

Curriculum Vitae
Anton Khoroshkin

Date/Place of birth	August 20, 1981, Moscow, Russia
Marital status	Married, 3 children
Current address	Simons Center for Geometry& Physics, State University of New York Stony Brook, NY 11794-3636, U.S.A.
Phone	+1-631-632 2845
E-mail	akhoroshkin@scgp.stonybrook.edu
Home pages	http://mysbfiles.stonybrook.edu/~akhoroshkin/ http://www.math.ethz.ch/~khorosh/

Education

- 9.02.2007 Ph.D. Moscow State University, Dept. of Mechanics and Mathematics, Chair of Algebra
Title: "Formal geometry and algebraic invariants of geometric structures"
Supervisors: Prof. Boris Feigin and Prof. Mikhail Zaicev
- 2003–2006 Graduate student at the Independent University of Moscow, Moscow State University and
École Polytechnique (Palaiseau, France).
- 25.06.2003 Diploma (with distinction) in Pure and Applied Mathematics at Moscow State University
- 22.05.2003 Diploma in Pure Mathematics at the Independent University of Moscow
- 1998–2003 Undergraduate student at the Independent University of Moscow
Supervisor: Boris Feigin
- 1998–2003 Undergraduate student at the Moscow State University
Supervisor: Mikhail Zaicev.

Research Interests:

Homological algebra, representation theory, algebraic topology, mathematical physics.
In particular, questions originated in noncommutative geometry, operad theory, Lie algebra cohomology and related combinatorics.

Employment experience

- 2011 – 2013 Simons postdoc fellowship at Simons Center for Geometry&Physics (Stony Brook, NY)
- 2008 – 2011 ETH postdoc fellowship at Swiss Federal Institute of Technology Zurich (ETH Zurich)
- 2007 – 2013 Research associate at the Institute of Theoretical and Experimental Physics
- 2007 – 2008 Postdoc at the French-Russian mathematics laboratory in Moscow, CNRS,
- 2007 – 2008 Postdoc at the Department of Mathematics, Stockholm University,
- 2003 – 2007 Research assistant at the Institute of Theoretical and Experimental Physics,
- 2003 – 2005 Teaching assistant, Independent University of Moscow.
- 2000 – 2003 Teaching assistant in a specialized mathematical class High school 57, Moscow,

Teaching experience

Undergraduate course "MATH 312/AMS 351 Applied algebra", Fall 2012, Stony Brook University

Graduate course/seminar "K-functor in Algebraic geometry" Spring 2011, ETH Zurich.

Graduate course "Homological algebra", Fall 2010, ETH Zurich.

Graduate course/seminar "Symmetric functions and Representation theory", Spring 2010, ETH Zurich.

Graduate course "Quadratic algebras and Koszul duality", Spring 2009, ETH Zurich.

Coorganizer of the research seminar "Talks in mathematical physics", Fall 2009 – 2011, ETH Zurich.

A short course on "Operads and Koszulness", 2007, Stockholm University.

Coorganizer of the research seminar "Homological/homotopical methods in geometry&physics", 2005-2007, ITEP, Moscow

An advanced graduate course "Noncommutative geometry, deformation theory and Duflo isomorphism", Fall 2004, Independent University of Moscow (*in Russian*).

Classes for courses of different levels of Algebra, Topology and Calculus, 2002-2006, IUM (Moscow).

Classes for advanced mathematics in specialized math. class High school 57, Moscow, 2000 – 2003.

Administrative duties

Journal referee for:

Int.Math.Res.Notes, J.of Algebra, J.Gen. Lie Theory Appl., Mat.Zametki, Functional anal. and appl.

Coorganizer of the conference:

“Representation theory and Quantization“, January 25-29, 2010, FIM, ETH Zurich

(see the webpage <http://www.math.ethz.ch/~khorosh/swiss-rus10/home.html>)

Invited talks

Informal Mathematical Physics Seminar, Columbia University, New York City, 2013

Representation Theory Seminar, Michigan State University, East Lansing, MI, 2013

Algebraic Geometry Seminar, University of Michigan, Ann Arbor, MI, 2013

Colloquium talk, Kansas State University, Manhattan, 2013

Colloquium talk, Weizmann Institute, 2013

Algebra Seminar, Technion, Haifa, 2013

Combinatorics Seminar, Bar Ilan, Tel Aviv, 2013

Representation Theory Seminar, MIT, Cambridge, 2012,

Infinite-Dimensional Algebra Seminar, MIT, Cambridge, 2012,

Experimental Mathematics Seminar, State University of New Jersey, Rutgers, 2012,

Seminar on Algebra, University of Oregon, Eugene, 2012,

Seminar on Algebra, Geometry&Physics, Stony Brook University, 2012,

Topology seminar, Stony Brook University 2012,

Representation Theory and Related Topics Seminar, North Eastern University, 2012,

String theory seminar, US Davis, 2012

Algebraic geometry seminar, Stanford University, 2012

Seminar on Representation Theory, Geometry&Combinatorics, University of California, Berkeley, 2012

Math.Phys group seminar Korteweg-de Vries Institute for Mathematics, 2011

Seminar on Lie theory, Weizmann Institute of Science, 2010

Seminar on Homological&homotopical methods in geometry, Higher School of Econ., Moscow, 2010.

Seminar on mathematical physics, Institute for Advanced Studies, Dublin, 2009.

Seminar on Lie theory, Genève, 2009, 2010, 2011

Seminar on algebra, Paris, Institut Henry Poincare, 2009

Seminar on mathematical physics, Kyoto University, 2008, 2009

Conference “Conf.Field Theory, Integrable models&Liouville Gravity”, Chernogolovka, Russia, June, 2009.

Algebra-topology seminar, ETH, Zürich 2009, 2011

Talks in Mathematical physics, ETH, Zürich 2008, 2011

Workshop “Classical&Quantum Integrable Systems”, IHEP, Protvino, Russia, January, 2008

Conference “Lie groups and physics”, Twente, December, 2007.

Workshop,Swiss-Rus. seminar on “Moduli spaces&physics”, University of Zürich, December, 2007.

Series of lectures for group of Math.Physics, Chalmers University of Technology, Göteborg, 2007.

Algebra&Geometry seminar, The Royal institute of technology, Stockholm, 2007, 2006.

Seminar on algebra, Norwegian University of Science and Technology, Trondheim, 2006

Seminar Algebres enveloppantes, Institut Mathematique de Jussieu, Paris 13, 2006

Conference “Low-dimensional mathematics”, Saint-Petersburg, 06/2006

Seminar on mathematical physics, Université d’Angers 2004, 2005

Seminar on Low-Dimensional Mathematics PDMI, SPb, 2003

The meeting of the “Mathematical Society” PDMI, Saint-Petersburg, 2003

Seminar of the chair of Higher Algebra, Moscow State University, 2005, 2007

Seminar “Selected algebraic questions” Moscow State University, 2000, 2003, 2006, 2009,

Seminar on Lie groups and theory of invariants Moscow State University, 2003, 2005.

Seminar on representation theory, Independent University of Moscow, 2000-2009,

Seminar on Riemann surfaces, Lie algebras&Mathematical physics IUM Moscow, 2003-2009,

Seminar of the French-Russian mathematics laboratory, IUM Moscow, 2006-2008,

Seminar on Characteristic classes&intersection theory, IUM Moscow 2007-2011,

Workshops “Petrovskie chteniya, Volga-2002, Volga-2004” Kazan 06/2002, 06/2004

Math.Physics and Harmonical analysys seminar, ITEP, Moscow, Russia 2004 – 2006
Math.Physics and Representation theory seminar, ITEP, Moscow, 2006–2008

Prizes

Special diploma in Moebius Contest (2006),
Honorable mention in Euler foundation contest (2007).
Russian Federation president award (2008).
ITEP young scientists award (2002, 2003, 2004, 2005, 2006, 2007).
Research grants from Russian Foundation for Basic Research (each year starting from 2006).

List of publications

Submitted:

1. “Lie algebra cohomology representing characteristic classes of flags of foliations”
Preprint available at math.arxiv.org:1303.1889, 30pp.
2. “Quillen Homology for operads via Gröbner bases” (with V. Dotsenko),
Preprint available at math.arxiv.org:1203.5053, 25pp. *Submitted to* Documenta Mathematica.
A positive referee report received, the required changes are in revision.
3. “Macdonald Polynomials and BGG reciprocity for current algebras”
(with A. Berenstein, M. Bennet, V. Chari, S. Loktev)
Preprint available at math.arxiv.org:1207.2446, 19pp. *Submitted to* Selecta Mathematica.
4. “On generating series of finitely presented operads” (with D. Piontkovski),
Preprint available at math.arxiv.org:1202.5170, 32pp. *Submitted to* Journal of Algebra.

Accepted or Published:

5. “Hypercommutative operad as a homotopy quotient of BV.” (with N. Markarian and S. Shadrin)
Communications in Mathematical Physics, to appear. // Preprint available at math.arxiv:1206.3749.
6. “Shuffle Algebras, Homology and Consecutive Pattern Avoidance” (with V. Dotsenko),
Algebra & number theory, to appear. // Preprint available at math.arXiv:1109.2690, 24 pp.
7. “Using homological duality in consecutive pattern avoidance” (with B. Shapiro)
Electronic J. of Combinatorics, vol.18(2), 2011, 17 pp.
8. “Gröbner bases for operads” (with V. Dotsenko)
Duke Math. J. 153 (2010), no. 2, 363–396.
9. “On syzygies of highest weight orbits.” (with A. L. Gorodentsev and A. N. Rudakov)
Moscow Seminar on Mathematical Physics. II, 79120, Amer. Math. Soc. Transl. Ser. 2, 221, Amer. Math. Soc., Providence, RI, 2007
10. “Quadratic algebras related to the bihamiltonian operad” (with M. Bershtein and V. Dotsenko)
IMRN 2007, no. 24, Art. ID rnm122, 30 pp.
11. “Character formulas for the operad of two compatible brackets and for the bi-Hamiltonian operad”
(with V. Dotsenko)
Funct. Anal. Appl. 41 (2007), no. 1, 1–17
12. “Syzygies of some quadratic varieties and their connection with the cohomology of Lie algebras”
Russian Math. Surveys 61 (2006), no. 5, 990–992
13. “Lie algebra of formal vector fields extended by formal \mathfrak{g} -valued functions”
Zap. Nauchn. Sem. S.-Peterburg. Otdel. Mat. Inst. Steklov. (POMI) 335 (2006), 205–230; translation in J. Math. Sci. (N. Y.) 143 (2007), no. 1, 2816–2830,

Preprints:

14. “Anick-type resolutions and consecutive pattern avoidance” (with V. Dotsenko)
Preprint available at [math.arXiv:1002.2761](https://arxiv.org/abs/math/1002.2761), 16 pp.
15. “Free resolutions via Gröbner bases” (with V. Dotsenko)
Preprint available at [math.arxiv:0912.4895](https://arxiv.org/abs/math/0912.4895), 24 pp.
16. “Lie algebra of formal vector fields that preserve the foliation structure”
preprint in russian ITEP-TH-09/07, available as VINITI RAS, N1376-B2006, – 2006, – 38pp.
17. “Koszul operads and distributive lattices”
Preprint ITEP-TH available at <http://elib.itep.ru/Mathphys/psfiles/05.95.ps>

Articles in preparation:

18. “Highest weight categories and orthogonal polynomials”
19. “On formality theorems for framed little discs operad” (with N. Markarian),
20. “Gröbner bases for dioperads” (with V. Dotsenko),
21. “On Hilbert series of wheeled operads”