

CURRICULUM VITAE

Oleksandr (Sasha) Tsymbaliuk

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Born: May 21, 1987, Kharkiv, Ukraine
Citizenship: Ukraine citizen

- Research Interests**
- Representation theory and its connection to Algebraic geometry
- Employment**
- Research Assistant Professor Sept. 2014–present
Simons Center for Geometry and Physics
at Stony Brook University
- Education**
- PhD in Mathematics, Massachusetts Institute of Technology 2009–2014
Thesis title: *The affine Yangian of \mathfrak{gl}_1 and the infinitesimal Cherednik algebras*
Thesis advisor: Prof. P.I. Etingof
 - MS in Mathematics, Moscow State University (cum laude) 2004–2009
Thesis title: *Heisenberg action in the equivariant K -theory of Hilbert schemes via shuffle algebra*
Thesis advisor: Prof. E.B. Vinberg
 - MS in Mathematics, Independent University of Moscow 2004–2009
Thesis title: *Quantum affine Gelfand-Tsetlin bases and quantum toroidal algebra via K -theory of affine Laumon spaces*
Thesis advisor: Prof. B.L. Feigin
- Research Visits**
- Institut des Hautes Études Scientifiques (IHES) June–July 2017
Bures-sur-Yvette, France
 - Max Planck Institut für Mathematik (MPIM) June–July 2016
Bonn, Germany
 - Max Planck Institut für Mathematik (MPIM) June 2015
Bonn, Germany
 - Research Institute for Mathematical Sciences (RIMS) January 2015
Kyoto, Japan
- Grants, Awards, and Fellowships**
- NSF grant DMS-1502497 2015–2018
 - SUNY Individual Development Award 2015–2016
 - JSPS Fellowship for Foreign Researchers Winter 2015
Japan Society for the Promotion of Science
 - Akamai Presidential Fellowship, MIT 2009–2010
 - Dobrushin Fellowship, Independent Moscow University Fall 2008
 - Dobrushin Fellowship, Independent Moscow University Spring 2008
 - Dobrushin Fellowship, Independent Moscow University Spring 2007
 - Silver Medal at the 45th International Mathematical Olympiad July 2004

Publication List

- *Multiplicative slices, relativistic Toda and shifted quantum affine algebras*, joint with M. Finkelberg
Submitted; arXiv:1708.01795
- *Several realizations of Fock modules for toroidal $\check{U}_{q,d}(\mathfrak{sl}_n)$*
Submitted; arXiv:1603.08915
- *Homomorphisms between different quantum toroidal and affine Yangian algebras*, joint with M. Bershtein
Submitted; arXiv:1512.09109
- *Classical limits of quantum toroidal and affine Yangian algebras*
Journal of Pure and Applied Algebra 221 (2017), 2633–2646
- *The affine Yangian of \mathfrak{gl}_1 revisited*
Advances in Mathematics 304 (2017), 583–645
- *Bethe subalgebras of $U_q(\widehat{\mathfrak{gl}}_n)$ via shuffle algebras*, joint with B. Feigin
Selecta Mathematica 22 (2016), no. 2, 979–1011
- *Infinitesimal Hecke algebras of \mathfrak{so}_N*
Journal of Pure and Applied Algebra 219 (2015), 2046–2061
- *Infinitesimal Cherednik algebras as W -algebras*, joint with I. Losev
Transformation Groups 19 (2014), no. 2, 495–526
- *Representations of infinitesimal Cherednik algebras*, joint with F. Ding
Representation Theory (electronic) 17 (2013), 557–583
- *Equivariant K -theory of Hilbert schemes via shuffle algebra*, joint with B. Feigin
Kyoto Journal of Mathematics 51 (2011), no. 4, 831–854
- *Quantum affine Gelfand–Tsetlin bases and quantum toroidal algebra via K -theory of affine Laumon spaces*
Selecta Mathematica 16 (2010), no. 2, 173–200

Teaching Experience

- Head instructor for *Mathematical Thinking* (at SBU) Fall 2016
- Lecturer for *Calculus B* (at SBU) Fall 2015
- Recitation leader for *Calculus IV with Applications* (at SBU) Fall 2014
- Teaching assistant for *Real Analysis* (at MIT) Spring 2014
- Recitation leader for *Multivariable Calculus* (at MIT) Fall 2012
- Grader for the following courses at MIT:
Real and Functional Analysis, Calculus, Commutative Algebra, Introduction to Arithmetic Geometry, Algebraic Groups

Mentoring Experience

- Mentor in the *MIT Directed Reading Program* Winter 2014
- Mentor in the *MIT PRIMES* program for high school students 2011–2013
(With our project, F. Ding won the 4th Prize at 2012 Intel STS US national competition and became 2012 Davidson Fellow Laureate)

Selected Talks

- QGM, Aarhus, Denmark, Seminar talk June 2017
Shifted affine quantum groups and shifted Yangians
- ESI, Austria, Conference “Geometry and Representation Theory” January 2017
Shifted quantum affine algebras
- UC Davis, Algebra and Discrete Mathematics Seminar November 2016
Shifted Yangians and shifted quantum affine algebras
- Brown University, Theoretical Physics Seminar November 2016
Affine Yangians and quantum toroidal algebras of \mathfrak{sl}_n and \mathfrak{gl}_1
- Uppsala Universitet, Sweden, Representation Theory Conference June 2016
Homomorphisms between different quantum toroidal and affine Yangian algebras
- Northeastern University March 2016
Geometry, Physics and Representation theory Seminar
Some new results on quantum toroidal algebras of \mathfrak{sl}_n
- SCGP, Program “Geometric representation theory” January 2016
Homomorphisms between different quantum toroidal and affine Yangian algebras
- Temple University, Algebra Seminar November 2015
Relation between quantum toroidal algebras of \mathfrak{sl}_n and affine Yangians of \mathfrak{sl}_{mn}
- Yale University, Geometry, Symmetry and Physics Seminar April 2015
Shuffle realization of $\check{U}_{q,d}(\mathfrak{sl}_n)$ and Bethe subalgebras of $U_q(\widehat{\mathfrak{gl}}_n)$
- Tokyo University, Japan, Infinite Analysis Seminar January 2015
Continuous and infinitesimal Hecke algebras
- CUNY, Representation Theory Seminar October 2014
Quantum toroidal and affine Yangian of \mathfrak{gl}_1 and \mathfrak{sl}_n
- Northeastern University, Graduate student seminar April 2014
The affine Yangian and the quantum toroidal of \mathfrak{gl}_1
- MIT-NEU, Graduate seminar on February 2014
Quantum cohomology and Representation theory
Geometric representation theory of the Hilbert schemes
- ETH Zurich, Switzerland, Talks in theoretical sciences November 2013
Trigonometric q -deformations of shift of the argument algebras
- Harvard-MIT, Graduate student seminar in September 2011
Geometric Representation theory
Category \mathcal{O} at the negative level
- Harvard-MIT, Graduate student seminar April 2011
Chiral version of Wakimoto modules
- Hebrew University, Israel, Representation theory Seminar October 2010
Geometric approach to Whittaker functions
- Boston University, Geometry Seminar April 2010
Laumon spaces and their role in representation theory
- MIT, Infinite Dimensional Algebra Seminar March 2010
Ding-Iohara algebras and their action on the

K-theory of the Hilbert scheme

- Clay Mathematics Institute Workshop “Macdonald Polynomials and Geometry”
Gelfand-Tsetlin bases via Laumon spaces March 2010
 - Research Program of the 25th Annual PCMI Summer Session
Park City, Utah July 2015
 - Workshop “RIMS Project 2014 Geometric Representation Theory”
Research Institute for Mathematical Sciences, Kyoto, Japan July 2014
 - Workshop on Yangians and Quantum Loop Algebras
Austin, TX May 2014
 - Summer School on Symplectic Reflection Algebras
Moscow region, Russia July 2013
 - Spring School on Algebraic Microlocal Analysis
Northwestern University, Evanston, IL May 2012
 - Summer School on Quantization and Representation Theory
Notre Dame University, IN June 2011
 - Program “Langlands Duality in Representation Theory”
Hebrew University, Jerusalem, Israel Fall 2010
 - Winter School on Representation Theory
Kyoto University, Kyoto, Japan January 2009
- Schools and Workshops**
- Professional Activities**
- **Editorial service**
Referee for the following journals:
 - Communications in Mathematical Physics
 - International Mathematics Research Notices
 - Journal of Algebra
 - Letters in Mathematical Physics
 - Moscow Mathematical Journal
 - Publications Mathématiques de l’IHÉS
 - Selecta Mathematica (New Series)
 - SIGMA
 - Transformation Groups
 - Reviewer for:
 - Mathematical Reviews
 - **Grant reviews**
In 2016, I had reviewed grant applications for NSF
 - **Seminars**
In Fall 2015–Spring 2016, I had organized an SCGP postdoc seminar