Curriculum Vitae
Alexander Borisov
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Contact Information

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Research Interests

Algebraic Geometry, Number Theory, and related areas.

Professional Experience

2014 – current Associate professor, Binghamton University
2013 – 2014 Lecturer, University of Pittsburgh.
2006 – 2013 Assistant professor, University of Pittsburgh.
2000–2006 Visiting assistant professor, Pennsylvania State University.
1999–2000 William Chauvenet visiting assistant professor, Washington University, St. Louis.
1997–1999 Instructor, Pennsylvania State University.
1996–1997 Postdoctoral associate/instructor, University of Georgia.

Education

1996 Ph.D., Penn State University, adviser Yuri Zarhin.
1992 M.S., Moscow State University, adviser V. Iskovskikh.

Honors and Awards

2011 Ford Award, from the Mathematical Association of America (jointly with M. Dickinson and S. Hastings, for our paper "A Congruence Problem for Polyhedra").
1996 Vollmer-Kleckner Scholarship in Science, from the Eberly College of Science and mathematics department, Penn State University.
1993–95 Haskell B. Curry Fellowship from the mathematics department of Penn State University.
1992 Diploma Cum Laude from the Moscow State University. (Had straight As while a student there; received some honorary fellowships).
1985, 86, 87 First and Second awards at the USSR Mathematical Olympiads.

Grants

2019–2022 A P.I. on the BUGCAT Conference grant, from the NSF.
2015–2018 A co-P.I. on the Upstate Number Theory Conference grant, from the NSF.
2011–2013 A P.I. on a Standard Award, from the National Security Agency (NSA).
2008–2010 A P.I. on a Standard Award, from the National Security Agency (NSA).
2005–2007 A P.I. on a Young Investigator Award, from the National Security Agency (NSA).

Publications and Preprints

23) A. Borisov. Frameworks for Keller Maps, peprint (2019). Web address: https://arxiv.org/abs/1901.04073.
22) A. Borisov. Geometrically Nilpotent Subvarieties. *Finite Fields Appl.* **50** (2018), 366–371.
21) A. Borisov. On the Stein factorization of resolutions of two-dimensional Keller maps. *Beitr. Algebra Geom.* **56**(2015), no.1, 299–312.
20) A. Borisov. On two invariants of divisorial valuations at infinity. *J. Algebraic Combin.* **39** (2014), no. 3, 691–710.
19) V. Alexeev, A. Borisov. On the log discrepancies in toric Mori contractions. *Proc. Amer. Math. Soc.* **142** (2014), no. 11, 3687–3694.
18) A. Borisov. Corrigendum to "Quantum integers and cyclotomy" [J. Number Theory 109 (1) (2004) 120–135]. *J. Number Theory* **145** (2014), 632–634.
17) A. Borisov. Iterations of integer polynomial maps modulo primes. *J. Integer Seq.* **16** (2013), no. 8, Article 13.8.3.
16) M. Barile, D. Bernardi, A. Borisov, J.-M. Kantor. On empty lattice simplices in dimension 4. *Proc. Amer. Math. Soc.* **139** (2011), no. 12, 4247–4253.
15) A. Borisov, M. Dickinson, S. Hastings. A Congruence Problem for Polyhedra. *American Mathematical Monthly*, **3** (2010) 232–249.
14) A. Borisov, M. Sapir. Polynomial maps over p-adics and residual properties of mapping tori of group endomorphisms. *Int. Math. Res. Not. IMRN*, **(2009)** no. 16, 3002–3015.
13) A. Borisov. Quotient singularities, integer ratios of factorials, and the Riemann hypothesis. *Int. Math. Res. Not. IMRN* 2008, no. **15**, Art. ID rnn052, 19 pp.

12) A. Borisov, M. Sapir. Polynomial maps over finite fields and residual finiteness of mapping tori of group endomorphisms. *Invent. Math.* **160** (2005), no. 2, 341–356.
11) A. Borisov, Y. Wang, M. Nathanson. Quantum integers and cyclotomy. *J. Number Theory* **109** (2004), no. 1, 120–135.
10) A. Borisov. On a question of Craven and a theorem of Belyi. *Proc. Amer. Math. Soc.* **131** (2003), 3677-3679.
9) A. Borisov, V. Shokurov. Directional rational approximations with some applications to algebraic geometry. (Russian) *Tr. Mat. Inst. Steklova* **240** (2003), *Biratsion. Geom. Linein. Sist. Konechno Porozhdennye Algebry,* 73–81.
8) A. Borisov. Convolution structures and arithmetic cohomology, *Compositio Math.,* **136** (2003), no. 3, 237–254.
7) A. Borisov. Boundedness of Fano threefolds with log-terminal singularities of given index. *J. Math. Sci. Univ. Tokyo* **8** (2001), no. 2, 329–342.
6) A. Borisov. On classification of toric singularities. Algebraic Geometry. 9. *J. Math. Sci. (New York)* **94** (1999), no. 1, 1111–1113.
5) A. Borisov, M. Filaseta, T.-Y. Lam, O. Trifonov. Classes of polynomials having only one non-cyclotomic irreducible factor. *Acta Arithmetica,* **90** (1999), no. 2, 121–153.
4) A. Borisov. On some polynomials allegedly related to the *abc* conjecture. *Acta Arithmetica,* **84** (1998), no. 2, 109–128.
3) A. Borisov. Minimal discrepancies of toric singularities. *Manuscripta Math.* **92** (1997), no. 1, 33–45.
2) A. Borisov. Boundedness theorem for Fano log-threefolds. *J. Algebraic Geom.* **5** (1996), no. 1, 119–133.
1) A. Borisov, L. Borisov. Singular toric Fano varieties, *Russian Acad. Sci. Sb. Math.* **75** (1993), no. 1, 277–283.

Older Preprints (not published for various reasons)
2011-12 A. Borisov. On resolution of compactifications of unramified planar self-maps.
1999 A. Borisov. Positive positive-definite functions and measures on locally compact abelian groups.
1999 A. Borisov. Convex lattice polytopes and cones with few lattice points inside, from a birational geometry viewpoint.
1990 A. Borisov, L. Borisov. Three-dimensional toric Fano varieties with terminal singularities. [Russian].

Referee Activity
Refereed papers for the following journals (in no particular order):

- Inventiones Mathematicae
- Duke Mathematical Journal
- American Journal of Mathematics
- Proceedings of the Royal Society A
- Memoirs of the American Mathematical Society
- Proceedings of the American Mathematical Society
- London Mathematical Society journals
- Nagoya Mathematical Journal
- International Journal of Mathematics and Mathematical Sciences
- Journal of the Franklin Institute
- Taiwanese Journal of Mathematics
- Archivum Mathematicum
- Journal of Algebraic Geometry
- Algebraic Geometry
- Discrete and Computational Geometry
- Acta Arithmetica
- Journal of Number Theory
- Journal de Theorie des Nombres de Bordeaux
- International Journal of Number Theory
- Journal of Combinatorics and Number Theory
- Journal of Algebra and its Applications
- Journal of Algebraic Combinatorics
- Australasian Journal of Combinatorics
- American Mathematical Monthly

Reviewed grant proposals for:

- National Science Foundation (NSF)
- National Security Agency (NSA)
- U.S. Civilian Research and Development Foundation (CRDF)

Presentations
(Excluding the numerous "in-house" seminar talks)
Invited Seminar Talks:

- University of Rochester
- Penn State University
- Rutgers University
- Ohio State University
- Columbia University
- UC Santa Barbara

- Johns Hopkins University
- University of Missouri
- George Mason University
- University of South Carolina

Colloquium Talks

- Binghamton University
- University of Pittsburgh

Selected Conference Talks

- Einstein Workshop on Polytopes and Algebraic Geometry (Freie Universität Berlin, 2019)
- Upstate New York Number Theory Conference (Binghamton, 2013)
- AIM Workshop on ACC for minimal log discrepancies and termination of flips (AIM, 2012)
- Geometric and Combinatoric Group Theory Conference (Vanderbilt, 2006)
- Workshop on Diophantine Geometry Related to the ABC Conjecture (University of Arizona, 1998)
- Birational Geometry Conference in Memory of Wei-Liang Chow (Johns Hopkins, 1996)

Teaching Experience

Undergraduate

- **Calculus 1,2**: Penn State University (many times, regular and engineering sections), University of Georgia, Washington University, University of Pittsburgh (regular and engineering sections), Binghamton University.
- **Linear Algebra**: Penn State University, Washington University, University of Pittsburgh, Binghamton University.
- **Calculus 3**: University of Pittsburgh, Binghamton University.
- **Honors Calculus**: Binghamton University (3 times).
- **Honors Introduction to Analysis**: University of Pittsburgh.
- **First Proofs Course**: University of Pittsburgh ("Introduction to Theoretical Mathematics", 6 times), Binghamton University ("Number Systems", 2 times).
- **Introduction to Analysis**: University of Pittsburgh.
- **Abstract Algebra**: University of Pittsburgh.
- **Numerical Linear Algebra**: University of Pittsburgh.
- **Finite Mathematics**: Pennsylvania State University (below-Calculus-level course).

- **Number Theory**: Binghamton University (undegraduate/MAT course).

Graduate

- **Linear Operators 1, 2** : University of Pittsburgh (mandatory first-year sequence; taught 4 times each).
- **Algebra 1, 2**: University of Pittsburgh.
- **Rings and Algebras**: Binghamton University (2 times).
- **Fields and Galois Theory**: Binghamton University.
- **Introduction to Algebraic Geometry**: Binghamton University.
- **Toric Varieties**: Binghamton University.

Reading Courses:

- Group Theory (Binghamton University).
- Introduction to Algebraic Geometry (University of Pittsburgh, Binghamton University).
- Algebraic Number Theory (University of Pittsburgh, Binghamton University).

Graduate Students Supervision

At Binghamton University:

- Spring 2019: Changwei Zhou, Ph.D.
  Thesis title: "Some results on Arakelov Theory of Arithmetic Surfaces"
- Spring 2018: Patrick Milano, Ph.D.
  Thesis title: "Mixed Ghost Spaces"

At the University of Pittsburgh:

- Spring 2011: Daniel Juncos, M.S.
  Thesis title: "On the Báez-Duarte Approach to The Nyman-Beurling Criterion for the Riemann Hypothesis"
- Fall 2010: Andrew Perriello, M.S.
  Thesis title: "Lattice-free Simplexes in Dimension 4"
- Spring 2010: Daman Bouya, M.A.

Service

At Binghamton University:

- The principal organizer of Binghamton Arithmetic Seminar. (Fall 2014-current). The website:
  www2.math.binghamton.edu/p/seminars/arit
- Course coordinator for Calculus 1 (Fall 2015), Calculus 2 (Fall 2016), Calculus 3 (Spring 2018), Linear Algebra (Spring 2020).

- Graduate Student Recruiting Committee (Fall 2019–current)
- University Undergraduate Curriculum Committee (Fall 2017-current).
- Undergraduate Committee (Fall 2017-current).
- MAT Committee (Fall 2017-current).
- Calculus Committee (Fall 2015–current).
- Calculus Advisory Committee (Fall 2015–Spring 2019)
- MA examination coordinator (Fall 2014–Spring 2015).
- Ph.D. Defense commitee chair for Changwei Zhou.
- Ph.D. Defense commitee chair for Patrick Milano.
- Ph.D. Defense committee member for Jinghao Li, Ding Ding, Charles Evans
- Candidacy Examination Committee chair for Patrick Milano, Changwei Zhou, John Brown, Patrick Carney.
- Candidacy Examination Committee member for Eran Crockett, Kunal Sharma, Andrew Kelly, Rachel Skipper, Micah Loverro, Andrew Lamoureux
- Undergraduate adviser (Fall 2014–current).

At the University of Pittsburgh:

- Course Coordinator for Calculus 1 (Spring 2007) and Calculus 3 (Spring 2014).
- Graduate Committee member (Fall 2007–Spring 2013).
- Preliminary Examination Committee member (Spring 2007–Spring 2013; all Linear Algebra, except for Analysis in April and August of 2008).
- Topology Search Committee (Fall 2008, Fall 2009/Spring 2010).
- Differential Geometry Search Committee (Fall 2010/Spring 2011).
- Calculus Textbook Committee (Spring 2009).
- Comprehensive Examination Committee: Jorge Cely, Onyeka Obi.
- MA Defense committee member: Jonathan Graf, Jonathan Chernus, Laurel Martin, Amine Hallab, Evan Jenkins, Jared Burns, Sean Evans, Alex Tonchingsub.
- MS Thesis committee chairman: Dan Juncos, Andrew Perriello.
- MA Defense committee chairman: Daman Bouya.
- Undergraduate advisor (2007–2014).

Outreach and Other Professional Activity

- June 2020-current Co-organizer and administrator of Upstate New York Online Number Theory Colloquium. The webpage: people.math.binghamton.edu/borisov/UpstateNYOnline/Colloquium.html

- Fall 2019: Designer and co-instructor of the First Year Experience course "The Art of Logical Thinking".
- Spring 2018–current: Organizer and coach of an informal problem-solving group for the Putnam competition.
- The main organizer of the Seventh Upstate New York Number Theory Conference, held at Binghamton on May 6–7, 2017. The conference website:
  people.math.binghamton.edu/borisov/NTconf2017.html
- Fall 2014: Talk at Binghamton University Math Club on an elementary problem ("Three Wise Men Placing Kings on a Large Chessboard").
- Fall 2011: Participant in the Dietrich School of Arts and Sciences Writing in the Disciplines Seminar program.
- Spring 2011: Talk on Riemann Hypothesis at Carnegie Mellon University's "Big Ideas" undergraduate course.
- Spring 2011: Talk on Riemann Hypothesis at University of Pittsburgh Math Club.
- 2008/2009, 2012/2013, 2013/2014: Coach of the Carson Middle School Math Counts team.
- 2008–2015: Volunteer at the Math Kangaroo competition, at University of Pittsburgh.
- 1987–1993: Participated in the scientific part of the organization of high school mathematical Olympiads in USSR, specifically problem inventing and grading of all-USSR Olympiads and training camps for International Olympiads. A member of all-USSR Mathematical Olympiad Jury 1990–1992, a coordinator at the IMO (Moscow, 1992).

Personal Information

Born in Minsk, Belarus, June 11, 1971. Married to Dr. Inna Sysoeva; we have three children, ages 19 to 26. Citizen of U.S.A. since 2008.