

Curriculum Vitae

Lev A. Borisov

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Personal

Born in 1971 in Minsk, Belarus; US citizen

Education

5/96 PhD in mathematics, University of Michigan
 Advisor: Igor Dolgachev. Thesis title:
 A finiteness theorem for subgroups of $Sp(4, \mathbb{Z})$
6/92 BS in mathematics
 Moscow State University, Russia

Professional experience

Since 7/19 Distinguished Professor
 Rutgers University
9/23-5/24 Visitor
 Institute for Advanced Study
Since 7/09 Professor I
 Rutgers University
7/17-6/20 graduate program director
 Rutgers University
9/16-5/17 Member
 Institute for Advanced Study
4/08-7/09 Professor
 University of Wisconsin, Madison
7/04-3/08 Associate Professor
 University of Wisconsin, Madison
7/02-6/04 Assistant Professor
 University of Wisconsin, Madison
9/97-6/02 Ritt Assistant Professor
 Columbia University
8/96-7/97 Postdoctoral Fellow
 MSRI, Berkeley, California
1/94-5/95 Teaching Assistant
 University of Michigan

Research specialty

Algebraic geometry and related areas

Awards

11/17	AMS fellow, class of 2018, for contributions to algebraic geometry and mirror symmetry
9/16-12/16	Simons Foundation Fellowship
3/17-2/20	NSF grant DMS-1651014 (AGNES conference)
9/16-8/19	NSF grant DMS-1601907
5/12-4/16	NSF grant DMS-1201466
5/08-4/12	NSF grant DMS-0758480
5/05-4/08	NSF grant DMS-0456801
4/02-4/05	NSF grant DMS-0140172
8/96-7/97	MSRI Postdoctoral Research Fellowship
9/95-5/96	Alfred P. Sloan Doctoral Dissertation Fellowship
7/87	Gold medal at the International Math Olympiad

Graduate Student Advising

Michael Rose, PhD defended Summer 2007
Zheng Hua, PhD defended Spring 2009
Hanjun Kim, PhD defended Summer 2009
Zhan Li, PhD defended Spring 2014
Howard Nuer, PhD defended Spring 2016
Chengxi Wang, PhD defended Spring 2020
Vernon Chan, PhD defended Spring 2022
Zengrui Han, PhD expected Spring 2025
Ishaan Shah, PhD expected Spring 2026
Bojue Wang, PhD expected Spring 2027

Publications

- , *On equations of fake projective planes with automorphism group of order 21*, *Épijournal Géom. Algébrique* 7 (2023), Art. 17, 19 pp.
- , A. Buch, E. Fatighenti, *A journey from the octonionic \mathbb{P}^2 to a fake \mathbb{P}^2* , *Proc. Amer. Math. Soc.* 150 (2022), no. 4, 1467-1475.
- , C. Wang, *On strong exceptional collections of line bundles of maximal length on Fano toric Deligne-Mumford stacks*, *Asian J. Math.* 25 (2021), no. 4, 505-520.
- , S.-K. Yeung, *Explicit equations of the Cartwright-Steger surface*,

- Épjournal Géom. Algébrique 4 (2020), Art. 10, 13 pp.
- , J. Keum, *Explicit equations of a fake projective plane*,
Duke Math. J. 169 (2020), no. 6, 1135-1162.
- , A. Caldararu, A. Perry, *Intersections of two Grassmannians in \mathbb{P}^9* ,
J. Reine Angew. Math. 760 (2020), 133-162.
- , Z. Han, C. Wang, *On duality of certain GKZ hypergeometric systems*,
Asian J. Math. 25 (2021), no. 1, 65-88.
- , D. Orlov, *Equivariant exceptional collections on smooth toric stacks*,
Izv. Ross. Akad. Nauk Ser. Mat. 83 (2019), no. 4, 50-85; translation
in Izv. Math. 83 (2019), no. 4, 698-730.
- , A. Fischle, P. Neff, *Optimality of the relaxed polar factors by
a characterization of the set of real square roots of real symmetric
matrices*, ZAMM Z. Angew. Math. Mech. 99 (2019), no. 6, e201800120,
26 pp.
- , A. Libgober, *Stringy E-functions of Pfaffian-Grassmannian double
mirrors*, Algebr. Geom. 6 (2019), no. 4, 486-515.
- , C. Wang, *On stringy Euler characteristics of Clifford non-commutative
varieties*, Adv. Math. 349 (2019), 1117-1150.
- , A. Fischle, P. Neff, *Explicit global minimization of the symmetrized
Euclidean distance by a characterization of real matrices with symmetric
square*. SIAM J. Appl. Algebra Geom. 3 (2019), no. 1, 31-43.
- , H. Nuer, *Ulrich Bundles on Enriques Surfaces*, Int. Math. Res. Not.
IMRN 2018, no. 13, 4171-4189.
- , *Class of the affine line is a zero divisor in the Grothendieck ring*,
J. Alg. Geom. 27 (2018), no. 2, 203-209.
- , Z. Li, *On Clifford double mirrors of toric complete intersections*,
Adv. Math. 328 (2018), 300-355.
- , P. Neff, S. Sra, C. Thiel, *The sum of squared logarithms inequality in
arbitrary dimensions*, Linear Algebra Appl. 528 (2017), 124-146.
- , H. Nuer, *On (2, 4) complete intersection threefolds that contain an
Enriques surface*, Math. Z. 284 (2016), no. 3-4, 853-876.
- , *Classical algebraic geometry: a modern view [book review]*. Bull.
Amer. Math. Soc. (N.S.) 52 (2015), no. 1, 129-134.
- , P. Horja, *Applications of homological mirror symmetry to hypergeo-
metric systems: duality conjectures*, Adv. Math. 271 (2015), 153-187.
- , Z. Li, *On complete intersections with trivial canonical class*,
Adv. Math. 268 (2015), 339-349.
- , *On stringy cohomology spaces*,
Duke Math. J. 163 (2014), no. 6, 1105-1126.
- , P. Gunnells, *On Hilbert modular threefolds of discriminant 49*,
Selecta Math. (N.S.) 19 (2013), no. 4, 923-947.
- , *Berglund-Hübsch mirror symmetry via vertex algebras*,

- Comm. Math. Phys. 320 (2013), no. 1, 73-99.
- , R.P. Horja, *On the better behaved version of the GKZ hypergeometric system, with R.P. Horja*, Math. Ann. 357 (2013), no. 2, 585-603.
- , R. Kaufmann, *On CY-LG correspondence for (0,2) toric models*, Adv. Math. 230 (2012), no. 2, 531-551.
- , R. Jin, *Finding integral diagonal pairs in a two dimensional N-set*, Proc. Amer. Math. Soc. 139 (2011), no. 7, 2431-2434.
- , S. Salamon, J. Viaclovsky, *Twistor geometry and warped product orthogonal complex structures*, Duke Math. Journal, 156 (2011), no. 1, 125-166.
- , J. Viaclovsky, *Threefolds of order one in the six-quadric*, Proceedings of the Steklov Institute of Mathematics, 264 (2009), 18-29.
- , Z. Hua, *On the conjecture of King for smooth toric Deligne-Mumford stacks*, Adv. Math. 221 (2009), no. 1, 277-301.
- , Andrei Caldararu, *The Pfaffian-Grassmannian derived equivalence*, J. Algebraic Geom. 18 (2009), no. 2, 201-222.
- , A. Libgober, *Higher elliptic genera*, Math. Res. Lett. 15 (2008), no. 3, 511-520.
- , Z. Hua, *On Calabi-Yau threefolds with large nonabelian fundamental groups*, Proc. Amer. Math. Soc. 136 (2008), no. 5, 1549-1551.
- , R.P. Horja, *Mellin-Barnes integrals as Fourier-Mukai transforms*, Adv. Math. 207 (2006), no. 2, 876-927.
- , R.P. Horja, *On the K-theory of smooth toric DM stacks*, Snowbird lectures on string geometry, 21-42, Contemp. Math., 401, Amer. Math. Soc., Providence, RI, 2006.
- , *On Wronskians of weight one Eisenstein series*, J. Number Theory 121 (2006), no. 1, 132-152
- , *Holomorphic Eisenstein series with Jacobian twists*, Algebraic geometry, 1-15, Contemp. Math., 422, Amer. Math. Soc., Providence, RI, 2007
- , L. Chen, G. Smith, *The orbifold Chow ring of toric Deligne-Mumford stacks*, J. Amer. Math. Soc. 18 (2005), no. 1, 193-215
- , A. Libgober, *McKay correspondence for elliptic genera*, Annals of Math. 161 (2005), No. 3, 1521-1569
- , *Higher Stanley-Reisner rings and Toric Residues*, Compositio Math. 141 (2005), no. 1, 161-174
- , *Chiral rings of vertex algebras of mirror symmetry*, Math. Z., 248 (2004), 3, 567-591.
- , E. Mukhin, *Self-self-dual spaces of polynomials*, Adv. Math., 190 (2004), no. 1, 77-118.
- , A. R. Mavlyutov, *String cohomology of Calabi-Yau hypersurfaces via Mirror Symmetry*, Adv. Math. 180 (2003), no. 1, 355-390.

- , P. E. Gunnells, *Toric modular forms of higher weight*, J. Reine Angew. Math. 560 (2003), 43-64.
- , A. Libgober, *Elliptic genera of singular varieties, orbifold elliptic genus and chiral deRham complex*, Mirror symmetry, IV (Montreal, QC, 2000), 325-342, AMS/IP Stud. Adv. Math., 33, Amer. Math. Soc., Providence, RI, 2002.
- , A. Libgober, *Elliptic genera of singular varieties*, Duke Math. J. 116 (2003), no. 2, 319-351.
- , P. E. Gunnells, *Wonderful blowups associated to group actions*, Selecta Math, 8 (2002), no. 3, 373-379.
- , P. E. Gunnells, S. Popescu, *Elliptic functions and equations of modular curves*, Math. Ann. 321 (2001), no. 3, 553-568.
- , P. E. Gunnells, *Toric modular forms and nonvanishing of L-functions*, J. Reine Angew. Math. 539 (2001), 149-165.
- , P. E. Gunnells, *Toric varieties and modular forms*, Invent. Math. 144 (2001), no. 2, 297-325.
- , *Vertex algebras and mirror symmetry*, Comm. Math. Phys. 215 (2001), no. 3, 517-557.
- , A. Libgober, *Elliptic genera of toric varieties and applications to mirror symmetry*, Invent. Math. 140 (2000), no. 2, 453-485.
- , *String cohomology of a toroidal singularity*, J. Algebraic Geom. 9 (2000), no. 2, 289-300.
- , *A finiteness theorem for subgroups of $\mathrm{Sp}(4, Z)$* , Algebraic geometry, 9. J. Math. Sci. (New York) 94 (1999), no. 1, 1073-1099.
- , M. B. Halpern, C. Schweigert, *Systematic approach to cyclic orbifolds*, Internat. J. Modern Phys. A 13 (1998), no. 1, 125-168.
- V. V. Batyrev, —, *Mirror duality and string-theoretic Hodge numbers*, Invent. Math. 126 (1996), no. 1, 183-203.
- V. V. Batyrev, —, *On Calabi-Yau complete intersections in toric varieties*, Higher-dimensional complex varieties (Trento, 1994), 39-65, de Gruyter, Berlin, 1996.
- V. V. Batyrev, —, *Dual cones and mirror symmetry for generalized Calabi-Yau manifolds*, Mirror symmetry, II, 71-86, AMS/IP Stud. Adv. Math., 1, Amer. Math. Soc., Providence, RI, 1997.
- A. A. Borisov, —, *Singular toric Fano three-folds*, Russian Acad. Sci. Sb. Math. 75 (1993), no. 1, 277-283.

Preprints

- , A. Duncan, *Asymptotics of immaculate line bundles on smooth toric Deligne-Mumford stacks*, arXiv:2312.02885.
- , M. Ji, Y. Li, *Explicit equations of the fake projective plane $(a = 7, p = 2, \emptyset, D_3X_7)$* , arXiv:2308.14237.

- , M. Ji, Y. Li, S. Mondal, *On the Geometry of a Fake Projective Plane with 21 Automorphisms*, arXiv:2308.10429.
- , Z. Lihn, *Realizing a Fake Projective Plane as a Degree 25 Surface in \mathbb{P}^5* , arXiv:2301.09155.
- , Z. Han, *On Hypergeometric Duality Conjecture*, arXiv:2301.01374.
- , V. Chan, C. Wang, *Derived Partners of Enriques Surfaces*, arXiv:2108.07768.
- , E. Fatighenti, *New explicit constructions of surfaces of general type*, arXiv:2004.02637.
- , C. Wang, *On H -trivial line bundles on toric DM stacks of $\dim \geq 3$* , arXiv:1904.00799.
- , J. Keum, *Research announcement: equations of a fake projective plane*, (2 pages + 2 pages tables), arXiv:1710.04501.
- E. Bach, —, *Absorption Probabilities for the Two-Barrier Quantum Walk*, arXiv:0901.4349.
- , *Introduction to the vertex algebra approach to mirror symmetry*, math.AG/9912195.
- , *Towards the Mirror Symmetry for Calabi-Yau complete intersections in Gorenstein Toric Fano Varieties*, math.AG/9310001.

Seminar/colloquium talks

Boston University, Columbia University, CUNY, Indiana University-Purdue University Indianapolis, Kansas State University, Massachusetts Institute of Technology, McGill University, Northwestern University, Oklahoma State University, Princeton University, Purdue University, Rutgers University, SUNY at Binghamton, SUNY at Stony Brook, University of Georgia, University of Illinois at Chicago, University of Illinois at Urbana-Champaign, University of Massachusetts at Amherst, University of Michigan at Ann Arbor, University of Minnesota, University of Pennsylvania, University of Wisconsin-Madison, University of Utah, Virginia Commonwealth University, Yale University

Miscellaneous

- Co-organizer of AGNES conference at Rutgers, May 2022
- Co-organizer of AGNES conference at Rutgers, April 2018
- Co-organizer of Geometry, Symmetry and Physics seminar at Rutgers University
- Co-organizer of algebraic geometry seminar at University of Wisconsin 9/2005–5/2009
- Afternoon talk at Summer Institute in Algebraic Geometry
- Talks at Oberwolfach, MSRI, AIM, IAS, CIRM
- Co-organizer of math/physics seminar at University of Wisconsin

in 2002-2003 academic year
Co-organizer of a syzygies seminar at Columbia University
in 2001-2002 academic year
Co-organizer of the algebraic geometry section of AMS meeting
at Columbia University in November of 2000
Reviewer for Mathematical Reviews, referee for various journals
Editor of the Proceedings of AMS, June 2010-January 2018
Appointments and Promotions committee (Rutgers) 2013-14, 2014-15