Curriculum Vitae

Aleksey Zinger
October 14, 2024

Department of Mathematics	(631) 632-8288 (phone)
Stony Brook University	(631) 632-7631 (fax)
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Research Interests	Geometric properties of Gromov-Witten invariants in algebraic geometry and symplectic topology via analytic and topological methods; mirror symmetry and other connections with string theory and enumerative geometry

Employment

Stony Brook University, Department of Mathematics
Professor, 09/14-Present
Associate Professor, 01/09-08/14
Assistant Professor, 09/05-01/09

Max-Planck-Institut für Mathematik
Visiting Scientist, 09/15-05/16

Institute for Advanced Study, School of Mathematics
Member, 09/11-08/13, 09/20-05/21

Stanford University, Department of Mathematics
NSF Postdoc/Instructor, 09/02-08/05

Education

Massachusetts Institute of Technology (97-02)
Ph.D. in Mathematics, June 02
Thesis Title: *Enumerative Algebraic Geometry via Techniques of Symplectic Topology and Analysis of Local Obstructions*
Thesis Adviser: Tomasz Mrowka

Massachusetts Institute of Technology (93-97)
B.S. in Mathematics with minors in Physics and Economics, June 97

Grants and Honors

NSF CAREER and standard grants, 07/06-07/26; total $1,521,021
Simons Fellowship, 09/20-08/21
IAS von Neumann Fellowship, 09/11-05/12
Sloan Research Fellowship, 09/06-09/10
NSF PostDoctoral Research Fellowship, 09/02-08/05
Clay Math Institute Liftoff Fellowship, Summer 02
NSF Graduate Research Fellowship, 98-01
John A. Bucsela Prize, MIT Department of Mathematics, May 97

PhD Students	Stony Brook Department of Mathematics

PhD Students
Stony Brook Department of Mathematics
Spencer Cattalani (geometric analysis), January 22-present
Xujia Chen[1,2] (real Gromov-Witten theory), March 17-May 21
Jingchen Niu (pseudoholomorphic curves), September 11-July 16
Alexandra Popa[1] (mirror symmetry), September 08-July 12
Ritwik Mukherjee (enumerative geometry), December 06-December 11
    [1]Chairman's award for the best research by a finishing student (SBU Math)
    [2]President's award to distinguished doctoral students (SBU)

Postdoc Mentees
Penka Georgieva (Princeton/IMJ-PRG), Summer 12-Spring 16
Mohammad Tehrani (SCGP), Fall 13-Spring 17

Teaching
Stony Brook Department of Mathematics
  Course Instructor for

MAT127 (Calculus C),	Fall 09*,10*, Spr 15,17*,22*
MAT131 (Calculus I),	Fall 06
MAT211 (Intro Linear Algebra),	Spr 23
MAT312 (Applied Algebra),	Spr 19, Fall 19
MAT320 (Intro to Analysis),	Spr 18,19,24
MAT324 (Real Analysis),	Fall 17
MAT401 (Intro to Enumerative Geometry),	Fall 08,18
MAT530 (General Topology),	Fall 06
MAT531 (Differential Geometry),	Spr 06,10,11
MAT542/1 (Algebraic Topology),	Fall 16, 23
MAT545 (Complex Geometry),	Fall 08, 19, 22
MAT562 (Symplectic Geometry),	Fall 24
MAT566 (Differential Topology),	Fall 06, Spr 15,18,24,25
MAT614 (Enumerative Geometry),	Fall 07
MAT615 (Complex Geometry II),	Spr 09, 20, 23
MAT620 (Enumerative Geometry),	Fall 13
MAT645 (*J*-Holomorphic Curves),	Spr 14,22
MAT648 (Mirror Symmetry),	Fall 14

    *course head and instructor for 2 sections

Stanford Department of Mathematics
  Course Instructor for Math53 (ODEs), Winter and Autumn 04
MIT Department of Mathematics
  Recitation Instructor for 18.02 (Multivariable Calculus), Fall 00
  Graduate Tutor for introductory courses, Fall 97 and Spr 98
  Undergraduate Tutor for upper-level courses, Fall 96 and Spr 97
        introductory courses, Fall 95 and Spr 96
  Grader for 18.02 (Multivariable Calculus), Fall 94
MIT Experimental Studies Group, Fall 97
  Course Tutor for 18.02 (Multivariable Calculus)
Johns Hopkins Center for Talented Youth Program, Summer 97
  Teaching Assistant for high-school geometry

References
Ilia Itenberg, IMJ-PRG, France
Jun Li, Department of Mathematics, Stanford
Chiu-Chu Liu, Department of Mathematics, Columbia
Rahul Pandharipande, Department of Mathematics, ETH Zürich
Gang Tian, BICMR, Beijing, and Department of Mathematics, Princeton
Ravi Vakil, Department of Mathematics, Stanford

Other Department and University Service at Stony Brook

- Thesis exam committee member for

  ○ Mohamed El Alami (homology mirror symmetry), May 22

  ○ Mu Zhao, (symplectic topology), July 20

  ○ Yuhan Sun (symplectic topology), May 20

  ○ Yuan Gao (symplectic topology), May 18

  ○ Zhiyu Tian (algebraic geometry), April 11

  ○ Michael Chance (symplectic topology), July 09

  ○ Yakov Savelyev (symplectic topology), June 08

  ○ Yusuf Mustopa (algebraic geometry), April 08

  ○ Emiko Dupont (symplectic topology), July 07

  ○ Zhigang Han (symplectic topology), July 06

- Minor topic advisor for the oral graduate student exam for:

  ○ Dahye Cho (complex geometry), July 17-January 18

  ○ Jun Wen (mirror symmetry), October 10-March 11

  ○ Mark Hughes (complex geometry), March 10-February 11

  ○ Zhiyu Tian (pseudo-holomorphic curves), February 09-May 09

  ○ Canor Koca (Morse theory), April 07-February 08

  ○ Christopher Bay (spectral sequences), December 06-May 07

- Department representative for the oral graduate student exam for:

  ○ Alessandro Pilastro (hyperkähler geometry), March 24

  ○ Hang Yuan (symplectic topology), May 17

  ○ Yuhan Sun (symplectic topology), October 16

  ○ Yi Zhu (algebraic geometry), March 09

  ○ Gabriel Drummond-Cole (algebraic topology), May 06

- Member of

  ○ Graduate Committee, Fall 17-Spring 2021

  ○ Chair Selection Committee, Fall 18-Spring 19

  ○ Appointments Committee, Fall 10-Spring 12, Fall 13-Spring 15 (Chair, Fall 14-Spring 15)

  ○ Simons Lecture Committee, Fall 13-Spring 15

  ○ Graduate Committee, Fall 10-Spring 12

  ○ Math Club Committee, Fall 09-Spring 11

  ○ Library Committee, Fall 06-Spring 09

- Co-organizer of

  - SCGP workshop on *Moduli Spaces of Pseudo-Holomorphic Curves*, March 14
  - *Stony Brook Mathematics Colloquium*, Fall 07-Spring 09
  - *New York Area Symplectic Seminar*, Fall 05-Spring 09
  - *24th Annual Geometry Festival*, April 09
  - RTG Workshop on *Algebraic and Symplectic Geometry of Uniruled and Rationally Connected Manifolds*, March 08
  - *DusaFest* (conference in symplectic topology in honor of D. McDuff's 60th birthday), October 06
  - *Mini-Workshop at DusaFest* (short presentations by young researchers), October 06

- Director for comprehensive written graduate student exam, 01/22

- Grader of comprehensive written graduate student exams:
       01/06, 08/07, 08/09, 01/11, 08/13, 08/16, 01/18, 01/24

- Advisor at incoming student orientations: Summer 06,09,10,16-19

Other Professional Service

- Thesis exam committee member for

  - Yaim Cooper (algebraic geometry), Princeton, May 13
  - Aaron Pixton (algebraic geometry), Princeton, May 13
  - Mohammad Tehrani (symplectic topology), Princeton, August 12
  - Matt Deland (algebraic geometry), Columbia, May 09

- Co-organizer of

  - *IAS-PU Joint Symplectic Geometry Seminar*, Princeton, Fall 12-Spring 13
  - AMS Special Session on *New Developments in Symplectic Topology*, San Antonio, January 06
  - *WAGS* (Western Algebraic Geometry Seminar), Stanford, April 03

- Mentor (replacement PhD advisor) for Yaim Cooper, Princeton, Fall 11 - Spring 13

- Referee of papers for 27 different journals

- Reviewer on NSF grant and fellowship panels, 4 times

- Outside grant reviewer for Simons Foundation, NSA, NSERC (Canada), and Israel Science Foundation

Book

X. Chen and A. Zinger, *Spin/Pin-Structures and Real Enumerative Geometry*, World Scientific, 2023

Published Research Articles

1. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology: structures*, Acta Math. Sin. 40 (2024), no. 1, 107—160

2. X. Chen and A. Zinger, *WDVV-type relations for Welschinger's invariants: applications*, Kyoto J. Math. 61 (2021), no. 2, 339—376

3. M. Farajzadeh Tehrani and A. Zinger, *On the rim tori refinement of relative Gromov-Witten invariants*, Commun. Contemp. Math. 23 (2021), no. 5, paper no. 2050051, 50pp

4. X. Chen and A. Zinger, *WDVV-type relations for disk Gromov-Witten invariants in dimension 6*, Math. Ann. 379 (2021), no. 3-4, 1231—1313

5. M. Farajzadeh Tehrani and A. Zinger, *On the refined symplectic sum formula for Gromov-Witten invariants*, Internat. J. Math. 31 (2020), no. 4, 2050032, 60 pp

6. A. Zinger, *Some questions in the theory of pseudoholomorphic curves, Geometric Analysis, in Honor of Gang Tian's 60th Birthday*, Progress in Math. 333 (2020), 587–616

7. A. Zinger, *Some conjectures on the asymptotic behavior of Gromov-Witten invariants, Handbook for Mirror Symmetry of Calabi-Yau and Fano Manifolds*, ALM 47, 523–550, Higher Education Press and International Press, 2019

8. M. Farajzadeh Tehrani and A. Zinger, *Normal crossings degenerations of symplectic manifolds*, Peking Math. J. 2 (2019), no. 3-4, 275–351

9. A. Zinger, *Energy bounds and vanishing results for the Gromov-Witten invariants of the projective space*, J. Geom. Phys. 145 (2019), 103479

10. P. Georgieva and A. Zinger, *Real Gromov-Witten theory in all genera and real enumerative geometry: computation*, J. Diff. Geom. 113 (2019), no. 3, 417—491

11. P. Georgieva and A. Zinger, *Real Gromov-Witten theory in all genera and real enumerative geometry: properties*, J. Symplectic Geom. 17 (2019), no. 4, 1083–1158

12. P. Georgieva and A. Zinger, *Real Gromov-Witten theory in all genera and real enumerative geometry: construction*, Ann. Math. 188 (2018), no. 3, 685—752

13. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology*, Adv. Math. 339 (2018), 672—748

14. J. Niu and A. Zinger, *Lower bounds for the enumerative geometry of positive-genus real curves*, Adv. Math. 339 (2018), no. 1, 191–247

15. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Singularities and semistable degenerations for symplectic topology*, C. R. Math. Acad. Sci. Paris 356 (2018), no. 4, 420-–432

16. P. Georgieva and A. Zinger, *A recursion for counts of real curves in $\mathbb{CP}^{2n-1}$: another proof*, Internat. J. Math. 29 (2018), no. 4, 1850027, 21pp

17. P. Georgieva and A. Zinger, *Enumeration of real curves in $\mathbb{CP}^{2n-1}$ and a WDVV relation for real Gromov-Witten invariants*, Duke Math. 166 (2017), no. 17, 3291—3347

18. P. Georgieva and A. Zinger, *Real orientations, real Gromov-Witten theory, and real enumerative geometry*, ERA MS 24 (2017), 87–99

19. P. Georgieva and A. Zinger, *On the topology of real bundle pairs over nodal symmetric surfaces*, Topology Appl. 214 (2016), 109--126

20. M. Farajzadeh Tehrani and A. Zinger, *Absolute vs. relative Gromov-Witten invariants*, J. Symplectic Geom. 14 (2016), no. 4, 1189–1250

21. P. Georgieva and A. Zinger, *The moduli space of maps with crosscaps: the relative signs of the natural automorphisms*, J. Symplectic Geom. 14 (2016), no. 2, 359–430

22. A. Zinger, *The determinant line bundle for Fredholm operators: construction, properties, and classification*, Math. Scand. 118 (2016), no. 2, 203–268

23. M. Farajzadeh Tehrani and A. Zinger, *Counting genus zero real curves in symplectic manifolds*, Part II, Geom. Topol. 20 (2016), no. 2, 629—695

24. P. Georgieva and A. Zinger, *The moduli space of maps with crosscaps: Fredholm theory and orientability*, Comm. Anal. Geom. 23 (2015), no. 3, 81–140

25. A. Zinger, *Double and triple Givental's J-function for stable quotients invariants*, Pacific J. Math. 272 (2014), no. 2, 439–507

26. J. Chen and A. Zinger, *The robustness of zero-determinant strategies in iterated prisoner's dilemma games*, J. Theoret. Biol. 357 (2014), 46–54

27. Y. Cooper and A. Zinger, *Mirror symmetry for stable quotients invariants*, Mich. Math. J. 63 (2014), no. 3, 571–621

28. A. Zinger, *The genus 0 Gromov-Witten invariants of projective complete intersections*, Geom. Top. 18 (2014), no. 2, 1035-1114

29. A. Popa and A. Zinger, *Mirror symmetry for closed, open, and unoriented Gromov-Witten invariants*, Adv. Math. 259 (2014), 448–510

30. A. Zinger, *On transverse triangulations*, Münster J. Math. 5 (2012), 99–106

31. A. Zinger, *A comparison theorem for Gromov-Witten invariants in the symplectic category*, Adv. Math. 228 (2011), no. 1, 535–574

32. R. Pandharipande and A. Zinger, *Enumerative geometry of Calabi-Yau 5-folds*, *New Developments in Algebraic Geometry, Integrable Systems and Mirror Symmetry*, Advanced Studies in Pure Mathematics 59 (2010), 239–288

33. A. Zinger, *Genus-zero two-point hyperplane integrals in the Gromov-Witten theory*, Comm. Analysis Geom. 17 (2010), no. 5, 1–45

34. A. Zinger, *The reduced genus-one Gromov-Witten invariants of Calabi-Yau hypersurfaces*, J. Amer. Math. Soc. 22 (2009), no. 3, 691–737

35. J. Li and A. Zinger, *On the genus-one Gromov-Witten invariants of complete intersections*, J. Diff. Geom. 82 (2009), no. 3, 641-690

36. A. Zinger, *Reduced genus-one Gromov-Witten invariants*, J. Diff. Geom. 83 (2009), no. 2, 407–460

37. A. Zinger, *A sharp compactness theorem for genus-one pseudo-holomorphic maps*, Geom. Top. 13 (2009), no. 5, 2427–2522

38. D. Zagier and A. Zinger, *Some properties of hypergeometric series associated with mirror symmetry*, *Modular Forms and String Duality*, Fields Inst. Commun. 54 (2008), 163–177

39. A. Zinger, *Standard vs. reduced genus-one Gromov-Witten invariants*, Geom. Top. 12 (2008), no. 2, 1203–1241

40. A. Zinger, *Pseudocycles and integral homology*, Trans. AMS 360 (2008), no. 5, 2741–2765

41. R. Vakil and A. Zinger, *A desingularization of the main component of the moduli space of genus-one stable maps into $\mathbb{P}^n$*, Geom. Top. 12 (2008), no. 1, 1–95

42. A. Zinger, *Intersections of tautological classes on blowups of moduli spaces of genus-one curves*, Mich. Math. 55 (2007), no. 3, 535–560

43. R. Vakil and A. Zinger, *A natural smooth compactification of the space of elliptic curves in projective space*, ERA AMS 13 (2007), 53–59

44. J. Li and A. Zinger, *On Gromov-Witten invariants of a quintic threefold and a rigidity conjecture*, Pacific J. Math 233 (2007), no. 2, 417–480

45. A. Zinger, *On the structure of certain natural cones over moduli spaces of genus-one holomorphic maps*, Adv. Math. 214 (2007), no. 2, 878–933

46. A. Zinger, *Counting rational curves of arbitrary shape in projective spaces*, Geom. Top. 9 (2005), 571–697

47. A. Zinger, *Enumeration of genus-three plane curves with a fixed complex structure*, J. Algebraic Geom. 14 (2005), no. 1, 35–81

48. A. Zinger, *Enumeration of one-nodal rational curves in projective spaces*, Topology 43 (2004), no. 4, 793–829

49. A. Zinger, *Enumerative vs. symplectic invariants and obstruction bundles*, J. Sympl. Geom. 2 (2004), no. 4, 445–543

50. A. Zinger, *Completion of Katz-Qin-Ruan's enumeration of genus-two plane curves*, J. Algebraic Geom. 13 (2004), no. 3, 547–561

51. A. Zinger, *Enumeration of genus-two curves with a fixed complex structure in $\mathbb{P}^2$ and $\mathbb{P}^3$*, J. Diff. Geom. 65 (2003), no. 3, 341–467

52. M. Kalka, E. Mann, D. Yang, and A. Zinger, *The exponential decay rate of the lower bound for the first eigenvalue of compact manifolds*, Inter. J. Math. 8 (1997), no. 3, 345-355

Other Research Preprints on arXiv

1. A. Zinger, *Smooth bowups: global vs. local perspectives*, math/2312.16112

2. P. Georgieva and A. Zinger, *Algebraic properties of real Gromov-Witten invariants*, math/2311.11999

3. P. Georgieva and A. Zinger, *Geometric properties of real Gromov-Witten invariants*, math/2311.11994

4. X. Chen, P. Georgieva, and A. Zinger, *The cohomology ring of the Deligne-Mumford space of real rational curves with conjugate marked points*, math/2305.08798

5. X. Chen and A. Zinger, *Blowdowns of the Deligne-Mumford spaces of real rational curves*, math/2305.08811

6. A. Zinger, *Real topological recursions and WDVV relations*, math/2003.05860

7. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology, II*, math/1908.09390

8. A. Zinger, *Real Ruan-Tian perturbations*, math/1701.01420

9. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *The smoothability of normal crossings symplectic varieties*, math/1410.2573v2

10. P. Georgieva and A. Zinger, *Orientability in real Gromov-Witten theory*, math/1308.1347 (superseded by Publ. 12)

Expository Notes

- A. Zinger, *Foundations of Smooth Manifolds and Vector Bundles*, in preparation

- A. Zinger, *The Virtual Fundamental Class in Gromov-Witten Theory: the Li-Tian Construction and Beyond*, in preparation

- A. Zinger, *Equivariant Localization and Mirror Symmetry*, in preparation

- A. Zinger, *The (co)homology of the Deligne-Mumford moduli spaces of marked rational curves*, math/2404.00839

- A. Zinger, *Notes on J-holomorphic maps*, math/1706.00331

- M. Farajzadeh Tehrani and A. Zinger, *On symplectic sum formulas in Gromov-Witten theory*, math/1404.1898

- A. Zinger, *Basic Riemannian geometry and Sobolev estimates used in symplectic topology*, math/1012.3980

- A. Zinger, *Counting plane rational curves: old and new approaches*, math/0507105