Samuel Grushevsky

<u>Employment</u>

2021 -	Deputy Director	Simons Center for
		Geometry and Physics
2014 -	Professor of Mathematics	Stony Brook University
2009 - 2014	Associate Professor	Stony Brook University
2005 - 2010	Assistant Professor	Princeton University
2002 - 2005	Instructor	Princeton University
	Educatio	<u>ON</u>
2002	Ph.D. in mathematics	Harvard University
	Ph.D. advisor:	Professor Yum-Tong Siu
	Dissertation title	Effective Schottky problem

	Dissertation title:	Effective Schottky problem
1998	A.B. 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. Curves, abelian varieties, and moduli.

AWARDS

Fellow of the American Mathematical Society, class of 2022 Bessel Research Award from the Humboldt foundation, 2015 Simons Fellowship in Mathematics, 2015–2016 NSF Mathematical Sciences Postdoctoral Research Fellowship, 2002–2006 Clay Liftoff Fellow in Mathematics, Summer 2002 NSF Graduate Research Fellowship, 1998–2001

<u>Grants</u>

PI on NSF Division of Mathematical Sciences (DMS) individual grants continuously since 2006; PI on NSF DMS conference grants for 8th and 7th Iberoamerican Congresses on Geometry, co-PI on AGNES conference grants, at Stony Brook in 2023, 2020 (virtual), 2017, 2014, 2011, and Versatility of Integrability conference at Columbia, 2011.

Personal

Birthdate:December 5, 1978Birthplace:Moscow, RussiaCitizenship:USA

PH.D. STUDENTS

- Prabhat Devkota, Stony Brook Ph.D. expected 08/2026. Topics on homology and log-MMP for strata of curves with a differential.
- Myeongjae Lee, Stony Brook Ph.D. expected 05/2025. Connected components of generalized strata of differentials. Will start 09/2025 as Zorn postdoctoral fellow at Indiana University.
- Frederik Benirschke, Stony Brook Ph.D. 08/2021. Complex-linear subvarieties: equations and degenerations. Currently at a hedge fund after being L.E.Dickson Instructor at University of Chicago.
- Xuntao Hu, Stony Brook Ph.D. 08/2019: Variational formulas and strata of abelian differentials. Currently data scientist at Attentive.
- Anant Atyam, Stony Brook Ph.D. 08/2014: Affine stratifications and equivariant vector bundles on the moduli of principally polarized abelian varieties. Currently data scientist at Apple.
- Chaya Norton, Stony Brook Ph.D. 08/2014: Limits of real-normalized differentials on stable curves. Currently in the data science industry.

Post-docs mentored

- Karl Winsor, 2023–: (NSF postdoc sponsoring scientist) Teichmüller dynamics: absolute period foliations and orbit closures.
- Benjamin Dozier, 2019–2021: Teichmüller dynamics; currently tenure-track assistant professor at Cornell University.
- Dmitry Zakharov, 2010–2013: Chow and homology rings of abelian varieties, their moduli, and compactifications; currently tenured associate professor at Central Michigan University.

<u>PUBLICATIONS</u>

- (with G. Mondello, R. Salvati Manni, J. Tsimerman) Compact Subvarieties of the Moduli Space of Complex Abelian Varieties, preprint arXiv: 2404.06009, 36pp.
- (with S. Cacciatori, A. Voronov) Tree-Level Superstring Amplitudes: The Neveu-Schwarz Sector, Journal of High Energy Physics (2024) 8, 32pp.
- 55. (with S. Casalaina-Martin, K. Hulek) The birational geometry of moduli of cubic surfaces and cubic surfaces with a line, preprint arXiv: 2312.15369, 21pp. Moduli, to appear.
- 54. (with R. Salvati Manni) Moduli of abelian varieties near the locus of products of elliptic curves, preprint arXiv: 2307.05238, 30pp.

- (with D. Chen, D. Holmes, M. Möller, J. Schmitt) A tale of two moduli spaces: logarithmic and multi-scale differentials, preprint arXiv: 2212.04704, 55pp.
- 52. (with T. Ibukiyama, G. Mondello, R. Salvati Manni) Differentiating Siegel modular forms, and the moving slope of \mathcal{A}_g , Int. Math. Res. Not. 2024 (4), 3442–3486.
- (with S. Casalaina-Martin, K. Hulek, R. Laza) Non-isomorphic smooth compactifications of the moduli space of cubic surfaces, Nagoya Math. J. 254 (2024), 315–365.
- (with F. Benirschke, B. Dozier) Equations of linear subvarieties of strata of differentials. Geometry and Topology 26 (2022) 6, 2773– 2830.
- 49. (with K. Hulek) The cone of effective surfaces on $\overline{\mathcal{A}}_3$, Moscow Math. Journal 22 (2022) 4, 657–703.
- 48. (with M. Bainbridge, D. Chen, Q. Gendron, M. Möller) *The moduli* space of multi-scale differentials, preprint arXiv: 1910.13492, 138pp.
- 47. (with S. Casalaina-Martin, K. Hulek, R. Laza) Cohomology of the moduli space of cubic threefolds and its smooth models, Memoirs of the AMS 282 (2023) 1395.
- (with H. Farkas, R. Salvati Manni) An explicit solution to the weak Schottky problem, Algebraic Geometry 8 (2021) 3, 358–373.
- 45. (with I. Krichever, C. Norton) Real-normalized differentials: limits on stable curves, Russian Math Surveys 74 (2019) 2, 265–324.
- 44. (with K. Hulek, O. Tommasi; with an appendix by M. Dutour Sikirić) Stable Betti numbers of (partial) toroidal compactifications of the moduli space of abelian varieties, Proceedings in honour of Nigel Hitchin's 70th birthday, Volume II, 581–610 (2018), Oxford University Press.
- (with M. Bainbridge, D. Chen, Q. Gendron, M. Möller) Strata of kdifferentials, Algebraic Geometry 6 (2019) 2, 196–233.
- 42. (with G. Codogni, E. Sernesi) *The degree of the Gauss map for theta divisors*, Algebra and Number Theory 11 (2017), 983–1001.
- (with E. Clader, F. Janda, D. Zakharov) Powers of the theta divisor and relations in the tautological ring, Int. Math. Res. Not. 2018 (24), 7725-7754.
- (with M. Bainbridge, D. Chen, Q. Gendron, M. Möller) Compactification of strata of abelian differentials, Duke Math. J. 167 (2018) 12, 2347—2416.
- 39. (with K. Hulek) The intersection cohomology of the Satake compactification of \mathcal{A}_q for $g \leq 4$, Math. Annalen 369 (2017) 3-4, 1353–1381.
- 38. (with S. Casalaina-Martin, K. Hulek, R. Laza) Complete moduli of

cubic threefolds and their intermediate Jacobians, Proceedings of the London Mathematical Society (new series) 122 (2021) 2, 259–316.

- (with M. Möller) Explicit formulas for infinitely many Shimura curves in genus 4, Asian J. Math. 22 (2018) 2 (special issue dedicated to N. Mok), 381—390.
- 36. (with F. Dalla Piazza, A. Fiorentino, S. Perna, R. Salvati Manni) Vector-valued modular forms and the Gauss map, Doc. Math. 22 (2017), 1063–1080.
- (with S. Casalaina-Martin, K. Hulek, R. Laza; with an appendix by M. Dutour Sikirić) *Extending the Prym map to toroidal compactifications of A_a*, J. Europ. Math. Soc. 19 (2017) 3, 659–723.
- (with M. Möller) Shimura curves in the locus of genus 3 hyperelliptic curves, Int. Math. Res. Not. 2016 (6), 1603–1639.
- 33. (with K. Hulek and O. Tommasi) The stable cohomology of the perfect cone toroidal compactification of the moduli space of abelian varieties, J. Reine Angew. Math. 741 (2018), 211-254.
- 32. (with F. Cléry and G. van der Geer; with an appendix by S. Mukai) Siegel modular forms of genus 2 and level 2, Internat. J. of Math. 26 (2015) 5, 51 pp.
- (with R. Salvati Manni) On the Coble quartic, Amer. J. of Math. 137 (2015) 3, 765–790.
- (with D. Zakharov) The zero section of the universal semiabelian variety, and the double ramification cycle, Duke Math. J. 163 (2014) 5, 953–982.
- (with D. Zakharov) The double ramification cycle and the theta divisor, Proc. AMS 142 (2014) 12, 4053–4064.
- (with K. Hulek) Geometry of theta divisors a survey, A celebration of algebraic geometry, 361—390 (Volume published on the occasion of Joe Harris' 60th birthday), Clay Math. Proc., 18, Amer. Math. Soc., Providence, RI, 2013.
- (with G. Farkas, R. Salvati Manni, A. Verra) Singularities of theta divisors and the geometry of A₅, J. Europ. Math. Soc. 16 (2014), 1817– 1848.
- 26. (with R. Salvati Manni) The Prym map on divisors, and the slope of A₅ (with an appendix by K. Hulek), Int. Math. Res. Not. 2014 (2014) 24, 6645–6660.
- 25. (with I. Krichever) Real-normalized differentials and the spectral curves of the Calogero-Moser system, in Complex Geometry and Dynamics: the Abel symposium 2013, Springer 2015, 123–138.
- 24. (with K. Hulek) The class of the locus of intermediate Jacobians of

cubic threefolds, Invent. Math. 190 (2012), 119–168.

- 23. (with K. Hulek) Principally polarized semiabelic varieties of torus rank up to 3, and the Andreotti-Mayer loci, Pure Appl. Math. Q. (special issue in memory of Eckart Viehweg) 7 (2011), 1309–1360.
- (with R. Salvati Manni) The Scorza correspondence in genus 3, Manuscripta Math. 141 (2013) 1, 111–124.
- 21. The Schottky problem, in Current Developments in Algebraic Geometry, MSRI Publications 59, Cambridge Univ. Press (2012), 129–164.
- (with I. Krichever) The universal Whitham hierarchy and the geometry of the moduli space of pointed Riemann surfaces, Surv. Differ. Geom. 14 (2010), 111–130.
- (with R. Salvati Manni) The superstring cosmological constant and the Schottky form in genus 5, Amer. J. Math. 133 (2011) 4, 1007–1027. Erratum 134 (2012) 4, 1139-1142.
- (with R. Salvati Manni) The vanishing of two-point functions for threeloop superstring scattering amplitudes, Comm. Math. Phys. 294 (2010) 2, 343–352.
- (with R. Salvati Manni) The loci of abelian varieties with points of high multiplicity on the theta divisor, Geom. Dedicata 139 (2009) 1, 233-247.
- 16. A special case of the Γ_{00} conjecture, in Liaison, Schottky Problem and Invariant Theory: Remembering Federico Gaeta. Progr. Math. 280 (2010), 223–234.
- Superstring scattering amplitudes in higher genus, Comm. Math. Phys. 287 (2009) 2, 749–767.
- (with C. Erdenberger and K. Hulek) Some intersection numbers of divisors on toroidal compactifications of A_g, J. of Alg. Geom. 19 (2010), 99–132.
- (with I. Krichever) Integrable discrete Schrödinger equations and a characterization of Prym varieties by a pair of quadrisecants, Duke Math. J. 152 (2010) 2, 317–371.
- 12. (with R. Salvati Manni) Singularities of the theta divisor at points of order two, Int. Math. Res. Not. (2007), article ID rnm045, 14pp.
- 11. Geometry of \mathcal{A}_g and its compactifications, in Algebraic Geometry: Seattle 2005, Proc. Sympos. Pure Math. 80, 193–234.
- 10. (with R. Salvati Manni) Jacobians with a vanishing theta-null in genus 4, Israel J. Math. 164 (2008), 303–315.
- (with D. Lehavi) Some intersections in the Poincaré bundle, and the universal theta divisor on the moduli space of (semi)abelian varieties, Int. Math. Res. Not. (2008), article ID rnm129, 19pp.

- (with C. Erdenberger and K. Hulek) Intersection theory of toroidal compactifications of A₄, Bull. London Math. Soc. 38 (2006), 396–400.
- Multiplier ideals in algebraic geometry, in Snowbird lectures in Geometry, Contemp. Math. 388, AMS 2005, 89–106.
- (with R. Salvati Manni) Theta functions of arbitrary order and their derivatives, J. Reine Angew. Math. (Crelle) 590 (2006), 31–43.
- (with R. Salvati Manni) Two generalizations of Jacobi's derivative formula, Math. Res. Lett. 12 (2005) 6, 921-932.
- (with R. Salvati Manni) Gradients of odd theta functions, J. Reine Angew. Math. (Crelle) 573 (2004), 43–59.
- 3. Effective algebraic Schottky problem, math.AG/0403009, 23pp.
- Cubic equations for the hyperelliptic locus, Asian J. Math. 8 (2004) 1, 161–172 (special issue dedicated to Yum-Tong Siu on his 60th birthday). Erratum 9 (2005) 2, 273.
- 1. An explicit upper bound for Weil-Petersson volumes of the moduli spaces of punctured Riemann surfaces, Math. Ann. 321 (2001) 1, 1–13.

<u>Talks</u>

Special Schools and Lecture Series:

- Integrable systems and algebraic geometry, Beijing Institute of Mathematical Sciences and Applications, Beijing, China, 2024;
 7.5 hours on the Riemann-Schottky problem and integrable systems
- Winter school on algebraic curves, Riemann surfaces, and moduli spaces, Morningside Center for Mathematics, Beijing, China, 2019;
 5 hours on double ramification cycles and strata of differentials
- Geometry RTG lectures at Northeastern University, Boston, MA, 2018;
 4 hours on Mirzakhani's recursion for Weil-Petersson volumes
- CIMPA-CIMAT-ICTP school on moduli of curves, Guanajuato, Mexico, 2016;

5 hours on birational geometry and topology of the moduli of curves

 Moduli spaces in algebraic geometry and physics, Hamburg, Germany, 2013;

3 hours on moduli of abelian varieties and string scattering

- Ecole de géométrie algébrique, Roscoff, France, 2012;
 5 hours on moduli of curves for experts in dynamics
- Géométrie Algébrique en Liberté (GAeL) XX, Grenoble, France, 2012;
 4 hours on moduli of curves and abelian varieties
- Gauge theory and string theory, Cargèse, France, 2012;
 2 hours on string scattering amplitudes

- Lectures at Leibniz Universität, Hannover, Germany, 2010;
 5 hours on string scattering amplitudes and modular forms
- 3. Lectures at KIAS, Seoul, South Korea, 2009; 8 hours on abelian varieties and integrable systems
- School on abelian varieties, Mainz, Germany, 2008;
 5 hours on moduli of abelian varieties
- Conference on algebraic geometry, Zacatecas, Mexico, 2006;
 3 hours on theta functions

Conferences:

- 87. Holomorphic Differentials, Berlin, Germany, 2024
- 86. Moduli of Varieties, Salt Lake City, UT, 2024
- 85. Moduli Spaces and Modular Forms, Schiermonnikoog, the Netherlands, 2024
- 84. A panorama of moduli spaces, Frankfurt, Germany, 2024
- 83. Workshop on Complex Geometry, Hong Kong, 2023
- Combinatorics, Dynamics, and Geometry on Moduli Spaces, Luminy, France, 2022
- 81. German Math Society (DMV) annual meeting, Berlin, Germany, 2022
- Algebraic Geometry in Hannover, for Klaus Hulek's 70th birthday, Hannover, Germany, 2022
- 79. Moduli spaces and logarithmic geometry, Stockholm, Sweden, 2021
- 78. Universidad de la Frontera: geometry center opening workshop (in zoom), Pucon, Chile, 2020
- 77. Geometry of algebraic varieties, in honor of Olivier Debarre's 60th birthday, Luminy, France, 2019
- MSRI special semester on holomorphic differentials in mathematics and physics, Berkeley, CA, 2019
- 75. MSRI special semester on birational geometry and moduli spaces, Berkeley, CA, 2019
- Holomorphic differentials in mathematics and physics, Stony Brook, NY, 2019
- Dynamics and moduli spaces of translation surfaces, Toronto, Canada, 2018
- 72. Tau Functions of Integrable Systems and Their Applications, Banff, Canada, 2018
- 14th Weihnachtsworkshop on Geometry and Number Theory, Karlsruhe, Germany, 2016
- 70. Surface bundles workshop, Oberwolfach, Germany, 2016

- 69. Complex Geometry Conference, in honor of Ngaiming Mok's 60th birthday, Seoul, South Korea, 2016
- Cycles on moduli spaces, GIT, and Dynamics, at ICERM, Providence, RI, 2016
- 67. Integrability, moduli, and dynamics, Institut Mittag-Leffler, Stockholm, Sweden, 2016
- 66. Modular forms and moduli spaces workshop, Oberwolfach, Germany, 2016
- 65. Geometry of algebraic varieties, Berlin, Germany, 2015
- 64. Flat surfaces, CIRM, Luminy, France, 2015
- 63. Arbeitstagung 2015, Bonn, Germany, 2015
- 62. Current developments in moduli theory, Boston, MA, 2014
- 61. Komplexe Analysis workshop, Oberwolfach, Germany, 2014
- 60. Effective moduli spaces and applications to cryptography, Rennes, France, 2014
- 59. Flat Surfaces workshop, Oberwolfach, Germany, 2014
- 58. AGNES, Boston, MA, 2013
- 57. Cohomology of the moduli space of curves, Zurich, Switzerland, 2013
- 56. Integrable systems and moduli spaces workshop, Banff, Canada, 2013
- 55. 10th Abel Symposium: complex geometry, Trondheim, Norway, 2013
- 54. Complex Geometry Conference, Seoul, South Korea, 2013
- 53. Deformation and moduli in complex geometry, Seoul, South Korea, 2013
- 52. Moduli workshop, Oberwolfach, Germany, 2013
- 51. Algebraic geometry, modular forms and applications to physics workshop, Edinburgh, 2012
- 50. Heilbronn Institute lecture, Edinburgh, 2012
- 49. Texas Geometry and Topology Conference, Houston, 2012
- 48. Algebraic and complex geometry conference, dedicated to Klaus Hulek's 60th birthday, Hannover, Germany, 2012
- 47. Komplexe Analysis workshop, Oberwolfach, Germany, 2012
- 46. Georgia algebraic geometry symposium, in honor of Robert Varley, Athens, GA, 2012
- 45. Arithmetic, motives, and moduli spaces, Paris, France, 2012
- 44. Moduli spaces and modular forms, CIRM, Luminy, France, 2011
- 43. SIAM conference on applied algebraic geometry, Raleigh, NC, 2011
- 42. KIAS workshop on periods and moduli, Seoul, South Korea, 2011
- 41. Park City mathematics institute, Park City, UT, 2011
- 40. NoGAGS (Northern Germany Algebraic Geometry Seminar), Berlin, Germany, 2011

- 39. V Iberoamerican congress on complex geometry, Pucon, Chile, 2010
- 38. Komplexe Analysis workshop, Oberwolfach, Germany, 2010
- 37. Geometry and Dynamics of Teichmüller space, Bonn, Germany, 2010
- 36. Moduli workshop, Oberwolfach, Germany, 2010
- 35. Moduli, Berlin, Germany, 2009
- 34. Moduli and Discrete Groups, RIMS, Kyoto, Japan, 2009
- 33. Classical Algebraic Geometry Today, MSRI, Berkeley, CA, 2009
- 32. Arithmetic Algebraic Geometry Related to Moduli Spaces, Tokyo, Japan, 2009
- 31. Komplexe Analysis workshop, Oberwolfach, Germany, 2008
- Moduli workshop, Symposium on Algebraic Geometry, Warwick, UK, 2008
- 29. Algebraic Geometry satellite conference of the ECM, Leiden, the Netherlands, 2008
- 28. Joint International AMS/SBM meeting, Rio de Janeiro, Brazil, 2008
- 27. Clay workshop on automorphic forms in moduli problems of Schottky and Brill-Noether type, Cambridge, MA, 2008
- 26. IV Iberoamerican conference on complex geometry, Ouro Preto, Brazil, 2007
- 25. The geometry of holomorphic and algebraic curves in complex algebraic varieties, Montreal, QC, 2007
- 24. Curves, abelian varieties and their interactions on the occasion of the 65th birthday of Roy Smith, Athens, GA, 2007
- 23. Program on moduli spaces, Institut Mittag-Leffler, Djursholm, Sweden, 2007
- 22. Berkeley-Stanford algebraic geometry colloquium, Stanford, CA, 2006
- 21. Modular forms, Schiermonnikoog, the Netherlands, 2006
- 20. Workshop on abelian varieties, Amsterdam, the Netherlands, 2006
- Recent developments in higher-dimensional algebraic geometry, Banff, Canada, 2006
- 18. KIAS workshop on complex geometry, Seoul, South Korea, 2005
- 17. Modular forms and related moduli spaces, Rome, Italy, 2005
- 16. AMS summer institute in algebraic geometry, Seattle, WA, 2005
- 15. University of Michigan/Ohio State University algebraic geometry workshop, Columbus, OH, 2005
- 14. Birational geometry of moduli spaces (at AIM), Palo Alto, CA, 2004
- 13. Komplexe Analysis workshop, Oberwolfach, Germany, 2004
- AMS summer research conference in algebraic geometry, Snowbird, UT, 2004
- 11. III Iberoamerican congress on geometry, Salamanca, Spain, 2004

- Recent Developments in Several Complex Variables, CR geometry, and Complex Algebraic Geometry, celebrating Yum-Tong Siu's 60th birthday, Hong Kong, 2003
- VBAC (Vector bundles on algebraic curves) 2003, Porto, Portugal, 2003
- 8. Geometry of Moduli Spaces, Lille, France, 2003
- 7. Perspectives in Classification and Moduli Theory, Cortona, Italy, 2002
- 6. Komplexe Analysis workshop, Oberwolfach, Germany, 2002
- 5. ICM 2002 satellite conference on complex analysis, Kyoto, Japan, and Shanghai, China, 2002
- 4. Moduli of Curves, Ann Arbor, MI, 2002
- AMS Eastern sectional meeting, session on abelian varieties, Williamstown, MA, 2001
- 2. AMS Eastern sectional meeting, special session on enumerative methods in algebraic geometry, Lowell, MA, 2000
- Workshop on Riemann Surfaces in honor of Hershel Farkas's 60th birthday, Jerusalem, Israel, 1999

Seminars and Colloquia: (total: 126)

- Algebraic geometry: Bar Ilan, Ben Gurion (×3), Boston College, Caltech, U of Chicago, U of Illinois at Chicago (×4), Columbia (×4), Courant (×3), Duke, Essen, U of Georgia, Göttingen, Leibniz Universität Hannover (×6), Harvard-MIT (×4), Humboldt Universität Berlin (×4), Johns Hopkins (×2), Köln, Northwestern, Ohio State (×2), Paris VI (Jussieu), Princeton (×2), Purdue, Stanford (×3), Stony Brook (×3), Tel Aviv, UC Berkeley, UC Davis, UC San Diego, Yale (× 2), ZAG (zoom)
- Algebra: Copenhagen, IMPA, MPIS, Roma "La Sapienza" (×4), UCLA, U of Pennsylvania
- Analysis: Michigan State, Princeton
- Colloquium: Ben Gurion, Berlin ($\times 2$), U of Colorado, Cornell, Hebrew U ($\times 2$), U of Maryland College Park, Penn State, Rice, Rutgers, Rutgers-Newark, U of Southern California, Stony Brook ($\times 2$), U of Utah
- Dynamics: BiSTRO (zoom), CUNY graduate center, Institut Henri Poincaré
 Geometry / Differential Geometry: UC Berkeley, Boston U, U of Colorado (×2, Fragment), Columbia, Essen, Hebrew U (×3), Hong Kong U (×2),
 Skolkovo Center for Advanced Studies (zoom), U of Maryland College
 Park, U of Massachusetts at Amherst (Valley), Osaka, Princeton (×3),
 Roma Tre (×5), Rutgers, Stony Brook, U of Texas at Austin

Math/physics: CRM Montreal, Stony Brook, U of Pennsylvania

Special series: Hebrew U ($\times 4$), Michigan State

Topology: CUNY, U of Chicago

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INVITED VISITS

Leibniz Universität Hannover, Germany: Mar 2024, Aug 2018, Jun 2017, Jun 2016, Apr 2016, Sep 2015, Jun 2014, Jan 2010, Aug 2008, Sep 2006,

Weizmann Institute of Science, Rehovot, Israel: Feb-Jun 2022

- Moduli spaces and logarithmic geometry, Institut Mittag-Leffler, Stockholm, Sweden: Nov 2021
- Dynamics: Topology and Numbers, Hausdorff Center, Bonn, Germany: Jan 2020

MSRI holomorphic differentials in mathematics and physics program, Berkeley, CA: Aug and Nov 2019

- American Institute of Mathematics SQuaRE, San Jose, CA: Oct 2019, Dec 2018, Sep 2017
- MSRI birational geometry and moduli spaces program, Berkeley, CA: May 2019

Max Planck Institut für Mathematik, Bonn, Germany: Jun-Jul 2018

- Humboldt Universität Berlin, Germany: Jul 2017, Oct 2015, Jan 2010, Aug 2008, ...
- Columbia University, New York, NY: Jan-Mar 2016

Università Roma La Sapienza, Italy: Oct 2023, Jul 2023, Dec 2015, Mar 2015, Mar 2014, May 2008, ...

- Institute for Advanced Studies, Princeton, NJ: Jan, Feb, and Apr 2015
- Université Paris VII professeur invité, France: Jun 2014
- Hebrew University, Jerusalem, Israel: May 2010, Apr 2007

Osaka University, Japan: Jun 2009

MSRI algebraic geometry semester, Berkeley, CA: Jan-Feb 2009

IMPA, Rio de Janeiro, Brazil: Jun 2008

Universität Duisburg-Essen, Germany: Apr 2008

University of Copenhagen, Denmark: Oct 2007

Institut Mittag-Leffler, program on moduli spaces, Stockholm, Sweden: Feb and Jun 2007

Conferences and schools co-organized

- Geometry of Moduli special session at Summer Research Institute in Algebraic Geometry, Fort Collins, CO, Jul 2025
- Hodge Theory and Algebraic Geometry (on the occasion of Mark de Cataldo's 60th birthday), Stony Brook, May 2025
- Riemann Surfaces: Random, Flat, and Hyperbolic Geometry, Oberwolfach, Germany, Sep 2024

- 2nd annual Simons math summer workshop: Moduli, Simons Center, Stony Brook, Jul 2024
- Program and workshop on Geometric, algebraic, and physical structures around the moduli of meromorphic quadratic differentials, Simons Center, Stony Brook, May-Jun 2024
- Member of the scientific committee for 8^{th} Iberoamerican Congress on Geometry, Pucon, Chile, Dec 2023
- Program and workshop on supergeometry and supermoduli, Simons Center, Stony Brook, Mar-May 2023
- AGNES (Algebraic Geometry Northeastern Series) conference, Stony Brook, Apr 2023
- Workshop on supergeometry and supermoduli, Simons Center, Stony Brook, Mar 2023
- Algebraic Geometry, Mathematical Physics, and Solitons celebrating the work of Igor Krichever, New York, Oct 2022
- Enumerative geometry of surfaces workshop, Oberwolfach, Germany, Jun 2021
- Virtual AGNES (Algebraic Geometry Northeastern Series) conference, Stony Brook, Oct 2020
- Graduate school on geometry and dynamics on Teichmüller spaces, Simons Center, Stony Brook, Apr 2019
- Workshop on flat surfaces and algebraic curves, Oberwolfach, Germany, Sep2018
- Member of the scientific committee for 7^{th} Iberoamerican Congress on Geometry, Valladolid, Spain, Jan 2018
- AGNES (Algebraic Geometry Northeastern Series) conference, Stony Brook, Apr 2017
- 6th Stony Brook mini-school in geometry: singular metrics and direct images, Stony Brook, Apr 2017
- Supermoduli workshop, Simons Center, Stony Brook, May 2015
- 4th Stony Brook mini-school in geometry: birational geometry and derived categories, Stony Brook, Apr 2015
- 3rd Stony Brook mini-school in geometry: invitation to Gromov-Witten theory, Stony Brook, Jan 2015
- Graduate workshop on moduli of curves, Simons Center, Stony Brook, Jul 2014
- AGNES (Algebraic Geometry Northeastern Series) conference, Stony Brook, Apr 2014
- 2^{nd} Stony Brook mini-school in geometry: complex dynamics and algebraic surfaces, Stony Brook, Apr 2014

- 1^{st} Stony Brook mini-school in geometry: K-stability, Stony Brook, Dec2013
- Workshop on deformations and moduli in complex geometry, KIAS, Seoul, Mar 2013
- AGNES (Algebraic Geometry Northeastern Series) conference, Stony Brook, Oct 2011
- "The Versatility of Integrability", a conference on integrable systems in algebra, geometry, and physics, dedicated to Igor Krichever's 60th birthday, Columbia University, May 2011

<u>SERVICE</u>

2023-: member of the editorial board of the *Moduli* journal

- 2009–: member of the standing organizing committee of biannual AGNES (Algebraic Geometry Northeastern Series) workshops
- 2009–: co-organizer of the weekly Stony Brook algebraic geometry (previously algebra, geometry, and physics) seminar
- 2009–: member of the Stony Brook math hiring committee (as are all tenure-track faculty members)
- 2018–2021: Stony Brook mathematics graduate program director
- 2016–2021: Stony Brook math department/Simons Center liaison
- 2017–2018: Stony Brook mathematics associate graduate director

Feb 2016–Jan 2018: American Mathematical Society Eastern Section Program Committee

- 2016–2017: Stony Brook math department course scheduling director
- 2013–2015: member of the Stony Brook math search committee
- 2013–2014: member of the Stony Brook math graduate committee
- 2009–2013: co-organizer of Stony Brook math department colloquium
- 2006–2009: Princeton math department undergraduate placement officer

2006–2009: co-organizer of Princeton algebraic geometry seminar

- 2005–2008: co-organizer of Princeton math department colloquium
- Served on numerous Ph.D. defense committees at Stony Brook and Princeton, and also served on committees or reported on dissertations at Columbia University, Goether Universität Frankfurt, Hebrew University of Jerusalem, Leibniz Universität Hannover, Humboldt Universität Berlin, Université
 - de Bourgogne, and Stony Brook Physics Department.

Served on numerous Ph.D. oral exams at Stony Brook and Princeton.

TEACHING

Stony Brook University:

Fall 2021: MAT 656 — Topics in Dynamical Systems (Teichmüller Dynamics): an advanced graduate course.

- Spring 2021: MAT 615 Topics in Algebraic Geometry (Moduli of Curves): an advanced graduate course on the construction and geometry of the moduli of complex curves.
- Spring 2020: MAT 127 Calculus C: series and differential equations (2 sections, course coordinator).
- Fall 2018: MAT 320 Introduction to Analysis: advanced introduction to rigorous analysis with proofs.
- Fall 2018: MAT 598 Graduate teaching practicum.
- Fall 2017: MAT 319 Foundation of Analysis: introduction to rigorous analysis with proofs.
- Fall 2017: MAT 670 Topics in Complex Analysis (Teichmüller Dynamics): an advanced graduate courses, from the definition of the Teichmüller flow to the recent applications of Hodge theory to orbit classification.
- Spring 2017: MAT 536 Complex Analysis I: an introductory graduate course on complex analysis.
- Fall 2016: MAT 626 Topics in Complex Analysis (Teichmüller Theory): a graduate course, starting from the definition of the Teichmüller space and ending with Mirzakhani's recursions for Weil-Petersson volumes and intersection numbers on moduli.
- Spring 2015: MAT 615 Topics in Algebraic Geometry (Abelian Varieties): an advanced graduate course, from the basics of abelian varieties, to the Kodaira dimension of their moduli space.
- Fall 2014: MAT 319 Foundation of Analysis: introduction to rigorous analysis with proofs.
- Fall 2014: MAT 590 Preparation course for the graduate comprehensive examination.
- Spring 2014: MAT 614 Topics in Algebra (Introduction to Algebraic Geometry): an introductory graduate course.
- Fall 2013: MAT 536 Algebra III (commutative algebra): a second-year graduate course on commutative algebra with a view towards algebraic geometry.
- Fall 2013: MAT 320 Introduction to Analysis: advanced introduction to rigorous analysis with proofs.
- Spring 2013: MAT 531 Geometry/Topology II: introductory graduate course on smooth manifolds.
- Fall 2012: MAT 626 Topics in Complex analysis (Teichmüller Theory): an advanced graduate course, from the basics of the theory, towards hyperbolic geometry and intersection theory.
- Fall 2012: MAT 319 Foundation of Analysis: introduction to rigorous analysis with proofs.

- Spring 2012: MAT 615 Topics in Algebra (Introduction to Algebraic Geometry): an introductory graduate course for students with some familiarity with complex manifolds or algebraic varieties, covering sheaves and schemes.
- Fall 2011: MAT 545 Complex Geometry: an intermediate graduate courses introducing the basic notions and concepts of complex manifolds and Kähler geometry, following the beginning chapters of Griffiths-Harris.
- Fall 2011: MAT 260 Problem solving: a course for undergraduate students interested in sharpening their problem-solving skills in mathematics, quickly going over different mathematical ideas and problems that can be solved using them.
- Spring 2011: MAT 615 Topics in Algebra (Multiplier Ideal Sheaves): an advanced graduate course on the algebraic and analytic construction of multiplier ideal sheaves, proving Nadel vanishing from both viewpoints, and culminating in a proof of invariance of plurigenera for varieties of general type.
- 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 curves.
- 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 , Lebesque measure and Lebesque 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}_q , 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

Journals: Acta Mathematica, Annals of Mathematics, Duke Mathematical Journal, Forum of Mathematics: Pi, Inventiones Mathematicae, Journal of the AMS, Publications Mathématiques de l'IHÉS, and

Acta Mathematica Vietnamica, Advances in Mathematics, Algebra and Number Theory, Algebraic and Geometric Topology, Algebraic Geometry, Algebra and Number Theory, American Journal of Mathematics, Annales scientifiques de l'École normale supérieure, Annali di Matematica Pura ed Applicata, Annali di Scuola Normale Superiore, Bulletin of the LMS, Central European Journal of Mathematics, Communications in Algebra and Geometry, Communications in Mathematical Physics, Communications of the AMS, Compositio Mathematica, Contemporary Mathematics, Discrete Mathematics, Documenta Mathematica, Functional Analysis and Applications, Geometriae Dedicata, GAFA, Geometry and Topology, Houston Journal of Mathematics, Indiana University Mathematics Journal, International Journal of Mathematics, Journal of Algebra, Journal of Algebraic Geometry, Journal d'Analyse Mathematique, Journal de l'École Polytechnique, Journal de Maths pures et appliquées, Journal für die reine und angewandte Mathematik (Crelle), Journal of Differential Geometry, Journal of Geometry and Physics, Journal of Modern Dynamics, Journal of the EMS, Journal of the Institute of Mathematics of Juisseu, Letters in Mathematical Physics, Manuscripta Mathematica, Mathematics Research Letters, Mathematical Reviews, Mathematische Annalen, Mathematische Nachrichten, Mathematische Zeitschrift, Memoirs of the AMS, Michigan Mathematical Journal, Moscow Mathematical Journal, Nuclear Physics B, Proceedings of the AMS, Proceedings of the LMS, Revista Matematica Iberoamericana, SIGMA (Symmetry, Integrability and Geometry: Methods and Applications), Springer Monographs, Transactions of the AMS.

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