

Alexei Oblomkov

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University of Massachusetts
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Citizenship: Russia, US Permanent Resident since 2010.

RESEARCH INTERESTS

Representation theory (special functions and orthogonal polynomials, Hecke algebras); algebraic geometry (Gromov-Witten and Donaldson-Thomas invariants, noncommutative geometry, projective geometry); mathematical physics (inverse scattering, integrable systems)

EDUCATION

2005	Massachusetts Institute of Technology	Ph.D. in mathematics Advisor: Pavel Etingof Title: Double Affine Hecke Algebras and Noncommutative Geometry
1999-2001	Independent University of Moscow	Graduate Study
1999-2001	Moscow State University	Graduate Study
1998	Independent University of Moscow	MA in Pure Mathematics
1998	Moscow State University	MA in Pure Mathematics

EMPLOYMENT

2009-	University of Massachusetts, Amherst	Assistant Professor
2008-2009	Princeton University	Visiting Assistant Professor
2006-2008	Princeton University	Instructor
2005-2006	Institute for Advanced Study	Postdoctoral Fellow

GRANTS

2010-2013	NSF Division of Mathematical Sciences Grant, DMS-1001609
2007-2010	NSF Division of Mathematical Sciences Grant, DMS-0701367
2003-2006	Civilian Research and Development Foundation Grant, RMI-2545-MO-03

AWARDS

2010-2012	Sloan Fellowship
2004	Charles and Jennifer Johnson Prize, MIT departmental award for the best paper submitted by a graduate student
2004, 2003	Rogers Family Prize, MIT departmental award for the best mentor-mentee team in Summer Program for Undergraduate research
1996-1997	Lomonosov Stipend, Moscow State University award for high academic achievement

PUBLICATIONS

1. *Integrability of some quantum systems associated with the root system B_2* , (Russian) Vestnik Moskov. Univ. Ser. I Mat. Mekh. 72 (1999), no. 2, 6–9; translation in Moscow Univ. Math. Bull. 54 (1999), no. 2, 5–8.
2. *Monodromy-free Schrodinger operators with quadratically increasing potential*, (Russian) Teoret. Mat. Fiz. 121 (1999), no. 3, 374–386; translation in Theoret. and Math. Phys. 121 (1999), no. 3, 1574–1584.
3. (with F. L. Zak, A. V. Inshakov, S. M. L’vovski) *On congruences of lines of order one in \mathbb{P}^3* , preprint (1999), available at <http://www.mccme.ru/iium/postscript/s99/notes>.
4. (with O. Chalykh), *Harmonic oscillator and Darboux transformations in many dimensions*, Phys. Lett. A 267 (2000), no. 4, 256–264.
5. (with A. Penskoï) *Two-dimensional algebro-geometric difference operators*, J. Phys. A 33 (2000), no. 50, 9255–9264.
6. *Difference operators on two-dimensional regular lattices*, (Russian) Teoret. Mat. Fiz. 127 (2001), no. 1, 34–46; translation in Theoret. and Math. Phys. 127 (2001), no. 1, 435–445.
7. *On the spectral properties of two classes of difference periodic operators*, (Russian) Mat. Sb. 193 (2002), no. 4, 87–112; translation in Sb. Math. 193 (2002), no. 3-4, 559–584.
8. *The isoenergy spectral problem for multidimensional difference operators*, (Russian) Funktsional. Anal. i Prilozhen. 36 (2002), no. 2, 45–61; translation in Funct. Anal. Appl. 36 (2002), no. 2, 120–133.
9. (with O. Chalykh, P. Etingof) *Generalized Lamé operators*, math.QA/0212029, Communications in Math. Physics. 239 (2003), no. 1-2, 115–153.
10. *Heckman-Opdam’s Jacobi polynomials for the BC_n root system and generalized spherical functions*, math.RT/0202076, Adv. Math., 186 (2004), no. 1, 153–180.
11. *The double affine Hecke algebras and Calogero-Moser spaces*, math.RT/0303190, Represent. Theory 8 (2004), 243–266.
12. *Double affine Hecke algebras of rank 1 and affine cubic surfaces*, math.RT/0306393, IMRN, (2004), no. 18, 877–912.
13. (with J. V. Stokman) *Vector valued spherical function and Macdonald-Koornwinder polynomials*, math.QA/0311512, Compositio Math. 141, (2005), no. 5, 1310–1350.
14. (with A. Penskoï) *Laplace transformations and spectral theory of two-dimensional semi-discrete and discrete hyperbolic Schroedinger operators*, math-ph/0311036, IMRN, (2005), no. 18, 1089–1126.
15. (with P. Etingof) *Quantization and orbifold cohomology*, math.QA/0311005, Proceedings of the JHLM Workshop, Contemporary Mathematics series, (2006), no. 417, 171–182.
16. (with P. Etingof, W. L. Gan) *Generalized double affine Hecke algebras of higher rank*, math.QA/0504089, Crelle’s Journal, (2006), no. 600, 177–201.
17. (with P. Etingof, E. Rains) *Generalized double affine Hecke algebras of rank 1 and quantized Del Pezzo surfaces*, math.QA/0406480, Advances in Mathematics, 212 (2007), no. 10, 749–796.
18. *Deformed Harish-Chandra homomorphism for the cyclic quiver*, math.RT/0504395, Mathematical Research Letters, 33 (2007), Issue 3, 359–372.
19. (with P. Etingof, W. L. Gan, V. Ginzburg) *Harish-Chandra homomorphisms and symplectic reflection algebras for wreath-products*, math.RT/0511489, Publications Mathématiques de l’IHÉS, No. 105 (2007), 91–155.

20. (with P. Etingof, S. Loktev, L. Rybnikov) *A Lie algebra construction of Generalized double affine Hecke algebras*, arXiv:0809.3976, Transform. Groups 13 (2008), no. 3-4, 541–556.
21. (with E. Stoico) *Finite dimensional representations of double affine Hecke algebra of rank 1*, math.RT/0409256, Journal of Pure and Applied Algebra, vol. 213 (2009), no. 5, 766–771
22. (with D. Maulik) *Quantum cohomology of $\text{Hilb}_m(A_n)$* , arXiv:0802.2737, Journal of AMS, vol. 22 (2009), 1055–1091.
23. (with D. Maulik) *Donaldson-Thomas theory of $A_n \times \mathbb{P}^1$* , arXiv:0802.2739, Compos. Math., 145 (2009), no. 5, 1249–1276.
24. (with D. Maulik, A. Okounkov, R. Pandharipande) *The Gromov-Witten/Donaldson-Thomas correspondence for toric 3-folds*, arXiv:0809.3976, submitted.
25. (with V. Shende) *The Hilbert scheme of a plane curve singularity and the HOMFLY polynomial of its link*, arXiv:1003.1568, submitted.
26. (with A. Okounkov, R. Pandharipande) *On GW/DT correspondence with descendants*, in preparation.
27. *Virasoro constraints for the Hilbert scheme of points on surface*, in preparation.

SELECTED TALKS

Wall-crossing in Mathematics and Physics, Mathematics, University of Illinois at Urbana-Champaign, 05/2010.
University of Illinois, Chicago, Algebraic Geometry Seminar, 03/2010.
University of Wisconsin, Madison, Geometry Seminar, 11/2009.
University of Michigan, Ann Arbor, Mathematical Physics Seminar, 10/2009.
Boston University, Geometry Seminar, 10/2009.
AMS Special Session on TQFT, University of Illinois at Urbana-Champaign, 04/2009.
University of Chicago, Chicago, Representation Theory Seminar, 11/2009.
MIT, Noncommutative Algebra Seminar, 05/2009.
Cornell University, Representation Theory Seminar, 04/ 2009.
Stony Brook University, Colloquium, 01/2009.
University of Massachusetts, Amherst, Special seminar, 12/2008.
University of Texas, Austin, Special seminar, December, 12/2008.
University of Illinois at Urbana-Champaign, Algebraic geometry seminar, 12/2008.
University of Michigan, Special seminar, 11/2008.
Northwestern University, Mathematical Physics Seminar, 10/2007.
University of California, Riverside, Lie Theory Seminar, 12/2006.
University of Virginia, Charlottesville, Colloquium: 11/2006.
University of Virginia, Charlottesville, Algebra Seminar, 11/2006.
University of Massachusetts, Amherst, Representation Theory Seminar, November, 12/2005.
AMS Special Session on Noncommutative Algebra and Noncommutative Birational Geometry, University of Oregon, 11/2005.
University of Washington, Algebra Seminar, 11/2005.
AMS Special Session on Algebraic Geometry and Combinatorics, UC, Santa Barbara, 04/2005.
Rutgers University, Lie Group Seminar, 10/2005.
University of Michigan, Algebra Seminar, 12/2004.
CalTech, Analysis Seminar, 11/2004.

MIT, Infinite-Dimensional Algebra Seminar, 04/2004.
Yale University, Geometry, Symmetry and Physics, 12/2003.
University of Massachusetts, Amherst, Representation Theory Seminar, 12/2003.
Cornell University, Lie Groups Seminar, 01/2003.
MIT, Infinite-Dimensional Algebra Seminar, 11/2002.
University of Amsterdam, Lectures on special functions, 07/2002.

TEACHING

University of Massachusetts

Fall 2010: Graduate Algebra, (Math 631)
 Taught lectures
 Spring 2010: Calculus I, (MAT 131, 2 sections)
 Taught lectures and problem sessions

Princeton University:

Spring 2009: Multivariable Calculus (MAT 201)
 Taught review sessions
 Spring 2009: Junior Seminar: Representation Theory of Finite Groups
 Organize the Seminar
 Fall 2008: Advanced Multivariable Calculus (MAT 203, Course Head)
 Taught lectures, review sessions
 Spring 2008: Multivariable Calculus (MAT 201, 2 sections)
 Taught lectures and problem sessions
 Fall 2007: Advanced Multivariable Calculus (MAT 203, 2 sections)
 Taught lectures and problem sessions
 Spring 2007: Multivariable Calculus (MAT 201, 2 sections)
 Taught lectures and problem sessions
 Fall 2006: Advanced Multidimensional Calculus (MAT 203, 2 sections)
 Taught lectures and problem sessions

MIT:

Summer 2004: Summer Program in Undergraduate Research at MIT
 Mentored 2 undergraduate students
 Spring 2004: Linear Algebra (18.06)
 Taught problem sessions
 Fall 2003: Advanced Calculus (18.01A)
 Multidimensional Calculus (18.02)
 Taught problem sessions
 Summer 2004: Summer Program in Undergraduate Research at MIT
 Mentored 2 undergraduate students
 Spring 2003: Differential Equations (18.03)
 Taught problem sessions and graded problems
 2001-2002: Graded problems for 2 graduate level courses

Independent University of Moscow:

1999-2001: Advanced Algebra courses
 Taught problem sessions

Spring 2000: Organized the seminar on Projective Algebraic
 Geometry for undergraduate students.

SERVICES

Refereeing: Communications in Mathematical Physics, Contemporary Mathematics, Transformation Groups, IMRN, JAMS, Annals, Journal of Algebraic Combinatorics A, Advances in Mathematics.

Coorganizer of Princeton Algebraic Geometry Seminar (Spring, 2009); served on general exam committees.

Coorganizer of Valley Geometry Seminar (Fall 2009, Spring 2010), Quantum Field Theory Seminar (Fall 2010); gave 5 lectures on Algebraic Geometry Reading Seminar; served on Colloquium Committee.

REFERENCES

Professor P. Etingof MIT, USA, etingof@math.mit.edu

Professor A. Okounkov Princeton University, USA, okounkov@math.princeton.edu

Professor R. Pandharipande Princeton University, USA, rahulp@math.princeton.edu