

# Samuel Grushevsky

## EMPLOYMENT

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

## EDUCATION

2002	Ph.D. in mathematics	Harvard University
	Ph.D. advisor:	Professor Yum-Tong Siu
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

## GRANTS

PI on NSF Division of Mathematical Sciences (DMS) individual grants continuously since 2006: 2101631, 2021-2024; 1802116, 2018-2022; 1501265, 2015-2019; 1201369, 2012-2016; 0901086, 2009-2012; 0555867, 2006-2010.  
PI on NSF DMS conference grants 1954579 and 1745652 (8th and 7th Iberoamerican Congresses on Geometry), 1111152 (Versatility of Integrability), co-PI on 1937757, 1651122, 1360586, 1066154 (AGNES).

## PERSONAL

Birthdate: December 5, 1978  
Birthplace: Moscow, Russia  
Citizenship: USA

## PH.D. STUDENTS

- Prabhat Devkota, started Ph.D. program at Stony Brook in 2020.
- Myeongjae Lee, Stony Brook Ph.D. expected 08/2024. Topics on topology and geometry of generalized strata of curves with a differential..
- Frederik Benirschke, Stony Brook Ph.D. 08/2021. *Complex-linear subvarieties: equations and degenerations*. Currently L.E.Dickson Instructor at University of Chicago.
- Xuntao Hu, Stony Brook Ph.D. 08/2019: *Variational formulas and strata of abelian differentials*. Currently working in data science.
- Anant Atyam, Stony Brook Ph.D. 08/2014: *Affine stratifications and equivariant vector bundles on the moduli of principally polarized abelian varieties*. Currently in the industry at JPMorgan, New York.
- Chaya Norton, Stony Brook Ph.D. 08/2014: *Limits of real-normalized differentials on stable curves*. Currently postdoc at University of Michigan, Ann Arbor.

## POST-DOCS MENTORED

- 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 tenure-track assistant professor at Central Michigan University.

## PUBLICATIONS

50. (with F. Benirschke, B. Dozier) *Equations of linear subvarieties of strata of differentials*, preprint arXiv: 2011.11664, 50pp; Geometry and Topology, to appear.
49. (with K. Hulek) *The cone of effective surfaces on  $\overline{\mathcal{A}}_3$* , preprint arXiv: 2007.02995, 40pp.
48. (with M. Bainbridge, D. Chen, Q. Gendron, M. Möller) *The moduli space of multi-scale differentials*, preprint arXiv: 1910.13492, 122pp.
47. (with S. Casalaina-Martin, K. Hulek, R. Laza) *Cohomology of the moduli space of cubic threefolds and its smooth models*, preprint arXiv: 1904.08728, 101pp, *Memoirs of the AMS*, to appear.
46. (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.
43. (with M. Bainbridge, D. Chen, Q. Gendron, M. Möller) *Strata of  $k$ -differentials*, 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.
41. (with E. Clader, F. Janda, D. Zakharov) *Powers of the theta divisor and relations in the tautological ring*, Int. Math. Res. Not. **2018** (2018) 24, 7725–7754.
40. (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  $\mathcal{A}_g$  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*, preprint arXiv: 1510.08891, 48pp, Proceedings of London Mathematical Society (new series), to appear.
37. (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.
35. (with S. Casalaina-Martin, K. Hulek, R. Laza; with an appendix by M. Dutour Sikirić) *Extending the Prym map to toroidal compactifications of  $\mathcal{A}_g$* , J. Europ. Math. Soc. **19** (2017) 3, 659–723.
34. (with M. Möller) *Shimura curves in the locus of genus 3 hyperelliptic curves*, Int. Math. Res. Not. **2016** (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.
31. (with R. Salvati Manni) *On the Coble quartic*, Amer. J. of Math. **137** (2015) 3, 765–790.
30. (with D. Zakharov) *The zero section of the universal semiabelian va-*

- riety, and the double ramification cycle, *Duke Math. J.* **163** (2014) 5, 953–982.
29. (with D. Zakharov) *The double ramification cycle and the theta divisor*, *Proc. AMS* **142** (2014) 12, 4053–4064.
  28. (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.
  27. (with G. Farkas, R. Salvati Manni, A. Verra) *Singularities of theta divisors and the geometry of  $\mathcal{A}_5$* , *J. Europ. Math. Soc.* **16** (2014), 1817–1848.
  26. (with R. Salvati Manni) *The Prym map on divisors, and the slope of  $\mathcal{A}_5$  (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.
  22. (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.
  20. (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.
  19. (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.
  18. (with R. Salvati Manni) *The vanishing of two-point functions for three-loop superstring scattering amplitudes*, *Comm. Math. Phys.* **294** (2010) 2, 343–352.
  17. (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  $\Gamma_0$  conjecture*, in *Liaison, Schottky Problem and Invariant Theory: Remembering Federico Gaeta*. *Progr. Math.* **280**

- (2010), 223–234.
15. *Superstring scattering amplitudes in higher genus*, Comm. Math. Phys. **287** (2009) 2, 749–767.
  14. (with C. Erdenberger and K. Hulek) *Some intersection numbers of divisors on toroidal compactifications of  $\mathcal{A}_g$* , J. of Alg. Geom. **19** (2010), 99–132.
  13. (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.
  9. (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.
  8. (with C. Erdenberger and K. Hulek) *Intersection theory of toroidal compactifications of  $\mathcal{A}_4$* , Bull. London Math. Soc. **38** (2006), 396–400.
  7. *Multiplier ideals in algebraic geometry*, in Snowbird lectures in Geometry, Contemp. Math. **388**, AMS 2005, 89–106.
  6. (with R. Salvati Manni) *Theta functions of arbitrary order and their derivatives*, J. Reine Angew. Math. (Crelle), **590** (2006), 31–43.
  5. (with R. Salvati Manni) *Two generalizations of Jacobi’s derivative formula*, Math. Res. Lett. **12** (2005) 6, 921–932.
  4. (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.
  2. *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.

## TALKS

### Special Schools and Lecture Series:

11. 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
10. Geometry RTG lectures at Northeastern University, Boston, MA, 2018;  
4 hours on Mirzakhani's recursion for Weil-Petersson volumes
  9. CIMPA-CIMAT-ICTP school on moduli of curves, Guanajuato, Mexico, 2016;  
5 hours on birational geometry and topology of the moduli of curves
  8. Moduli spaces in algebraic geometry and physics, Hamburg, Germany, 2013;  
3 hours on moduli of abelian varieties and string scattering
  7. École de géométrie algébrique, Roscoff, France, 2012;  
5 hours on moduli of curves for experts in dynamics
  6. Géométrie Algébrique en Liberté (GAeL) XX, Grenoble, France, 2012;  
4 hours on moduli of curves and abelian varieties
  5. Gauge theory and string theory, Cargèse, France, 2012;  
2 hours on string scattering amplitude
  4. 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
  2. School on abelian varieties, Mainz, Germany, 2008;  
5 hours on moduli of abelian varieties
  1. Conference on algebraic geometry, Zacatecas, Mexico, 2006;  
3 hours on theta functions

### Conferences:

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 Debarre's 60th birthday, Luminy, France, 2019
76. 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
74. Holomorphic differentials in mathematics and physics, Stony Brook, NY, 2019
73. Dynamics and moduli spaces of translation surfaces, Toronto, Canada, 2018

72. Tau Functions of Integrable Systems and Their Applications, Banff, Canada, 2018
71. 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
68. 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
30. 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
19. 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
12. AMS summer research conference in algebraic geometry, Snowbird, UT, 2004
11. III Iberoamerican congress on geometry, Salamanca, Spain, 2004
10. Recent Developments in Several Complex Variables, CR geometry, and Complex Algebraic Geometry, celebrating Yum-Tong Siu's 60th birthday, Hong Kong, 2003
9. 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
3. 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
1. Workshop on Riemann Surfaces in honor of Hershel Farkas's 60th birthday, Jerusalem, Israel, 1999

**Seminars and Colloquia:** (total: 112)

Algebraic geometry: Bar Ilan, Ben Gurion ( $\times 3$ ), Boston College, Caltech, U of Chicago, U of Illinois at Chicago ( $\times 4$ ), Columbia ( $\times 4$ ), Courant ( $\times 3$ ), Duke, Essen, U of Georgia, Göttingen, Leibniz Universität Hannover ( $\times 6$ ), Harvard-MIT ( $\times 4$ ), Humboldt Universität Berlin ( $\times 4$ ), Johns Hopkins ( $\times 2$ ), Köln, Northwestern, Ohio State ( $\times 2$ ), Paris VI (Jussieu), Princeton ( $\times 2$ ), Purdue, Stanford ( $\times 3$ ), Tel Aviv, UC Berkeley, UC Davis, Yale ( $\times 2$ ), ZAG (zoom)

Algebra: Copenhagen, IMPA, MPIS, Roma "La Sapienza" ( $\times 4$ ), UCLA, U of Pennsylvania

Analysis: Michigan State, Princeton

Colloquium: Ben Gurion, Berlin ( $\times 2$ ), U of Colorado, Hebrew U ( $\times 2$ ), U of Maryland College Park, Penn State, Rice, Rutgers, Rutgers-Newark, Stony Brook ( $\times 2$ )

Dynamics: BiSTRO (zoom), Institut Henri Poincaré

Geometry / Differential Geometry: UC Berkeley, Boston U, U of Colorado ( $\times 2$ , Fragment), Columbia, Essen, Hebrew U ( $\times 3$ ), Hong Kong U ( $\times 2$ ),

Skolkovo Center for Advanced Studies, U of Maryland College Park, U of Massachusetts at Amherst (Valley), Osaka, Princeton ( $\times 3$ ), Roma Tre ( $\times 4$ ), Rutgers, Stony Brook ( $\times 3$ ), 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

### INVITED VISITS

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

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, Sep 2018

Member of the scientific committee for 7<sup>th</sup> Iberoamerican Congress on Geometry, Valladolid, Spain, Jan 2018

AGNES (Algebraic Geometry Northeastern Series) conference, Stony Brook, Apr 2017

6<sup>th</sup> Stony Brook mini-school in geometry: singular metrics and direct images, Stony Brook, Apr 2017

Supermoduli workshop, Simons Center, Stony Brook, May 2015

4<sup>th</sup> Stony Brook mini-school in geometry: birational geometry and derived categories, Stony Brook, Apr 2015

3<sup>rd</sup> 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<sup>nd</sup> Stony Brook mini-school in geometry: complex dynamics and algebraic surfaces, Stony Brook, Apr 2014

1<sup>st</sup> Stony Brook mini-school in geometry: K-stability, Stony Brook, Dec 2013

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

### SERVICE

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 mathematics 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 schedule director  
 2013–2015: member of the Stony Brook math department search committee  
 2013–2014: member of the Stony Brook math department 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, Hebrew University of Jerusalem, Leibniz Universität Hannover, Humboldt Universität Berlin, 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  $\mathbb{R}^n$ , 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

*Journals:* Acta Mathematica, Acta Mathematica Vietnamica, Advances in Mathematics, Agence National de la Recherche (France), 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, Annals of Mathematics, Bulletin of the LMS, Central European Journal of Mathematics, Communications in Algebra and Geometry, Communications of the AMS, Communications in Mathematical Physics, Compositio Mathematica, Contemporary Mathematics, Discrete Mathematics, Documenta Mathematica, Duke Mathematical Journal, Functional Analysis and Applications, Geometriae Dedicata, GAFA, Geometry and Topology, Houston Journal of Mathematics, Indiana University Mathematics Journal, International Journal of Mathematics, International Mathematics Research Notices, Israel Journal of Mathematics, Inventiones Mathematicae, Israel Journal of Mathematics, Journal of Algebra, Journal of Algebraic Geometry, Journal of the AMS, Journal d'Analyse Mathématique, Journal of the Institute of Mathematics of Jussieu, Journal de Maths pures et appliquées, Journal für die reine und angewandte Mathematik (Crelle), Journal of Geometry and Physics, Journal of the EMS, Journal of Modern Dynamics, 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, Publications Mathématiques de l'IHÉS, Revista Mathematica Iberoamericana, SIGMA (Symmetry, Integrability and Geometry: Methods and Applications), Springer Monographs, Transactions of the AMS.

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