

Samuel Grushevsky

EMPLOYMENT

2009–	Associate Professor	Stony Brook University
2005–2010	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-0901086 (transferred to Stony Brook as DMS-1053313), \$155776, 2009-2012

NSF Division of Mathematical Sciences grant DMS-0555867, \$107857, 2006-2010

NSF Mathematical Sciences Postdoctoral Research Fellowship, 2002-2006

NSF Graduate Research Fellowship, 1998-2001

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*, in *Algebraic Geometry: Seattle 2005*, *Proceedings of Symposia in Pure Mathematics* **80**, 193–234.
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*, *Duke Mathematical Journal* **152** (2010) 2, 317–371.
14. (with C. Erdenberger and K. Hulek) *Some intersection numbers of divisors on toroidal compactifications of \mathcal{A}_g* , *Journal of Algebraic Geometry*, **19** (2010), 99–132.
15. *Superstring scattering amplitudes in higher genus*, *Communications in Mathematical Physics* **287** (2009) 2, 749–767.

16. *A special case of the Γ_{00} conjecture*, in Liaison, Schottky Problem and Invariant Theory: Remembering Federico Gaeta. Progress in Mathematics **280** (2010), 223–234.
17. (with R. Salvati Manni) *The loci of abelian varieties with points of high multiplicity on the theta divisor*, Geometriae Dedicata, **139** (2009) 1, 233–247.
18. (with R. Salvati Manni) *The vanishing of two-point functions for three-loop superstring scattering amplitudes*, Communications in Mathematical Physics **294** (2010) 2, 343–352.
19. (with R. Salvati Manni) *On the cosmological constant for the chiral superstring measure*, American Journal of Mathematics, to appear, arXiv:0809.1391, 20pp.
20. (with I. Krichever) *The universal Whitham hierarchy and the geometry of the moduli space of pointed Riemann surfaces*, Surveys in Differential Geometry **14** (2010), 111–130.
21. *The Schottky problem*, for the proceedings of “Classical Algebraic Geometry Today” workshop, MSRI 2009, preprint arXiv:1009.0369, 39pp.
22. (with R. Salvati Manni) *The Scorza correspondence in genus 3*, preprint arXiv:1009.0375, 15pp.
23. (with K. Hulek) *The class of the locus of intermediate Jacobians of cubic threefolds*, in preparation.
24. (with K. Hulek) *Principally polarized semiabelic varieties of torus rank up to 3, and the Andreotti-Mayer loci*, in preparation.
25. (with I. Krichever) *Calogero-Moser curves, foliations by absolute periods, and the tautological ring of the moduli space of curves*, in preparation.
26. (with J.M. Muñoz Porras) *The Γ_{00} conjecture and the Schottky-Jung loci*, in preparation.

TALKS

Special Schools and Lecture Series:

Lectures on string scattering amplitudes and modular forms, Leibniz Universität, Hannover, Germany, January 2010 (5 lectures)

Lectures on abelian varieties and integrable systems, KIAS, Seoul, Korea, May 2009 (8 lectures)

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:

Geometry and Dynamics of Teichmüller space, Bonn, Germany, June 2010
 Moduli meeting, Oberwolfach, Germany, January 2010
 Moduli, Berlin, Germany, August 2009
 Moduli and Discrete Groups, RIMS, Kyoto, Japan, June 2009
 Classical Algebraic Geometry Today, MSRI, Berkeley, CA, January 2009
 Arithmetic Algebraic Geometry Related to Moduli Spaces, Tokyo, Japan,
 January 2009
 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 Nether-
 lands, 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, Au-
 gust 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, Febru-
 ary 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 ($\times 2$), Caltech, U of Chicago, Columbia ($\times 2$), Essen, Göttingen, Hannover, Harvard-MIT ($\times 2$), Humboldt, Johns Hopkins ($\times 2$), U of Illinois at Chicago, Köln, Ohio State ($\times 2$), Princeton ($\times 2$), Purdue, Stanford, Tel Aviv
 Algebra: Copenhagen, IMPA, Roma "La Sapienza" ($\times 2$), U of Pennsylvania
 Analysis: Michigan State, Princeton
 Colloquium: Berlin, Rice, Stony Brook ($\times 2$)
 Geometry: Boston U, Columbia, Essen, Hebrew U, Hong Kong U ($\times 2$), U of Maryland, Osaka, Princeton ($\times 3$), Roma Tre, Rutgers, Stony Brook, Valley (Amherst), U of Texas at Austin
 Math/physics: Stony Brook, U of Pennsylvania
 Special series: Hebrew University ($\times 4$), Michigan State
 Topology: CUNY

TEACHING

Stony Brook University:

Fall 2010: MAT 401 — Undergraduate seminar: a seminar for advanced undergraduate students on representation theory, mostly of finite groups.

Fall 2010: MAT 200 — Logic, Language and Proof: a course introducing rigorous proofs and rigorous mathematical tools, preparing the students for higher-level mathematics courses.

Spring 2010: MAT 615 — Topics in Algebraic Geometry (moduli of curves): an advanced graduate course on the construction of the moduli stack of complex curves via the geometric invariant theory/ Hilbert scheme techniques, and via the Teichmüller theory.

Fall 2009: MAT 126 — Calculus (2 sections): second semester calculus, i.e. integration, areas, volumes.

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.

SERVICE

2009–: member of the organizing committee of biannual AGNES (Algebraic Geometry Northeastern Series) workshops
2009–: co-organizer of Stony Brook mathematics department colloquium
2009–: co-organizer of Stony Brook algebra, geometry, and physics seminar
2006–2009: Princeton mathematics department undergraduate placement officer
2006–2009: co-organizer of Princeton algebraic geometry seminar
2005–2008: co-organizer of Princeton mathematics department colloquium

REFEREEING

Acta Mathematica, Acta Mathematica Vietnamica, Annals of Mathematics, Central European Journal of Mathematics, Communications in Mathematical Physics, Compositio Mathematica, Contemporary Mathematics, Discrete Mathematics, Documenta Mathematica, Geometriae Dedicata, International Mathematics Research Notices, Inventiones Mathematicae, Israel Journal of Mathematics, Journal d'Analyse Mathématique, Journal für die reine und angewandte Mathematik (Crelle), Journal of Geometry and Physics, Journal of the European Mathematical Society, Letters in Mathematical Physics, Manuscripta Mathematica, Mathematics Research Letters, Mathematical Reviews, Mathematische Annalen, Nuclear Physics B, Proceedings of the AMS, Transactions of the AMS.

Updated: August 2010