

Curriculum Vitae
Aleksey Zinger

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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. Bursela Prize, MIT Department of Mathematics, May 97

PhD Students	<p>Stony Brook Department of Mathematics</p> <p>Dino Zavattini (symplectic topology), August 25-present</p> <p>Spencer Cattalani (geometric analysis), January 22-present</p> <p>Xujia Chen^{1,2} (real Gromov-Witten theory), March 17-May 21</p> <p>Jingchen Niu (pseudoholomorphic curves), September 11-July 16</p> <p>Alexandra Popa¹ (mirror symmetry), September 08-July 12</p> <p>Ritwik Mukherjee (enumerative geometry), December 06-December 11</p> <p>¹Chairman's award for the best research by a finishing student (SBU Math)</p> <p>²President's award to distinguished doctoral students (SBU)</p>
Postdoc Mentees	<p>Penka Georgieva (Princeton/IMJ-PRG), Summer 12-Spring 16</p> <p>Mohammad Tehrani (SCGP), Fall 13-Spring 17</p>
Teaching	<p>Stony Brook Department of Mathematics</p> <p><i>Course Instructor</i> for MAT127 (Calculus C), Fall 09*,10*, Spr 15,17*,22*,26*</p> <p>MAT131 (Calculus I), Fall 06</p> <p>MAT211 (Intro Linear Algebra), Spr 23</p> <p>MAT312 (Applied Algebra), Spr 19, Fall 19</p> <p>MAT320 (Intro to Analysis), Spr 18,19,24,25</p> <p>MAT324 (Real Analysis), Fall 17,25</p> <p>MAT401 (Intro to Enumerative Geometry), Fall 08,18</p> <p>MAT530 (General Topology), Fall 06</p> <p>MAT531 (Differential Geometry), Spr 06,10,11</p> <p>MAT542/1 (Algebraic Topology), Fall 16,23</p> <p>MAT545 (Complex Geometry), Fall 08,19,22</p> <p>MAT562 (Symplectic Geometry), Fall 24</p> <p>MAT566 (Differential Topology), Fall 06, Spr 15,18,24,25</p> <p>MAT614 (Enumerative Geometry), Fall 07</p> <p>MAT615 (Complex Geometry II), Spr 09,20,23</p> <p>MAT620 (Enumerative Geometry), Fall 13</p> <p>MAT645 (<i>J</i>-Holomorphic Curves), Spr 14,22</p> <p>MAT648 (Mirror Symmetry), Fall 14</p> <p>*course head and instructor for 2 sections</p> <p>Stanford Department of Mathematics</p> <p><i>Course Instructor</i> for Math53 (ODEs), Winter and Autumn 04</p> <p>MIT Department of Mathematics</p> <p><i>Recitation Instructor</i> for 18.02 (Multivariable Calculus), Fall 00</p> <p><i>Graduate Tutor</i> for introductory courses, Fall 97 and Spr 98</p> <p><i>Undergraduate Tutor</i> for upper-level courses, Fall 96 and Spr 97</p> <p>introductory courses, Fall 95 and Spr 96</p> <p><i>Grader</i> for 18.02 (Multivariable Calculus), Fall 94</p> <p>MIT Experimental Studies Group, Fall 97</p> <p><i>Course Tutor</i> for 18.02 (Multivariable Calculus)</p> <p>Johns Hopkins Center for Talented Youth Program, Summer 97</p> <p><i>Teaching Assistant</i> for high-school geometry</p>
References	<p>Ilia Itenberg, IMJ-PRG, France</p> <p>Jun Li, Department of Mathematics, Stanford</p> <p>Chiu-Chu Liu, Department of Mathematics, Columbia</p> <p>Rahul Pandharipande, Department of Mathematics, ETH Zürich</p> <p>Gang Tian, BICMR, Beijing, and Department of Mathematics, Princeton</p> <p>Ravi Vakil, Department of Mathematics, Stanford</p>

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
 - Yuhua 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
 - Yuhua 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
- Coordinator for Department's graduate student awards, Spring 25
- 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

1. X. Chen and A. Zinger, *Spin/Pin-Structures and Real Enumerative Geometry*, World Scientific Publishing, xiv+452pp

Published Research Articles

1. S. Cattalani and A. Zinger, *Pseudocycles for Borel–Moore homology*, to appear in J. Topol. Anal., available at <https://doi.org/10.1142/S1793525324500389>
2. A. Zinger, *The (co)homology of the Deligne–Mumford moduli spaces of marked rational curves*, C. R. Math. Acad. Sci. Paris 363 (2025), 429–436
3. P. Georgieva and A. Zinger, *Algebraic properties of real Gromov–Witten invariants*, J. Math. Phys. 66 (2025), no. 1, paper no. 012302, 30pp
4. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology: structures*, Acta Math. Sin. 40 (2024), no. 1, 107–160
5. X. Chen and A. Zinger, *WDVV-type relations for Welschinger’s invariants: applications*, Kyoto J. Math. 61 (2021), no. 2, 339–376
6. 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
7. 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
8. 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
9. 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
10. 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
11. M. Farajzadeh Tehrani and A. Zinger, *Normal crossings degenerations of symplectic manifolds*, Peking Math. J. 2 (2019), no. 3–4, 275–351
12. A. Zinger, *Energy bounds and vanishing results for the Gromov–Witten invariants of the projective space*, J. Geom. Phys. 145 (2019), 103479
13. 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
14. 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
15. 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

16. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology*, Adv. Math. 339 (2018), 672—748
17. J. Niu and A. Zinger, *Lower bounds for the enumerative geometry of positive-genus real curves*, Adv. Math. 339 (2018), no. 1, 191–247
18. 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
19. 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
20. 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
21. P. Georgieva and A. Zinger, *Real orientations, real Gromov-Witten theory, and real enumerative geometry*, ERA MS 24 (2017), 87–99
22. P. Georgieva and A. Zinger, *On the topology of real bundle pairs over nodal symmetric surfaces*, Topology Appl. 214 (2016), 109–126
23. M. Farajzadeh Tehrani and A. Zinger, *Absolute vs. relative Gromov-Witten invariants*, J. Symplectic Geom. 14 (2016), no. 4, 1189–1250
24. 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
25. A. Zinger, *The determinant line bundle for Fredholm operators: construction, properties, and classification*, Math. Scand. 118 (2016), no. 2, 203–268
26. M. Farajzadeh Tehrani and A. Zinger, *Counting genus zero real curves in symplectic manifolds*, Part II, Geom. Topol. 20 (2016), no. 2, 629—695
27. 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
28. A. Zinger, *Double and triple Givental’s J -function for stable quotients invariants*, Pacific J. Math. 272 (2014), no. 2, 439–507
29. J. Chen and A. Zinger, *The robustness of zero-determinant strategies in iterated prisoner’s dilemma games*, J. Theoret. Biol. 357 (2014), 46–54
30. Y. Cooper and A. Zinger, *Mirror symmetry for stable quotients invariants*, Mich. Math. J. 63 (2014), no. 3, 571–621
31. A. Zinger, *The genus 0 Gromov-Witten invariants of projective complete intersections*, Geom. Top. 18 (2014), no. 2, 1035–1114
32. A. Popa and A. Zinger, *Mirror symmetry for closed, open, and unoriented Gromov-Witten invariants*, Adv. Math. 259 (2014), 448–510
33. A. Zinger, *On transverse triangulations*, Münster J. Math. 5 (2012), 99–106

34. A. Zinger, *A comparison theorem for Gromov-Witten invariants in the symplectic category*, Adv. Math. 228 (2011), no. 1, 535–574
35. 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
36. A. Zinger, *Genus-zero two-point hyperplane integrals in the Gromov-Witten theory*, Comm. Analysis Geom. 17 (2010), no. 5, 1–45
37. A. Zinger, *The reduced genus-one Gromov-Witten invariants of Calabi-Yau hypersurfaces*, J. Amer. Math. Soc. 22 (2009), no. 3, 691–737
38. J. Li and A. Zinger, *On the genus-one Gromov-Witten invariants of complete intersections*, J. Diff. Geom. 82 (2009), no. 3, 641–690
39. A. Zinger, *Reduced genus-one Gromov-Witten invariants*, J. Diff. Geom. 83 (2009), no. 2, 407–460
40. A. Zinger, *A sharp compactness theorem for genus-one pseudo-holomorphic maps*, Geom. Top. 13 (2009), no. 5, 2427–2522
41. 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
42. A. Zinger, *Standard vs. reduced genus-one Gromov-Witten invariants*, Geom. Top. 12 (2008), no. 2, 1203–1241
43. A. Zinger, *Pseudocycles and integral homology*, Trans. AMS 360 (2008), no. 5, 2741–2765
44. 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
45. A. Zinger, *Intersections of tautological classes on blowups of moduli spaces of genus-one curves*, Mich. Math. 55 (2007), no. 3, 535–560
46. R. Vakil and A. Zinger, *A natural smooth compactification of the space of elliptic curves in projective space*, ERA AMS 13 (2007), 53–59
47. 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
48. 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
49. A. Zinger, *Counting rational curves of arbitrary shape in projective spaces*, Geom. Top. 9 (2005), 571–697
50. A. Zinger, *Enumeration of genus-three plane curves with a fixed complex structure*, J. Algebraic Geom. 14 (2005), no. 1, 35–81
51. A. Zinger, *Enumeration of one-nodal rational curves in projective spaces*, Topology 43 (2004), no. 4, 793–829

52. A. Zinger, *Enumerative vs. symplectic invariants and obstruction bundles*, J. Sympl. Geom. 2 (2004), no. 4, 445–543
53. A. Zinger, *Completion of Katz-Qin-Ruan’s enumeration of genus-two plane curves*, J. Algebraic Geom. 13 (2004), no. 3, 547–561
54. 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
55. 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, *Geometric properties of real Gromov-Witten invariants*, math/2311.11994
3. 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
4. X. Chen and A. Zinger, *Blowdowns of the Deligne-Mumford spaces of real rational curves*, math/2305.08811
5. A. Zinger, *Real topological recursions and WDVV relations*, math/2003.05860
6. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology, II*, math/1908.09390
7. A. Zinger, *Real Ruan-Tian perturbations*, math/1701.01420
8. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *The smoothability of normal crossings symplectic varieties*, math/1410.2573v2
9. P. Georgieva and A. Zinger, *Orientability in real Gromov-Witten theory*, math/1308.1347 (superseeded by Publ. 15)

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, *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