebraic Geometry II*
- 2010-2011 *PDE for engineers, Gromov–Witten theory, Applied Complex Variables*

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**), Canad. Math. Bull. **52** (2009), no. 2, 161–174.
- (12) *On independence of generators of the tautological rings*, (**with D. Arcara**), Compos. Math. **144** (2008), no. 6, 1497–1503.
- (13) *Notes on axiomatic Gromov–Witten theory and applications*, Algebraic geometry—Seattle 2005. Part 1, 309–323, Proc. Sympos. Pure Math., 80, Part 1, Amer. Math. Soc., Providence, RI, 2009.
- (14) *Invariance of tautological equations II: Gromov–Witten theory*, J. Amer. Math. Soc. **22** (2009), no. 2, 331–352.
- (15) *The quantum orbifold cohomology of weighted projective space* (**with T. Coates, A. Corti, and H.-H. Tseng**), Acta Math. **202** (2009), no. 2, 139–193.
- (16) *Flops, motives and invariance of quantum rings* (**with H.-W. Lin and C.-L. Wang**), Ann. of Math. **172** (2010), no. 1, 243–290.

- (17) *Algebraic structures on the topology of moduli spaces of curves and maps* (with **R. Vakil**), to appear in Survey in Differential Geometry.
- (18) *Invariance of Gromov–Witten theory under a simple flop*, (with **Y. Iwao, H.-W. Lin and C.-L. Wang**), to appear in Crelle's.
- (19) *Analytic continuations of quantum cohomology*, (with **H.-W. Lin and C.-L. Wang**; \mathfrak{b}_2), to appear in proceedings ICCM 2010.
- (20) *Algebraic cobordism of bundles on varieties*, (with **R. Pandharipande**) to appear in JEMS.

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 $\overline{M}_{1,n}$* , (with **F. Qu**), to be submitted soon.

Work in preparation.

- (1) *Invariance of orbifold quantum cohomology under toric flops* (with **C. Cadman and Y. Jiang**), in preparation.
- (2) *Frobenius manifolds, Gromov–Witten theory, and Virasoro constraints* (with **R. Pandharipande**), a book in preparation.