

CURRICULUM VITAE

TAKAHIKO YOSHIDA

1. PERSONAL

Address: Department of Mathematics, School of Science and Technology, Meiji University, 1-1-1 Higashimita, Tama-ku, Kawasaki, 214-8571, Japan

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Citizenship: Japanese

2. DEGREE

Ph.D.: (Mathematical science), March 2003, the University of Tokyo.

Thesis title: *Quantization of the moduli space of flat connections on a punctured Riemann surface based on symplectic geometry*

Supervisor: Toshitake Kohno

M.A.: March 1999, the University of Tokyo.

Master thesis title: *The generating function for certain cohomology intersection pairings of the moduli space of flat connections*

Supervisor: Toshitake Kohno

A.B.: March 1997, Tohoku University

3. EMPLOYMENT AND RESEARCH FELLOWSHIP

April 2012 - Present: Department of Mathematics, School of Science and Technology, Meiji University, Lecturer

Sep 2011 - March 2012: Department of Mathematics, School of Engineering, Tokyo denki University, Assistant professor

April 2010 - Aug 2011: Meiji University, Meiji Institute of Advanced Study of Mathematical Sciences, Postdoctoral Fellow

April 2008 - March 2010: Meiji University, Advanced Graduate Program in Mathematical Sciences, Postdoctoral Fellow

April 2007 - March 2008: The University of Tokyo, The 21st Century COE (Center of Excellence) program, Postdoctoral Fellow

April 2004 - March 2007: The University of Tokyo, Japan Society of the promotion Science, Research Fellowship for Young Scientists (JSPS Postdoctoral Fellow)

Sep 2003 - March 2004: The University of Tokyo, The 21st Century COE (Center of Excellence) program, Postdoctoral Fellow

June 2002 - March 2003: The University of Tokyo, Research Assistant

4. TEACHING EXPERIENCE

April 2012 - Present: Meiji University, probability, calculus for undergraduate students, curves and surfaces, fundamental groups and covering spaces, foundations of differential manifolds

Sep 2011 - March 2012: Tokyo Denki University, linear algebra, differential geometry, and multi-valuable calculus for undergraduate students

April 2004 - Aug 2011: Meiji University, multi-variable calculus, ordinary differential equations, and Fourier analysis for undergraduate students

April 2002 - March 2005: Tokyo University of Technology, linear algebra and single valuable calculus for undergraduate students

5. OUTREACH

1. *Geometric methods in Quantization*, Advanced Mathematical Sciences C “Mathematics Everywhere”, Project Based Analysis and Research Cluster course, Institute for Advanced Study of Mathematical Sciences, Meiji University

6. GRANTS

April 2019 - March 2023: Japan Society of the promotion Science Grant-in-Aid for Scientific Research (C) 19K03479

April 2015 - March 2019: Japan Society of the promotion Science Grant-in-Aid for Scientific Research (C) 15K04857

April 2012 - March 2015: Japan Society of the promotion Science Grant-in-Aid for Scientific Research (C) 24540095

April 2010 - March 2012: Japan Society of the promotion Science Grant-in-Aid for Young Scientists (B) 22740046

April 2008 - March 2010: Japan Society of the promotion Science Grant-in-Aid for Young Scientists (B) 20740029

April 2004 - March 2007: Japan Society of the promotion Science Research Fellowship for Young Scientists 10136

7. RESEARCH INTEREST

Symplectic geometry, Transformation groups, Index theory

8. RESEARCH ARTICLES

8.1. Publications (refereed).

1. *RR-BS correspondence – a localization phenomenon of the index in geometric quantization*, Ronsetsu “Sugaku” 71 (2019), no. 1, 1-30.
2. *Torus fibrations and localization of index III* (with H. Fujita and M. Furuta), *Comm. Math. Phys.* 327 (2014), issue 3, 665-689.
3. *Torus fibrations and localization of index II* (with H. Fujita and M. Furuta), *Comm. Math. Phys.* 326 (2014), issue 3, 585-633.
4. *Equivariant local index*, RIMS Kôkyûroku Bessatsu B39 (2013), 215-232.
5. *Local torus actions modeled on the standard representation*, *Adv. Math.* 227 (2011), no. 5, 1914-1955.
6. *Torus fibrations and localization of index I* (with H. Fujita and M. Furuta), *J. Math. Sci, Univ. Tokyo* 17 (2010), no. 1, 1-26.
7. *On manifolds which are locally modeled on the standard representation of a torus, Noncommutativity and Singularities*, 353-363. *Advanced Studies in Pure Mathematics* 55. Mathematical Society of Japan, Tokyo, 2009.
8. *On liftings of local torus actions to fiber bundles*, *Toric Topology*, 391-402. Edited by M. Harada, Y. Karshon, M. Masuda, T. Panov. *Contemp. Math.* 460. American Mathematical Society, Providence, RI, 2008.
9. *On the geometric quantization of the moduli space of flat connections on a punctured Riemann surface*, *Review Bull. Cal. Math. Soc.* 12 (2004), no. 1-2, 97-108.
10. *Symplectic toric space associated to triangle inequalities* (with Y. Kamiyama), *Geometriae Dedicata* 93 (2002), no. 1, 25-36.
11. *The Generating function for certain cohomology intersection pairings of the moduli space of flat connections*, *J. Math. Sci. Univ. Tokyo* 8 (2001), no. 3, 541-558.

8.2. Proceedings.

12. *Equivariant local index and symplectic cut*, *New transformation groups and its related topics*, to appear in RIMS Kôkyûroku, Kyoto, 2016.
13. *RR≠BS via localization of index*, *Trends in Mathematics* 12 (2010), no. 1, 1-41.
14. *On the existence of symplectic structures compatible with local torus actions*, *Proceedings of 34th Symposium on Transformation Groups*, 91–96. Wing Co., Ltd., Wakayama, 2007.
15. *On Local torus actions modeled on the standard representation*, *The theory of transformation groups and its applications*, 94-106. RIMS Kôkyûroku 1569, Kyoto, 2007.
16. *Locally standard torus fibrations*, *Proceedings of 33rd Symposium on Transformation Groups*, 107-118. Wing Co., Ltd., Wakayama, 2007.
17. *Twisted toric structures*, *The 2nd COE Conference for Young Researchers*, 233-238. Hokkaido University Technical Report Series in Mathematics 104, Hokkaido, 2006.

8.3. Thesis.

18. *Quantization of the moduli space of flat connections on a punctured Riemann surface based on symplectic geometry*, the Graduate School of Mathematical Sciences, the University of Tokyo (2003).

8.4. Preprint.

19. *Adiabatic limits, theta functions, and geometric quantization*, arXiv:1904.04076.
20. *A formula for the equivariant local index of the reduced space in the symplectic cutting*, MIMS Technical Report No. 00044, 2014. 7 pages. Also available at arXiv:1402.6437.
21. *Geodesic flows on spheres and the local Riemann-Roch numbers* (with H. Fujita and M. Furuta), UTMS Preprint Series 2012-12. 12 pages, 2012. Also available at arXiv:1209.2924.
22. *Equivariant local index*, MIMS Technical Report No. 00037, 2011. 13 pages. Also available at arXiv:1111.0431.
23. *Torus fibrations and localization of index III* (with H. Fujita and M. Furuta), UTMS Preprint Series 2010-11. 25 pages. Also available at arXiv:1008.5007.
24. *RR=# BS via localization of index*, MIMS Technical Report No. 00029, 2010. 41 pages.
25. *Torus fibrations and localization of index II* (with H. Fujita and M. Furuta), UTMS Preprint Series 2009-21. 64 pages. Also available at arXiv:0910.0358.
26. *Acyclic polarizations and localization of Riemann-Roch numbers I* (with H. Fujita and M. Furuta), UTMS Preprint Series 2009-21. 64 pages. It is the old version of *Torus fibrations and localization of index I* which is available at arXiv:0804.3258.
27. *Twisted toric structures*, UTMS Preprint Series 2006-10. 40 pages. Also available at arXiv:math.SG/065376.
28. *Perfect Bott-Morse function on polygon space*, 11 pages, 2000.

9. TALKS

9.1. Invited.

1. **An index theoretic approach to RR-BS**
 - *Workshop on Topics in the Geometry and Topology of moduli spaces*, Waseda University, 25 January, 2020.
2. **Does the quantum Hilbert space depend on polarizations?**
 - *Workshop on Topics in the Geometry and Topology of moduli spaces*, Waseda University, 25 January, 2020.
3. **Adiabatic limits, theta functions, and geometric quantization**
 - *Mathematical Society of Japan Spring Meeting 2020*, Nihon University, 16 March, 2020.
 - *2019 Canadian Mathematical Society Winter Meeting*, The Chelsea Hotel (Toronto), Canada, 9 December 2019.

- *Toric Topology 2019 in Okayama*, Okayama University of Science, 20 November, 2019.
 - *The 46th Symposium on Transformation Groups*, Osaka Prefecture University, 1 November, 2019.
 - *Symplectic Geometry Seminar*, University of Toronto, 29 April, 2019.
 - *Geometry and Topology Seminar*, McMaster University, 21 March, 2019.
 - *Symplectic Geometry Seminar*, University of Toronto, 22 October, 2018.
 - *RIMS Conference “Geometry, Algebra and Combinatorics in Transformation Group Theory*, RIMS (Kyoto), 5 June, 2018.
 - *Toric Topology 2017 in Osaka*, Osaka City University, 13 December, 2017.
- 4. Theory of local index and its applications**
- *Workshop on loop spaces, supersymmetry and index theory*, Chern Institute, Nankai University, 20 July, 2017.
 - *Mito Geometry Seminar*, Ibaraki University, 24 June. 2016.
 - *TMU Geometry Seminar*, Tokyo Metropolitan University, June. 2015.
 - *Differential Geometry, Topology Seminar*, Keio University, December. 2015.
- 5. Equivariant local index and symplectic cut**
- *New transformation groups and its related topics*, RIMS (Kyoto), 24 May 2016.
 - *Conference on Geometry and Quantization 2013*, Erwin Schrödinger Institute for Mathematical Physics (Vienna, Austria), Aug. 2013.
- 6. Equivariant local index**
- *Conference on Geometry and Quantization 2011*, Chern Institute of Mathematics, Nankai University (Tianjin, China), Sep. 2011.
 - *Toric Topology and Automorphic Functions*, Pacific National University (Khabarovsk, Russia), Sep. 2011.
- 7. $RR=\#BS$ via localization of index** (series of seven lectures)
- *KAIST Toric Topology Workshop 2010*, KAIST (Daejeon, Korea), Feb. 2010.
- 8. Torus fibrations and localization of index**
- *Mini-workshop on Topological States and Non-commutative Geometry*, WPI-AIMR, Tohoku University (Sendai), Mar. 2015.
 - *UK-Japan Mathematical Forum*, Keio University (Yokohama), Jan. 2013.
 - *Topology Seminar*, Shinshu University (Matsumoto), Dec. 2012.
 - *The international Conference “Geometry, Topology, Algebra and Number theory, Applications”*, Steklov Mathematical Institute of RAS and Moscow State University (Moscow, Russia), Aug. 2010.
 - *The 57th geometry symposium in Japan*, Kobe University (Kobe), Aug. 2010.
 - *Noncommutative Geometry and Mathematical Physics*, Keio University (Yokohama), Jul. 2010.
 - *Workshop on Toric Topology and Related Topics*, Fudan University (Shanghai, China), May 2010.
 - *Differential Topology Seminar*, Kyoto University (Kyoto), Apr. 2010.

- *The 36th Symposium on Transformation Groups*, Osaka City University (Osaka), Dec. 2009.
- *Tuesday Seminar on Topology*, the University of Tokyo (Tokyo), Oct. 2009.
- *Geometry for Quantization 2009*, Waseda University (Tokyo), Sep. 2009.
- 9. **Acyclic polarizations and localization of Riemann-Roch numbers**
 - *Differential Geometry Seminar*, Osaka City University (Osaka), Jun. 2009.
 - *Differential Geometry and Topology Seminar*, Keio University (Yokohama), Jan. 2009.
 - *Geometry Seminar*, National Center for Theoretical Sciences (South) Mathematical Division, (Tainan, Taiwan) Dec. 2008.
 - *Fujisan one-day workshop in Geometry and Topology*, National Center for Theoretical Sciences (South) Mathematical Division, (Tainan, Taiwan) Dec. 2008.
 - *Tokyo Geometry Seminar*, The University of Tokyo (Tokyo), Dec. 2008.
- 10. **On local torus actions modeled on the standard representation**
 - *Topology Seminar*, Shinshu University (Matsumoto), Feb. 2008.
 - *Tokyo Geometry Seminar*, Tokyo Institute of Technology (Tokyo), Dec. 2007.
- 11. **Locally standard torus fibrations**
 - *33rd Symposium on Transformation Groups*, Kanagawa Volunteer Support Center (Yokohama), Nov. 2006.
- 12. **Twisted toric structure**
 - *The 2nd COE Conference for Young Researchers*, Hokkaido University (Sapporo), Feb. 2006.
 - *Topology Seminar*, Tokyo Institute of Technology (Tokyo), Dec. 2005.
 - *Topology Friday Seminar*, Kyusyu University (Fukuoka), Dec. 2005.
- 13. **On the geometric quantization of the moduli space of flat connections on a Riemann surface with marked points**
 - *The 50th Topology Symposium*, Matsumoto, Jul. 2003.
 - *Tuesday Seminar on Topology*, the University of Tokyo (Tokyo), Jan. 2003.
 - *International Symposium on Pure and Applied Mathematics*, Calcutta Mathematical Society (Calcutta India), Dec. 2002.
- 14. **Symplectic geometry of the moduli space of flat connections on a punctured Riemann surface**
 - *Noncommutative Geometry and Mathematical Physics*, Keio University (Yokohama), Jun. 2003.
 - *Topology Seminar*, Hokkaido University (Sapporo), Jun. 2003.
 - *Geometry and Physics Seminar*, Waseda University (Tokyo), May. 2003.
- 15. **On certain cohomology intersection pairings of the moduli space of flat connections on a Riemann surface with marked points**
 - *Symplectic Topology*, Kinosaki, Mar. 2001.
- 16. **Perfect Bott-Morse function on polygon space**
 - *International Symposium on Recent Advances in Mathematics and its Applications*, Calcutta Mathematical Society (Calcutta India), Dec. 2003.

17. **Notes on the bending flow on the moduli space of spatial polygons**

- *Topology related with Riemann surfaces*, Osaka City University (Osaka), Sep. 2000.

9.2. **Others.**

16. **Adiabatic limits, theta functions, and geometric quantization**

- *Toric Topology 2017 Osaka*, Osaka City University (Osaka), Dec. 2017.

17. **Equivariant local index**

- *Toric Topology 2011 Osaka*, Osaka City University (Osaka), Nov. 2011.
- *Geometry of Transformation groups and Combinatorics*, RIMS (Kyoto), 14 June 2011.
- *Toric geometry, Toric topology and Combinatorics*, Osaka City University (Osaka), Dec. 2010.

18. **Torus fibrations and localization of index**

- *Third International Conference on Geometry and Quantization*, the University of Luxembourg (Luxembourg), Sep. 2009.
- *The Mathematical Society of Japan meetings*, Nagoya University (Nagoya), Sep. 2010.

19. **Acyclic polarizations and localization of Riemann-Roch numbers**

- *Topology from infinite dimensional viewpoint*, Tottori University of Environmental Studies (Tottori), Feb. 2009.
- *Ikuta International workshop on Symplectic Geometry*, Meiji University (Kawasaki), Dec. 2008.
- *The Mathematical Society of Japan meetings*, Tokyo Institute of Technology (Tokyo), Sep. 2008.
- *New Horizons in Toric Topology*, University of Manchester (Manchester, UK), Jul 2008. (poster session)

20. **On counting lattice points and Riemann-Roch numbers in Lagrangian fibrations**

- *Symplectic Geometry Seminar*, University of Toronto (Toronto, Canada), Jan. 2008.

21. **On the existence of symplectic structures compatible with local torus actions**

- *34th Symposium on Transformation Groups*, Wakayama Municipal Auditorium (Wakayama), Nov. 2007.

22. **Classification of locally toric Lagrangian fibrations**

- *The Mathematical Society of Japan meetings*, Tohoku University (Sendai), Sep. 2007.

23. **On local torus actions modeled on the standard representation**

- *The Theory of Transformation Groups and its Applications*, RIMS (Kyoto), 30 May 2007.

- *The Mathematical Society of Japan meetings*, Saitama University (Saitama), Mar. 2007.
- 24. **Locally standard torus fibrations**
– *MSJ-IHES Joint Workshop on Noncommutativity*, IHES (France), 15 Nov. 2006.
- 25. **Twisted toric structures**
– *International Conference on Toric Topology*, Osaka City University (Osaka), May 2006.
- 26. **On the geometric quantization of the moduli space of flat connections on a Riemann surface with marked points**
– *The Mathematical Society of Japan meetings*, the University of Tokyo (Tokyo), Mar. 2003.
- 27. **A prequantum line bundle on the moduli space of flat connections on a punctured Riemann surface**
– *The 10th Japan-Korea school of knots and links*, the University of Tokyo (Tokyo), Feb. 2003.
- 28. **Perfect Bott-Morse function on polygon space**
– *Art of Low Dimensional Topology VI*, Kansai seminar house (Kyoto), Jan. 2000.
- 29. **The generating function for certain cohomology intersection pairings of the moduli space of flat connections on a Riemann surface with marked points and Duistermaat-Heckman's theorem**
– *The Mathematical Society of Japan meetings*, Hiroshima University (Hiroshima), Sep. 1999.

10. MEMBERSHIP

Mathematical Society of Japan