Tomoo Matsumura

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PERSONAL **Date of Birth:** January 6, 1978 **Citizenship:** Japan

EDUCATION

Boston University, USA
Ph.D. Mathematics, August 2007
Thesis: *Orbifold Cohomology of a Wreath Product Orbifold*
Thesis Advisor: Professor Takashi Kimura

International Christian University, Japan
M.S. Mathematics, March 2001
Thesis: *Bose-Mesner Algebras over K and Their Related Type II Matrices.*
Thesis Advisor: Professor Hiroshi Suzuki

International Christian University, Japan, Undergraduate Program (1996-1999)
Aishin Christian Highschool (キリスト教愛真高等学校, 1993-1996)

EMPLOYMENT

Okayama University of Science, Japan
(2015.04 – present) Junior Associate Professor (専任講師, tenured)

KAIST, Korea
(2013.03 – 2015.02) Visiting Professor (full time)
(2011.09 – 2013.02) ASARC Postdoc

Cornell University, USA
(2008.07 – 2011.06) H.C. Wang Assistant Professor

Max-Planck Institute for Mathematics, Bonn, Germany
(2007.09 – 2008.05) Postdoctoral Fellow

Boston University, USA
(2002.09 – 2007.05) Graduate Teaching Assistant

VISITING POSITIONS

Hokkaido University, Japan
(2011.07 - 2011.08) Visiting Scholar

University of Tokyo, Japan,
(2007.07 - 2007.08) Visiting Researcher (PDF), Funded by Center of Excellence.

Keio University, Japan
(2007.06) Visiting Researcher, Funded by Center of Excellence

Institute for Advanced Study, Princeton, USA
(2003.01 - 2003.05) Research Assistant, Supported by NSF and Boston University

PUBLISHED PAPERS

1. ***Equivariant Cohomology for Hamiltonian torus actions on symplectic orbifolds*** with T. Holm, *Transformation Groups*, 2012, Vol. 17, No. 3, p.717–746
2. ***Stringy and Orbifold cohomology of Wreath Product Orbifolds*** *European Journal of Pure and Applied Mathematics*, Vol. 5, No. 4 (2012), p.492–510
3. ***Connected Sum of Simplicial Complexes and Equivariant Cohomology*** with F. W. Moore, *Osaka Journal of Mathematics* Vol. 51, No. 2 (2014), p.405–425
4. ***Moment Angle Complexes and the Big Cohen-Macaulayness*** with S. Luo and F. W. Moore, *Algebraic and Geometric Topology*, Vol. 14, No. 1 (2014), p.379–406
5. ***Equivariant Cohomology of Weighted Grassmannians and Weighted Schubert Classes*** with Hiraku Abe, *Int Math Res Notices* (2014) doi: 10.1093/imrn/rnu003.
6. ***Pfaffian Sum Formula for Symplectic Grassmannians.*** with T. Ikeda, Mathematische Zeitschrift, DOI 10.1007/s00209-015-1423-x
7. ***Equivariant Giambelli formula for the symplectic Grassmannians –Pfaffian Sum Formula.*** with T. Ikeda, accepted for FPSAC 2015 Extended Abstract

PREPRINT/ EXPOSITORY

1. ***Lecture notes on cohomology of toric manifolds***
   Trends in Mathematics - New Series, Information Center for Mathematical Sciences, Volume 14, Number 1, 2012, pages 31–52.
2. ***Schur polynomials and Weighted Grassmannians***
   with Hiraku Abe, arXiv:1209.2597.
3. ***Determinantal and Pfaffian formulas of K-theoretic Schubert calculus***
   with Thomas Hudson, Takeshi Ikeda, and Hiroshi Naruse, arXiv:1504.02828.

AWARDS AND FELLOWSHIPS

Outstanding Professor, College of Natural Sciences, KAIST, 2014
Based on teaching evaluations from the students (Award: 2.5 million won)

Outstanding Professor, College of Natural Sciences, KAIST, 2013
Based on teaching evaluations from the students (Award: 1 million won)

Department Citation Excellence in Teaching, Boston University, 2004
Based on teaching evaluations from the students.

Boston Univeristy Fellowship, Boston University 2001
This is a fellowship given to a few new graduate students every year; it provides full support over the academic year

Best of the New Graduate Students Scholarship, ICU, Tokyo, 2001
This award is given to two new graduate students every year in the natural science department, and carries about $5000 award.

TEACHING EXPERIENCE

Visiting Professor, KAIST (2013–present)
MAS 102 (Calculus II, Edu3.0)
MAS 101 (Calculus I)
MAS 109 (Introduction to Linear Algebra)
MAS 201 (Differential Equations and Applications)

H.C. Wang Assistant Professor, Cornell University (2008–2011)
Math 7570 (Introduction to Poisson Geometry)
Math 7510 (Berstein seminar: Schubert Calculus)
In this seminar course, I instructed students to read papers and present them.
Math 4530 (Introduction to Topology and Algebraic Topology)
Math 2220 (Multivariable Calculus)
Math 2210 (Linear Algebra)
Math 1920 (Multivariable Calculus for Engineers)
Math 1110 (Calculus I)

Graduate Teaching Assistant, Boston University (2002 - 2007)
Courses taught as principal lecturer:
Math 123 (Calculus I)
Courses taught as recitation instructor:
Math 115/116 (Statistics I/II)
Math 123/124 (Calculus I/II)
Math 120 (Applied Mathematics for Social and Management Sciences)

Counselor for PROMYS program http://promys.bu.edu/
Boston University (Summer of 2003 - 2005)
This is a 6 week long training program on number theory for high school students and high school teachers, led by Prof. Glenn Stevens. The teaching philosophy of this program is that we encourage the participants to discover solutions to mathematics problems through exploration. I tutored high school teachers, helped them solving problems in number theory and graded. Counselors had a weekly meeting to discuss the progress of each participant.

INTENSIVE LECTURES

Nagoya University (2012.11)
Introduction to Cohomology of Toric Manifolds and Equivariant Methods.

2012 SNU/KIAS Toplogy Winter School
Cohomology of Toric Manifolds.

LICENSE Teaching mathematics for middle and high schools in Japan (2000.04)

Language Japanese (native), English, Korean

SERVICE

Cornell University:
Organizer, Seminar on Generalized Complex Structures (2008.09 - 2009.05)
Math Club Committee (2009.09 - 2011.05)
Math 2210/2220 Czar, (2010.01 - 2010.05 / 2011.01 - 2011.05)
Teaching Award Selection Committee (2008.09 - 2009.06)
Max-Planck-Institut für Mathematik:
Co-organizer, Seminar on geometric Langlands correspondence (2008.01 – 2008.05)
Co-organizer, Seminar on quantum cohomology (2007.09 – 2007.12)
Co-rganizer, Informal geometry seminar (2007.09 – 2008.05)
Keio University: Co-organizer, Informal geometry seminar (2007.06 – 2007.08)
Boston University: Co-organizer, Geometry Lunch Meeting (2006.01 – 2008.05)

CONFERENCE ORGANIZER

V International Conference Japan-Mexico "Topology and its Applications"
Colima, Mexico, Symplectic Topology Section Organizer (2010.09).
Topology of torus actions and its applications to geometry and combinatorics
KAIST, Daejeon, Korea (2014.08).
The 3rd Workshop "Schubert calculus and its related topics"
Okayama University of Science, Japan (2014.08)

CONFERENCE TALKS

The 3rd Workshop "Schubert calculus and its related topics", Okayama Science University
K-theoretic Schubert Calculus
Toric Topology 2014 in Osaka, Osaka City University
Schubert Calculus of type C
Toric Topology 2012 in Osaka, Osaka City University
Schubert Calculus of Weighted Grassmannians
KMS Annual Meeting 2012 Oct
Schubert calculus for weighted Grassmannians and weighted Schur functions
KMS Annual Meeting 2012 May
Moment Angle Complexes and Integral Cohomology of Toric Orbifolds
MSJ Annual Meeting 2012 March
Moment Angle Complexes and Integral Cohomology of Toric Orbifolds
Toric Topology 2011 in Osaka, Osaka City University
Moment Angle Complexes and Integral Cohomology of Toric Orbifolds
AMS 2010 Fall Central Section Meeting at University of Notre Dame (2010)
Equivariant cohomology for Hamiltonian torus actions on symplectic orbifolds
UK-Japan Winter School - Algebraic and Symplectic Geometry
Stringy cohomology of the symmetric product of an orbifold
Mathematics Research Centre, University of Warwick, UK (2008.01)
Summer school on symplectic geometry and toric topology
Orbifold Cohomology, Osaka City University, Osaka, Japan (2007.07)

CONFERENCES ATTENDED BY INVITATION

The 5th MSJ Seasonal Institute 2012 International summer school and conference on Schubert calculus, Osaka City University, Japan (2012, 07)
Toric Topology 2011 in Osaka Osaka City University, Japan (2011,11)
East Asia Symplectic Conference 2011 KIAS, Seoul, Korea, (2011.06)
POISSON 2010 Instituto Nacional de Matemática Pura e Aplicada, Brazil, (2010.07)
XVIIIth Oporto Meeting on Geometry, Topology and Physics
Faculdade de Ciencias da Universidade do Porto, Portugal, (2009.07)
Conference on Mathematical Physics and Geometric Analysis
Fields Institute, Toronto, Canada, (2008.01)
Algebraic aspects in geometry
Bedlewo, Poland, (2007.10)
Workshop on Algebraic Geometry and Physics
Korea Institute for Advanced Study, Seoul, South Korea, (2007.06)
Stacks in Geometry and Topology Workshop
Fields Institute, Toronto, Canada, (2007.05)

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Oberwolfach Seminar on Algebraic Stacks
Mathematisches Forschungsinstitut Oberwolfach, Germany, (2006.10)
International Conference on Toric Topology
Osaka City University, Osaka, Japan, (2006.06)
Generalized McKay Correspondences and Representation Theory
Mathematical Sciences Research Institute, Berkeley, USA, (2006.03)
C.I.M.E course on enumerative invariants in algebraic geometry and string theory, Cetraro, Italy, (2005.06)
Workshop on Algebraic Geometry and Physics
Instituto Superior Técnico, Lisbon, Portugal, (2004.09)
Simons Workshop in Mathematics and Physics
State University of New York, Stony Brook, USA, (2004.08)
School on Geometry and String Theory
Newton Institute, Cambridge, England, (2002.03 - 2002.04)

SEMINAR TALKS

University of Michigan, Ann Arbor
Schubert Calculus for Weighted Grassmannians (2013.01)
George Mason University
Schubert Calculus for Weighted Grassmannians (2013.01)
Nagoya University
Schubert Calculus for weighted Grassmannian Orbifolds (2012.11)
KIAS Geometry Seminar, Seoul
Weighted Grassmannians and their Schubert Calculus (2012.05)
Hamiltonian torus actions on orbifolds and orbifold GKM theorem (2010.11)
Seoul National University, Geometry Seminar, Seoul
Weighted Grassmannians and their Schubert Calculus(2012.05)
Cornell University Seminars, US
Moment Angle Complexes and Cohomology of Toric orbifolds (2012.01)
What is the 1+1 TQFT? (2010.03)
Introduction to orbifolds and differentiable stacks (2008.10)
The stringy cohomology of symmetric product of an orbifold (2008.04)
University of Beijin Seminar, Beijin
Moment Angle Complexes and Cohomology of Toric orbifolds (2011.10)
National Cheng Kung University Geometry Seminar, Taiwan
Moment Angle Complexes and Cohomology of Toric orbifolds (2011.9)
Hokkaido University Geometry Colloquium, Japan
Moment Angle Complexes and Cohomology of Toric orbifolds (2011.7)
Hamiltonian torus actions on orbifolds (2010.11)
University of Western Ontario Seminar
Equivariant cohomology for Hamiltonian torus actions on orbifolds (2011.04)
Queen's University Seminar
Equivariant cohomology for Hamiltonian torus actions on orbifolds (2011.02)
Boston University Geometry Seminar
Schubert Calculus for Weighted Grassmannians (2013.01) *Equivariant cohomology for Hamiltonian torus actions on orbifolds* (2010.12)
Calculus in a braided category and a model for stringy quantum cohomology (2008.01)
University of Massachusetts Boston Geometry Seminar
Equivariant cohomology for Hamiltonian torus actions on orbifolds (2010.12)
University of Connecticut Algebra Seminar
Equivariant cohomology for Hamiltonian torus actions on orbifolds (2010.12)
University of Tokyo IPMU Komaba Seminar
Hamiltonian torus actions on orbifolds and orbifold-GKM theorem (2010.11)
Seoul National University Symplectic Geometry Seminar
Hamiltonian torus actions on orbifolds (2010.11)
Keio University Differential Geometry and Topology Seminar
GKM theorem for Hamiltonian torus actions on orbifolds (2010.01)
Orbifold Cohomology of Wreath Product Orbifolds (2007.07)

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McMaster University Geometry and Topology Seminar
Schubert Calculus for Weighted Grassmannians (2013.01)
Stringy cohomology of the symmetric product of an orbifold (2008.01)
HyperKähler resolution conjecture and a wreath product orbifold (2007.01)

Max-Planck Insititut für Mathematik Seminar Algebraic Geometry
Stringy cohomology of symmetric product of an orbifold and the hyperKähler resolution conjecture (2007.11)

University of Luxembourg Geometry Seminar
Introduction to groupoids and stacks (2007.10)

University of Tokyo KAYO Topology Seminar
Orbifold Cohomology of Wreath Product Orbifolds and Hyperkähler Resolution Conjecture (2007.07)

University of Zurich, Oberseminar Algebraische Geometrie
Orbifold Cohomology of a Wreath Product Orbifold (2007.04)

University of Toronto Symplectic Geometry Seminar
Schubert Calculus for Weighted Grassmannians (2013.01)
Hamiltonian torus actions on symplectic orbifolds (2011.02)
Lehn-Sorger algebra, Fantechi-Göttsche ring and a wreath product orbifold (2007.01)