

Samuel Grushevsky

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EMPLOYMENT

2005–	Assistant Professor	Princeton University
2002–2005	Instructor	Princeton University
Summer 2002	Liftoff Fellow	Clay Mathematics Institute

EDUCATION

2002	Ph.D. in mathematics	Harvard University
	Ph.D. advisor:	Professor Yum-Tong Siu
	Dissertation title:	<i>Effective Schottky problem</i>
1998	B.A. in math and physics	Harvard University
1994–1996	undergraduate study	Moscow State University
1993–1996	undergraduate study	Independent U of Moscow
1994	High school diploma	Moscow State 57th school

RESEARCH INTERESTS

Algebraic and complex geometry, relations with number theory, integrable systems, and mathematical physics. Geometry of curves, abelian varieties, and their moduli; Schottky problem; theta functions and Siegel modular forms; superstring scattering amplitudes.

AWARDS

NSF Division of Mathematical Sciences grant DMS-0555867, 2006-2009

NSF Mathematical Sciences Postdoctoral Research Fellowship, 2002-2006

NSF Graduate Research Fellowship, 1998-2001

SERVICE

2006–: Princeton mathematics department undergraduate placement officer

2006–: co-organizer of the Princeton algebraic geometry seminar

2005–: co-organizer of the Princeton mathematics department colloquium

PERSONAL

Birthdate: December 5, 1978

Birthplace: Moscow, Russia

Citizenship: USA

PUBLICATIONS

1. *An explicit upper bound for Weil-Petersson volumes of the moduli spaces of punctured Riemann surfaces*, *Mathematische Annalen* **321** (2001) 1, 1-13.
2. *Cubic equations for the hyperelliptic locus*, *Asian Journal of Mathematics* **8** (2004) 1, 161-172 (special issue dedicated to Prof. Yum-Tong Siu on his 60th birthday). Erratum **9** (2005) 2, 273.
3. *Effective algebraic Schottky problem*, math.AG/0403009, 23pp.
4. (with R. Salvati Manni) *Gradients of odd theta functions*, *Journal für die reine und angewandte Mathematik (Crelle)* **573** (2004), 43–59.
5. (with R. Salvati Manni) *Two generalizations of Jacobi's derivative formula*, *Mathematics Research Letters* **12** (2005) 6, 921-932.
6. (with R. Salvati Manni) *Theta functions of arbitrary order and their derivatives*, *Journal für die reine und angewandte Mathematik (Crelle)*, **590** (2006), 31–43.
7. *Multiplier ideals in algebraic geometry*, in *Snowbird lectures in Geometry*, *Contemporary Mathematics* 388, AMS 2005, 89–106.
8. (with C. Erdenberger and K. Hulek) *Intersection theory of toroidal compactifications of \mathcal{A}_4* , *Bulletin of the London Mathematical Society* **38** (2006), 396–400.
9. (with D. Lehavi) *Some intersections in the Poincaré bundle, and the universal theta divisor on the moduli space of (semi)abelian varieties*, *International Mathematics Research Notices* (2008), article ID rnm129, 19pp.
10. (with R. Salvati Manni) *Jacobians with a vanishing theta-null in genus 4*, *Israel Journal of Mathematics* **164** (2008), 303–315.
11. *Geometry of \mathcal{A}_g and its compactifications*, *Proceedings of the Summer Institute in Algebraic Geometry, Seattle 2005*, to appear, arXiv:0711.0094, 42pp.
12. (with R. Salvati Manni) *Singularities of the theta divisor at points of order two*, *International Mathematics Research Notices* (2007), article ID rnm045, 14pp.
13. (with I. Krichever) *Integrable discrete Schrödinger equations and a characterization of Prym varieties by a pair of quadrisecants*, arXiv:0705.2829, 45pp.
14. (with C. Erdenberger and K. Hulek) *Some intersection numbers of divisors on toroidal compactifications of \mathcal{A}_g* , *Journal of Algebraic Geometry*, to appear, arXiv:0707.1274, 37pp.
15. *Superstring scattering amplitudes in higher genus*, *Communications in*

- Mathematical Physics, to appear, arXiv:0803.3469, 23pp.
16. *A special case of the Γ_{00} conjecture*, arXiv:0804.0525, 10pp.
 17. (with R. Salvati Manni) *The loci of abelian varieties with points of high multiplicity on the theta divisor*, Geometriae Dedicata, to appear, arXiv:0805.4148, 19pp.
 18. (with R. Salvati Manni) *The vanishing of two-point functions for three-loop superstring scattering amplitudes*, arXiv:0806.0354, 12pp.
 19. (with R. Salvati Manni) *On the cosmological constant for the chiral superstring measure*, arXiv:0809.1391, 20pp.
 20. (with I. Krichever) *The universal Whitham hierarchy and geometry of the moduli space of pointed Riemann surfaces*, arXiv:0810.2139, 17pp.

TALKS

Special Schools:

- School on abelian varieties, Mainz, Germany, April 2008 (5 lecture course on moduli of abelian varieties)
- Conference on algebraic geometry, Zacatecas, Mexico, June 2006 (3 lecture course on theta functions)

Conferences:

- Komplexe Analysis meeting, Oberwolfach, Germany, August 2008
- Moduli workshop, Symposium on Algebraic Geometry, Warwick, UK, July 2008 (two talks)
- Algebraic Geometry satellite conference of the ECM, Leiden, the Netherlands, July 2008
- Joint International AMS/SBM meeting, Rio de Janeiro, Brazil, June 2008
- Clay workshop on automorphic forms in moduli problems of Schottky and Brill-Noether type, Cambridge, MA, March 2008
- IV Iberoamerican conference on complex geometry, Ouro Preto, Brazil, August 2007
- The geometry of holomorphic and algebraic curves in complex algebraic varieties, Montreal, QC, April 2007
- Curves, abelian varieties and their interactions on the occasion of the 65th birthday of Roy Smith, Athens, GA, April 2007
- Program on moduli spaces, Institut Mittag-Leffler, Djursholm, Sweden, February 2007
- Berkeley-Stanford algebraic geometry colloquium, Stanford, CA, November 2006
- Conference on modular forms, Schiermonnikoog, the Netherlands, October 2006

Workshop on abelian varieties, Amsterdam, the Netherlands, May 2006 (two talks)

Recent developments in higher-dimensional algebraic geometry, Banff, Canada, April 2006

KIAS workshop on complex geometry, Seoul, Korea, September 2005

Modular forms and related moduli spaces, Rome, Italy, September 2005

AMS summer institute in algebraic geometry, Seattle, WA, August 2005

University of Michigan/Ohio State University algebraic geometry workshop, Columbus, OH, April 2005

Birational geometry of moduli spaces (at AIM), Palo Alto, CA, December 2004

Komplexe Analysis meeting, Oberwolfach, Germany, August 2004

AMS summer research conference in algebraic geometry, Snowbird, UT, July 2004

III Iberoamerican congress on geometry, Salamanca, Spain, June 2004

Conference on Recent Developments in Several Complex Variables, CR geometry, and Complex Algebraic Geometry, celebrating Professor Yum-Tong Siu's 60th birthday, Hong Kong, November 2003

VBAC (Vector bundles on algebraic curves) 2003, Porto, Portugal, July 2003

Geometry of Moduli Spaces, Lille, France, June 2003

Perspectives in Classification and Moduli Theory, Cortona, Italy, October 2002

Komplexe Analysis meeting, Oberwolfach, Germany, August 2002

ICM 2002 satellite conference on complex analysis, Kyoto, Japan - Shanghai, China, August 2002 (two talks)

Moduli of Curves, Ann Arbor, MI, March 2002

AMS Eastern sectional meeting, session on abelian varieties, Williamstown, MA, October 2001

AMS Eastern sectional meeting, special session on enumerative methods in algebraic geometry, Lowell, MA, March 2000

Workshop on Riemann Surfaces in honor of Hershel Farkas's 60th birthday, Jerusalem, Israel, June 1999

Seminars:

Algebraic geometry: Bar Ilan, Ben Gurion, U of Chicago, Columbia (x2), Essen, Göttingen, Hannover, Harvard-MIT, Johns Hopkins, U of Illinois at Chicago, Köln, Ohio State (x2), Princeton (x2), Purdue, Stanford, Tel Aviv

Algebra: Copenhagen, IMPA, Roma "La Sapienza" (x2), U of Pennsylvania

Analysis: Michigan State, Princeton

Colloquium: Rice, SUNY Stony Brook (x2)
Geometry: Boston U, Columbia, Essen, Hong Kong U (x2), Princeton (x3),
Roma Tre, Rutgers, Valley (Amherst), U of Texas at Austin
Math/physics: SUNY Stony Brook, U of Pennsylvania
Special series: Hebrew University (x4), Michigan State

TEACHING

Princeton University:

Fall 2008: MAT 553 — Algebraic Geometry: an advanced graduate class on multiplier ideals. Positivity of line bundles; algebraic and analytic definitions and basic properties of multiplier ideals; vanishing theorems; invariance of plurigenera for varieties of general type.

Fall 2007: MAT 104 — Calculus (2 sections): second semester calculus, i.e. limits, series, integration

Fall 2006: MAT 326 — Algebraic Topology: an advanced course covering differential forms, de Rham homology, Poincaré duality

Fall 2006: MAT 553 — Algebraic Geometry: an advanced graduate class on the theory of complex abelian varieties, starting from the basic definitions and leading up to the results of Pareschi and Popa on M-regularity

Spring 2006: MAT 104 — Calculus (2 sections): second semester calculus, i.e. limits, series, integration

Fall 2005: MAT 516 — Introduction to Algebraic Geometry: an introductory graduate class, covering affine and projective varieties, tangent spaces, divisors, cohomology

Fall 2005: MAT 314 — Introduction to Real Analysis: an advanced course covering analysis in \mathbb{R}^n , Lebesgue measure and Lebesgue integral, and Fourier series

Spring 2005: Junior seminar: a seminar on Riemann surfaces for mathematics juniors, instructing the students on their independent reading projects and presentations on the subject

Fall 2004: MAT 519 — Teichmüller theory: an advanced graduate class, starting from the basics of Teichmüller theory, and leading up to study of the curvature of the moduli space, Mirzakhani's proof of Witten-Kontsevich formula for intersection numbers on \mathcal{M}_g , and holography

Spring 2004: MAT 104 — Calculus (2 sections): second semester calculus, i.e. limits, series, integration

Harvard University:

Fall 2001: Calculus teaching fellow (Math 1b): second semester calculus.

1997-1998: Mathematics Course Assistant: holding problem sessions and grading homework for advanced math classes. Awarded Harvard University Certificate of Distinction in Teaching.

REFEREEING

Acta Mathematica, Annals of Mathematics, Central European Journal of Mathematics, Communications in Mathematical Physics, Compositio Mathematica, Contemporary Mathematics, Documenta Mathematica, Geometriae Dedicata, International Mathematics Research Notices, Inventiones Mathematicae, Israel Journal of Mathematics, Journal für die reine und angewandte Mathematik (Crelle), Journal of the European Mathematical Society, Letters in Mathematical Physics, Mathematical Reviews, Nuclear Physics B, Transactions of the AMS.

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