Curriculum Vitae

November 2003

Grigory Mikhalkin
Associate Professor (tenured)
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Education.

- Dissertation *"Topology and exterior logarithmic geometry of algebraic hypersurfaces"*, in preparation (towards the Doctor Sci. degree in the St.Petersburg Branch of the Steklov Mathematical Institute of the Russian Academy of Sciences).

- *Candidate degree 1995.* The St.Petersburg Branch of the Steklov Mathematical Institute of the Russian Academy of Sciences. *Dissertation*: The complex separation of real surfaces and extensions of Rokhlin congruence for curves on surfaces. *Advisor*: O. Viro.

- *Ph.D. 1993.* Department of Mathematics, Michigan State University. *Thesis*: Classification of smooth closed manifolds up to blowups. *Advisor*: S. Akbulut.

- *B.A. (with excellence) 1991.* Department of Mathematics, Leningrad University. *Diploma paper*: Real schemes of flexible M-curves of virtual degree 2 on cubics of type I rel. *Advisors*: V. Kharlamov, O. Viro.

Positions held.

- 1999-now. Associate Professor, University of Utah (tenured since July 2001).
- 1997-2000. Benjamin Peirce Lecturer on Mathematics; Assistant Professor of Mathematics, Harvard University.

- 1996-1997. Postdoctoral Member, Mathematical Sciences Research Institute, Berkeley.
- 1995-1996. Postdoctoral Fellow, Department of Mathematics, University of Toronto.
- 1994-1995. Gästforscher, Max-Planck-Institut für Mathematik, Bonn.
- 1993-1994. Member, School of Mathematics, Institute for Advanced Study, Princeton.
- 1993-now. Junior Research Fellow, Steklov Mathematical Institute of the Russian Academy of Sciences, St. Petersburg.

Visiting positions.

- May-June 2003. IHES, Paris.
- July 2002. MSRI, Berkeley.
- February 2002. IMPA, Rio de Janeiro.
- Fall 2001. The Institute for Advanced Study, Princeton.
- Summer 2001. Max-Planck-Institut für Mathematik, Bonn.
- May 2001. Université L. Pasteur, Strasbourg.
- Summer 2000. MSRI, Berkeley.
- September 1998 / January 1999. Mittag-Leffler Institute of the Swedish Royal Academy of Sciences, Stockholm.

Mathematical interests. Geometry. In particular: Topology, Algebraic Geometry, Symplectic Geometry, connections to physics and other areas. *Field of current research:* Amoebas of complex varieties, tropical algebraic geometry, topology of algebraic varieties.

Selected publications. *(see also the complete list of publications attached).*

- G. Mikhalkin, *Counting curves via lattice paths in polygons,* C. R. Math. Acad. Sci. Paris **336** (2003), no. 8, 629–634.
- G. Mikhalkin, *Decomposition into pairs-of-pants for complex algebraic hypersurfaces,* http://arxiv.org math.GT0205011 (2002), to appear in Topology.
- G. Mikhalkin, *Amoebas of algebraic varieties,* a report for the Real Algebraic and Analytic Geometry congress, June 2001, Rennes, France, http://arxiv.org math.AG/0108225.
- G. Mikhalkin, H. Rullgård, *Amoebas of maximal area,* Intern. Math. Res. Notices **9** (2001), 441-451.
- G. Mikhalkin, *Real algebraic curves, moment map and amoebas*, Ann. of Math. 151 (2000), no. 1, 309-326.
- G. Mikhalkin, *Biratonal equivalence for smooth manifolds with boundary*, Algebra i Analiz 11 (1999), no. 5, 152-165. (English translation in St. Petersburg Math. J. 11 (2000), 827-836.)

- G. Mikhalkin, *Topology of curves of degree* 6 *on cubic surfaces in* $\mathbb{R}P^3$, J. Algebraic Geom. 7 (1998), no. 2, 219–237.
- G. Mikhalkin, *Blowup equivalence of smooth closed manifolds*, Topology 36 (1997), no. 1, 287–299.
- G. Mikhalkin, *Adjunction inequality for real algebraic curves*, Math. Res. Lett. 4 (1997), no. 1, 45–52.
- G. Mikhalkin, M. Polyak, *Whitney formula in higher dimensions*, J. Differential Geom. 44 (1996), no. 3, 583–594.
- G. Mikhalkin, *The complex separation of real surfaces and extensions of Rokhlin congruence*, Invent. Math. 118 (1994), no. 2, 197–222.

Teaching courses (selected).

- *2002-2003.* Foundation of Analysis (Math 3210), Utah.
- *2000-2001.* Introduction to Geometric and Algebraic Topology (Math 4510 and Math 5520), Utah.
- *Fall 1997 and Spring 2000.* Classical Geometry (Math 138), Harvard.
- *Spring 2000.* Topology of Algebraic Varieties (Math 271), Harvard.
- *1998-1999.* Algebraic Topology (Math 272), Harvard.
- *1997-1998.* Honors Calculus for Students in Mathematical Physics (Math 22), Harvard.

Awards.

- NSF Grant, Topology (co-funded by the Algebra program) DMS#0104727, *Topology of algebraic hypersurfaces*, 2001-2004.
- 1999 St.Petersburg Mathematical Society Prize for the work on *real algebraic curves, moment map and amoebas.*
- NSF Grant, Topology, DMS#9801726, *Real Algebraic Structures on Smooth Manifolds*, 1998–2001.

Miscellaneous.

- Primary organizer of the workshop "Amoebas and tropical geometry", American Institute of Mathematics, Oct 23-26 2003, Palo Alto, CA

- One of the organizers of the special half-year program "Topological aspects of real algebraic geometry", MSRI, Berkeley, CA, Spring 2004.

- Invited short course on *amoebas of complex varieties and tropical algebraic geometry* for the special bimester "Topics in Complex and Real Geometry", Scuola Normale Superiore, Pisa, Italy, Spring 2003.

- Invited address, Western Section Meeting of the American Mathematical Society, Nov10-11, 2001, Irvine, CA.

- An organizer (together with T. Graber) the departmental colloquia in 1999, Department of Mathematics, Harvard University.

- One of the organizers of the conference "Real Algebraic Geometry", the Fields Institute for Mathematical Sciences, January 1997.

- Reviewer for *Mathematical Reviews* (since 1996) and for NSF and NSA grant proposals.

- Served as a referee for several professional journals including: *Adv. Math.*, *Ann. of Math.*, *Comment. Math. Helv.*, *Discrete Comput. Geom.*, *Duke Math. J.*, *European J. Math.*, *J. of Amer. Math. Soc.*, *Michigan Math. J.*, *Pacific J. Math.*, *Proc. Amer. Math. Soc.*, *Rocky Mountain J. Math.*, *St.Petersburg Math. J.* and *Topology*.

- Nominated for a *Canada Research Chair* by the University of Toronto in 2003.

- Work on *amoebas and enumeration of holomorphic curves* was presented at the Bourbaki seminar by I. Itenberg in June 2003.

List of publications.

(1) G. Mikhalkin, *Congruences for real algebraic curves on an ellipsoid,* Zapiski Nauchn. Seminarov LOMI, **193** (1991), 90-100 (Russian); Advances in Soviet Mathematics, **18** (1994), 223-233 (English translation).

(2) G. Mikhalkin, *Extensions of Rokhlin's congruence for curves on surfaces,* Lect. Notes in Mathematics, **1524** (1992), 372-377.

(3) A. Degtyarev, S. Finashin and G. Mikhalkin, *Generalized Pin-Structures and some applications to low-dimensional topology,* Advances in Soviet Mathematics, **18** (1994), 55-85.

(4) G. Mikhalkin, *Complex separation of real surfaces and extensions of Rokhlin congruence,* Invent. Math. **118** (1994), 197-222.

(5) G. Mikhalkin, *A proof of the topological Nash conjecture in dimension 4,* Turkish J. Math., **18** (1994), 53-59.

(6) G. Mikhalkin, *Surfaces in the neighborhoods of other surfaces in 4-manifolds,* Turkish J. Math., **19** (1995), 201-206.

(7) G. Mikhalkin, *Surfaces of small genus in connected sums of* $\mathbb{CP}^2$ *and real algebraic curves with many nests in* $\mathbb{RP}^2$*,* Contemp. Math., **182** (1995), 73-82.

(8) G. Mikhalkin, *Visible contours of cubic surfaces in* $\mathbb{RP}^3$*,* Preprint Max-Planck-Institute, Bonn 1995.

(9) G. Mikhalkin, M. Polyak, *Whitney formula in higher dimensions,* J. Differential Geom. **44** (1996), no. 3, 583-594.

(10) S. Finashin, G. Mikhalkin, *A* (-86)*-sphere in the* $K3$ *surface,* Turkish J. Math. **21** (1997), no. 1, 129-131.

(11) G. Mikhalkin, *J-holomorphic curves in almost complex surfaces do not always minimize the genus,* Proc. Amer. Math. Soc. **125** (1997), no. 6, 1831-1833.

(12) G. Mikhalkin, *Adjunction inequality for real algebraic curves,* Math. Res. Lett. **4** (1997), no. 1, 45-52.

(13) G. Mikhalkin, *Blowup equivalence of smooth closed manifolds,* Topology **36** (1997), no. 1, 287-299.

(14) G. Mikhalkin, *Topology of curves of degree* 6 *on cubic surfaces in* $\mathbb{R}\mathrm{P}^3$*,* J. Algebraic Geom. **7** (1998), no. 2, 219-237.

(15) G. Mikhalkin, *Birational equivalence for smooth manifolds with boundary,* Algebra i Analiz 11 (1999), no. 5, 152-165. (English translation in St.Petersburg Math. J. **11** (2000), 827-836.)

(16) G. Mikhalkin, *Real algebraic curves, moment map and amoebas,* Ann. of Math. (2) **151** (2000), no. 1, 309-326.

(17) G. Mikhalkin, H. Rullgård *Amoebas of maximal area,* Internat. Math. Res. Notices **9** 2001:9, 441–451.

(18) G. Mikhalkin, *Amoebas of algebraic varieties,* a report for the Real Algebraic and Analytic Geometry congress, June 2001, Rennes, France, http://arxiv.org math.AG/0108225.

(19) G. Mikhalkin, *Decomposition into pairs-of-pants for complex algebraic hypersurfaces,* http://arxiv.org math.GT0205011, to appear in Topology.
(20) G. Mikhalkin, *Counting curves via lattice paths in polygons,* C. R. Math. Acad. Sci. Paris **336** (2003), no. 8, 629–634.
(21) G. Mikhalkin, *Enumerative tropical algebraic geometry,* in preparation.
(22) G. Mikhalkin, *Tropical geometry and amoebas,* a survey in preparation.
(23) G. Mikhalkin, *Topology of maximal real algebraic hypersurfaces,* in preparation.