Alexei Oblomkov

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Citizenship:	Russia, US Permanent Resident since 2010, US citizen since 2014.

Education

2005	Massachusetts Institute of Technology	Ph.D. in mathematics Advisor: Pavel Etingof
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

2020-	University of Massachusetts, Amherst	Professor
2018 Spring	MSRI	Research Professor
2015-2019	University of Massachusetts, Amherst	Associate Professor
2009-2015	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

2022-2025	NSF DMS-2200798,	$217,038.00, sole PI
2018-2021	NSF FRG DMS-1760373,	$300,000, for UMass
2015-2016	NSF DMS-1546311, Workshop funding	$25,000, sole co-PI
2014-2019	NSF CAREER DMS-1352398	$420,000.00, sole PI
2010-2013	NSF DMS-1001609	$123,910.00, sole PI
2007-2010	NSF DMS-0701367	$111,300.00, sole PI

Awards

2018	Simons Fellow in Mathematics for Fall 2018
2014-2019	NSF CAREER Award
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

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/ium/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. Penskoi) *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 Lame 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. Penskoi) *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 Mathematiques de l'IHÉS, No. 105 (2007), 91–155.

20. (with P. Etingof, S. Loktev, L. Rybnikov) *A Lie-theoretic construction of spherical symplectic reflection algebras*, arXive: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* $\mathrm{Hilb}_m(A_n)$, arXive:0802.2737, Journal of AMS, vol. 22 (2009), 1055–1091.
23. (with D. Maulik) *Donaldson-Thomas theory of* $A_n \times \mathbb{P}^1$, arXive:0802.2739, Compos. Math., 145 (2009), no. 5, 1249–1276.
24. (with D. Maulik, A. Okounkov, R. Pandharipande) *The Gromow-Witten/Donaldson-Thomas correspondence for toric 3-folds*, arXive:0809.3976, Invent. Math. 186 (2011), no. 2, 434–479.
25. (with V. Shende) *The Hilbert scheme of a plane curve singularity and the HOMFLY polynomial of its link*, arxive:1003.1568, Duke Math. J. 161 (2012), no. 7, 1271–1303.
26. (with V. Shende, J. Rassmusen) *The Hilbert scheme of a plane curve singularity and HOMFLY homology of its link*, Geom. Topol. 22 (2018), no. 2, 645–691, arXive:1201.2115.
27. (with E. Gorsky, J. Rassmusen) *On stable Khovanov homology of torus knots*, arXiv:1206.2226, Exp. Math. 22 (2013), no. 3, 265–281.
28. (with E. Gorsky, V. Shende, J. Rassmusen), *Torus knots and Rational DAHA*, arXiv:1207.4523, Duke Math. J. 163, (2014), no. 15, 325–401.
29. (with Z. Yun) *Geometric Representations of graded and rational Cherednik algebras*, arXiv:1407.5685, Adv. Math. 292 (2016), 601–706.
30. (with S. Nawata) *Lectures on knot homology*, arXiv:1407.5685, Proceedings of "Workshop on Physics and Mathematics of Link Homology", at Centre de Recherches Mathematiques, Universite de Montreal, 137–177, Contemp. Math., 680, Amer. Math. Soc., Providence, RI, 2016.
31. (with L. Rozansky) *Knot Homology and sheaves on the Hilbert scheme of points on the plane* , Selecta Math. (N.S.) 24 (2018), no. 3, 2351–2454, arXiv:1608.03227.
32. (with L. Rozansky) *Affine Braid group, JM elements and knot homology*, Transform. Groups 24 (2019), no. 2, 531–544. arXiv:1702.03569.
33. (with L. Rozansky) *HOMFLYPT homology of Coxeter links*, Transform. Groups, 28 (2023), no. 3, 1245–1275, arXiv:1706.00124.
34. (with Z. Yun) *The cohomology ring of certain compactified Jacobians*, arXiv:1710.05391.
35. (with A. Okounkov, R. Pandharipande) *GW/PT descendent correspondence via vertex operators*, Communications in Mathematical Physics, arXiv:1806.00714.
36. (with L. Rozansky) *A categorification of a cyclotomic Hecke algebra*, arXiv:1801.06201.
37. (with E. Carlsson) *Affine Schubert calculus and double coinvariants*, arXiv:1801.09033.
38. (with L. Kamenova, G. Mongardi) *Symplectic involutions of* $K3^{[n]}$ *type and Kummer n type manifolds*, arXiv:1809.02810, Bull. Lond. Math. Soc. 54 (2022), no. 3, 894–909.
39. (with L. Rozansky), *Categorical Chern character and braid groups*, arXiv:1811.03257 Adv. Math.437 (2024), 66 pages.
40. (with L. Rozansky), *3D TQFT and HOMFLYPT homology*, arXiv:1812.06340, Lett. Math. Phys. 113 (2023), no. 3, Paper No. 71, 62 pages.
41. *EGL formula for DT/PT theory of local curves*, arXiv:1901.03014.

42. *Notes on matrix factorizations and knot homology*, arXiv:1901.04052, Lecture Notes in Math., 2248 Fond. CIME/CIME Found. Subser. Springer, Cham, 2019, 83–127.
43. (with L. Rozansky), *Dualizable link homology* , arXiv:1905.06511.
44. (with N. Bottman), *A compactification of the moduli space of marked vertical lines in* $\mathbb{C}^2$, arXiv:1910.02037.
45. (with M. Moreira, A. Okounkov, R. Pandharipande) *Stationary Virasoro constraints for stable pairs on toric varieties*, Forum Math. Pi 10 (2022), 62 pages.
46. (with L. Rozansky) *Matrix factorizations and* $gl(m|k)$*-quantum invariants*, arXiv:2212.02665.
47. (with E. Gorsky, M. Mazin) *Generic curves and non-coprime Catalans*, to appear in Adv. Math, arXiv:2210.12569.
48. (with E. Gorsky, O. Kivinen) *The affine Springer fiber - sheaf correspondence*, arXiv:2204.00303.
49. (with L. Kamenova, G. Mongardi) *Fixed loci of symplectic automorphisms of* $K3^{[n]}$ *and n-Kummer type manifolds* , arXiv:2308.14692.

Talks

EPFL, Switzerland, Week-long lecture-course on TQFT, 10/2024.
Les Diablerets workshop, Workshop Categorical topological invariants, 01/2024.
JHU, US, Topology Seminar, 10/2023.
AIM, US, Workshop on knot homology, 08/2023.
UC Davis, US, Algebraic Geometry Seminar, 06/2023.
Stony Brook University, US, Algebraic Geometry Seminar, 12/2022.
Yale University, US, Representation Theory Seminar, 11/2022.
MIT, US, Representation Theory Seminar, 11/2023.
Notre Damme University, US, Workshop on Matrix Factorizations, 10/2023.
Simons Center for Geometry and Physics, Lectures on GW/PT correspondence, 09/2023.
Harvard, US Mathematical Physics Seminar, 10/2022.
Washington University, US Geometry Seminar, 05/2022.
University of Hamburg, Mathematical Physics Colloquium, 10/2021.
University of Edinburgh, UK, Geometric Representation Theory and Lower-dimensional topology, 06/2019.
Schloss Hünigen, Switzerland, Helvetic Algebraic Geometry Seminar, 06/2019.
ETH, Switzerland, Algebraic Geometry Seminar, 06/2019.
CalTech, Hidden algeraic structures in topology, 04/2019.
Columbia University, Informal Mathematical Physics Seminar, 10/2018.
ETH, Switzerland, Algebraic Geometry Seminar, 10/2018.
CIME, Cetraro, Italy, Three lectures for Summer School on Geometric Representation theory and Gauge Theory.
MSRI, Enumerative Geometry Seminar, 04/2018.
UC Davis, Geometry and Topology Seminar, 04/2018.
Perimeter Institute, Canada Mathematical Physics Seminar talk, 10/2017.
University ot Waterloo, Canada Colloquium talk, 10/2017.
University of Hamburg, Germany String Math, Invited speaker, 07/2017.
CalTech Mathematical Physics Seminar Talk, 05/2017.
MIT Representation theory Seminar Talk, 03/2017
Fields Institute, Canada, One week workshop on Hall algebras and Enumerative invariants and Gauge Theory, Invited speaker, 11/2016.

ICTP, Trieste, Italy, One week workshop on Gauge Theory and related fields, Invited speaker, 09/2016.
CRM, Montreal Canada, One week workshop on algebraic cycles, Invited speaker, 06/2016.
North-Eastern University, Algebraic Geometry Seminar Talk, 03/2016.
Texas A&M, Geometry and Combinatorics Seminar Talk, 10/2015.
IAS/Park City Mathematics Institute, Summer School on Geometric Representation theory, Invited speaker, 06/2015
Stony Brook University, One-week workshop on Knot homology at SCGP, Invited Speaker, 05/2015.
Banff, One-week workshop on topological recursion, quantum curves and quantum invariants, Invited speaker, 06/2014.
North-Western University, Conference on QFT and representation theory, Invited speaker, 05/2014.
University of Geneva, Switzerland, Conference on quantum invariants and geometry, Invited speaker, 04/2014.
EPFL, Switzerland, Three lectures on Geometry Seminar, 04/2014.
North-Western University, Topology Seminar, 03/2014.
University of California, Davis, Series of three lectures on knot invariants and algebraic geometry, 02/2014.
University of Maryland, Colloquium, 04/2014.
Stanford University, Algebraic Geometry Seminar, 09/2013.
CRM, Montreal, Two-Week workshop, Four lectures on knot homology, DAHA and singular curves 07/2014.
Banff, One Week workshop on motivic DT invariants, Invited speaker, 06/2013.
MSRI, Conference on noncommutative Geometry, Invited speaker, 05/2013.
University of Michigan, Ann Arbor, Lie Theory seminar, 04/2013.
Rutgers University, Mathematical Physics Seminar, 12/2011.
University of North Carolina, Chapel Hill, Geometry and Mathematical Physics Seminar, 12/2011
University of North Carolina, Chapel Hill, Colloquium, 12/2011.
Oxford University, UK, Series of Lectures on knot invariants and Hilbert scheme of points on curves and DAHAs, 11/2011.
Simons Center for Geometry and Physics, Conference on Homological Invariants in Low dimensional Topology, 06/2011.
Simons Center for Geometry and Physics, Conference on Mirror Symmetry and Equivariant cohomology, 05/2011.
University of Texas, Austin, Geometry Seminar, 03/2011
University of Michigan, Ann Arbor, Mathematical Physics Seminar, 02/2011.
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, Colloqium, 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, Colloqium: 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.
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 2024: Graduate Algebra, (Math 612)
Taught lectures

Spring 2024: Graduate Complex Analyis, (Math 621)
Taught lectures

Spring 2024: Introduction into Linear Algebra, (Math 235)
Taught lectures

Fall 2023: Introduction to Complex Analyis, (Math 421)
Taught lectures

Spring 2023: Introduction to Linear Algebra, (Math 235)
Taught lectures

Fall 2022: Representation Theory, (Math 680)
Taught lectures

Fall 2022: Putnam Seminar, (Math 490)
Taught lectures

Spring 2022: Introduction to Complex Analysis, (Math 421)
Taught lectures

Fall 2021: Multi-variable Calculus, (Math 233)
Taught lectures

Spring 2021: Graduate Topology II, (Math 672)
Taught lectures

Fall 2020:	Multi-variable Calculus, (Math 233)
	Taught lectures
Fall 2020:	Graduate Topology I, (Math 671)
	Taught lectures
Spring 2020:	Introduction to Linear Algebra, (Math 235)
	Taught lectures
Spring 2019:	Graduate Topology II, (Math 672)
	Taught lectures
Fall 2019:	Introduction to Linear Algebra, (Math 235)
	Taught lectures
Fall 2019:	Graduate Topology I, (Math 671)
	Taught lectures
Summer 2019:	REU program
	Mentored four students
Spring 2019:	Advanced Multi-variable calculus, (Math 425)
	Taught lectures
Summer 2018:	REU program
	Mentored four students
Fall 2017:	Introduction to Linear Algebra, (Math 235)
	Taught lectures
Summer 2017:	REU program
	Mentored four students
Fall 2016:	Introduction to Topology, (Math 671)
	Taught lectures
Fall 2016:	Introduction into Linear Algebra, (Math 235)
	Taught lectures
Summer 2016:	REU program
	Mentored four students
Fall 2015:	Introduction to Linear Algebra, (Math 235)
	Taught lectures
Fall 2015:	Introduction to Representation Theory, (Math 797)
	Taught lectures
Summer 2015:	REU program
	Mentored four students
Spring 2015:	Introduction to Linear Algebra, (Math 235)
	Taught lectures, course chair for 5 other sections of the course
Fall 2014:	Introduction to Topology, (Math 671)
	Taught lectures
Fall 2014:	Introduction into Linear Algebra (Honors), (Math 235H)
	Taught lectures
Fall 2013:	Knot Invariants, (Math 797KI)
	Taught lectures
Fall 2013:	Introduction into Linear Algebra, (Math 235)
	Taught lectures
Summer 2013:	REU program
	Mentored one student
Fall 2012:	Putnam Exam, (Math 491A)

	Taught lectures
Fall 2012:	Multivariable Calculus, (Math 233)
	Taught lectures
Fall 2012:	Introduction into Linear Algebra, (Math 235)
	Taught lectures
Fall 2011:	Introduction into Linear Algebra, (Math 235)
	Taught lectures
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

Services

External Service:

Refereeing: Communications in Mathematical Physics, Contemporary Mathematics, Transformation Groups, IMRN, JAMS, Annals of Mathematics, Journal of Algebraic Combinatorics A, Advances in Mathematics, Transactions of AMS, Compositio, Journal of Algebra, Selecta, Inventiones.

Refereeing Grant Proposals: NSERC, NSA, Swiss National Science Foundation, the Netherlands Organisation for Scientific Research, the Chilean National Science and Technology Commission, Newton Institute Scientific proposals, served on three NSF panels.

Conference organization: PI co-organized one-week workshop in Banff (June 2014); co-organized three-day workshop in Amherst (October 2015); co-organized three-day worshop in Amherst (July 2017); co-organize one-week AIM workshop (October 2018); co-organized one-week FRG workshops at UC Davis (June 2019), at UMass (June 2020), at University of Oregon (2022); co-organized AIM community (2021-2022), co-organized two-month program at Simons Center for Physics and Geometry (2023), co-organized AIM workshop (2023), co-organizer of month-long program at Bernoulli Institute at EPFL, Lausanne (2025).

Internal Service:

Princeton University:
Coorganizer of Princeton Algebraic Geometry Seminar (Spring, 2009); served on six general exam committees; advised an undergraduate student on his senior thesis.

University of Massachusetts:
Coorganizer of Valley Geometry Seminar and Representation Theory Seminar (2009-), Quantum Field Theory Seminar (Fall 2010); gave lectures on Algebraic Geometry Reading Seminar (Spring 2009: 5 lectures, Spring 2010: 2 lectures, Fall 2010: 2 lectures, Spring 2011: 2 lectures, Spring 2012: 2 lectures); served on Colloquium Committee (Fall 2010, Fall 2013, Spring 2014, 2016-2017); Served on Advanced Graduate Algebra Exam Committee (Fall 2011– Spring 2013); Served on Advanced Graduate Topology Exam Committee Committee (Fall 2014– Spring 2023); Member of Faculty Search Committee (Fall 2011, Spring 2012, Fall 2012, Spring 2013, Spring 2019); Chair the Search Committee for Visiting Assistant Professor (2018-) Undergraduate Advisor (2010-), Served on Undergraduate Affairs Committee (Fall 2017); Member of Climate Committee (2023); Trained UMass Putnam Team (2022, 2015, 2016).

During the summer 2013 PI was supervising REU project of UMass for one student. During summers 2019, 2018, 2017, 2016, 2015 PI supervising REU projects for the teams of four students.

Ph.D. advising

1. My student Tom Shelly graduated in August 2016 and started his job as Visiting Assistant Professor at Mount Holyoke College.
2. My student Toby Willson graduated in December 2015 and started his job Bloomberg.
3. My student Arthur Wang graduated in May 2024.
4. My current student Pranav Kalkunte works on a problem related to motivic integration.
5. My current student Chuijiao Zhang works on Springer theory for DAHAs.

Date: 28 November, 2024

Alexei Oblomkov
University of Massachusetts, Amherst