

*Curriculum Vitae*  
**Aleksey Zinger**

July 13, 2022

Department of Mathematics (631) 632-8288 (phone)  
Stony Brook University (631) 632-7631 (fax)  
Stony Brook, NY 11794-3651 azinger@math.stonybrook.edu  
<http://www.math.stonybrook.edu/~azinger/>

**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, 07/06-05/23; total \$1,281,059  
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  
 Spencer Cattalani (Gromov-Witten theory), January 22-present  
 Xujia Chen<sup>1,2</sup> (real Gromov-Witten theory), March 17-May 21  
 Jingchen Niu (pseudoholomorphic curves), September 11-July 16  
 Alexandra Popa<sup>1</sup> (mirror symmetry), September 08-July 12  
 Ritwik Mukherjee (enumerative geometry), December 06-December 11  
<sup>1</sup>Chairman's award for the best research by a finishing student (SBU Math)  
<sup>2</sup>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 MAT312 (Applied Algebra), Spring 19, Fall 19  
 MAT320 (Intro to Analysis), Spring 18,19  
 MAT324 (Real Analysis), Fall 17  
 MAT542 (Algebraic Topology), Fall 16  
 MAT648 (Mirror Symmetry), Fall 14  
 MAT645 (*J*-Holomorphic Curves), Spring 14,22  
 MAT620 (Enumerative Geometry), Fall 13  
 MAT127 (Calculus C), Fall 09\*,10\*, Spring 15,17\*,22\*  
 MAT615 (Complex Geometry II), Spring 09, 20  
 MAT401 (Intro to Enumerative Geometry), Fall 08,18  
 MAT545 (Complex Geometry), Fall 08, 19  
 MAT614 (Enumerative Geometry), Fall 07  
 MAT566 (Differential Topology), Fall 06, Spring 15,18  
 MAT531 (Differential Geometry), Spring 06,10,11  
 MAT131 (Calculus I), Fall 06  
 MAT530 (General Topology), Fall 06  
 \*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 Spring 98  
*Undergraduate Tutor* for upper-level courses, Fall 96 and Spring 97  
 introductory courses, Fall 95 and Spring 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:
  - 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
- 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

## Publications

1. X. Chen and A. Zinger, *WDVV-type relations for Welschinger's invariants: applications*, Kyoto J. Math. 61 (2021), no. 2, 339-376
2. 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
3. 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
4. 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
5. 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
6. 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
7. M. Farajzadeh Tehrani and A. Zinger, *Normal crossings degenerations of symplectic manifolds*, Peking Math. J. 2 (2019), no. 3-4, 275-351
8. A. Zinger, *Energy bounds and vanishing results for the Gromov-Witten invariants of the projective space*, J. Geom. Phys. 145 (2019), 103479
9. 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
10. 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
11. 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
12. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology*, Adv. Math. 339 (2018), 672-748
13. J. Niu and A. Zinger, *Lower bounds for the enumerative geometry of positive-genus real curves*, Adv. Math. 339 (2018), no. 1, 191-247
14. 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
15. P. Georgieva and A. Zinger, *A recursion for counts of real curves in  $\mathbb{C}P^{2n-1}$ : another proof*, Internat. J. Math. 29 (2018), no. 4, 1850027, 21pp
16. P. Georgieva and A. Zinger, *Enumeration of real curves in  $\mathbb{C}P^{2n-1}$  and a WDVV relation for real Gromov-Witten invariants*, Duke Math. 166 (2017), no. 17, 3291-3347

17. P. Georgieva and A. Zinger, *Real orientations, real Gromov-Witten theory, and real enumerative geometry*, ERA MS 24 (2017), 87–99
18. P. Georgieva and A. Zinger, *On the topology of real bundle pairs over nodal symmetric surfaces*, Topology Appl. 214 (2016), 109–126
19. M. Farajzadeh Tehrani and A. Zinger, *Absolute vs. relative Gromov-Witten invariants*, J. Symplectic Geom. 14 (2016), no. 4, 1189–1250
20. 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
21. A. Zinger, *The determinant line bundle for Fredholm operators: construction, properties, and classification*, Math. Scand. 118 (2016), no. 2, 203–268
22. M. Farajzadeh Tehrani and A. Zinger, *Counting genus zero real curves in symplectic manifolds, Part II*, Geom. Topol. 20 (2016), no. 2, 629–695
23. 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
24. A. Zinger, *Double and triple Givental’s  $J$ -function for stable quotients invariants*, Pacific J. Math. 272 (2014), no. 2, 439–507
25. J. Chen and A. Zinger, *The robustness of zero-determinant strategies in iterated prisoner’s dilemma games*, J. Theoret. Biol. 357 (2014), 46–54
26. Y. Cooper and A. Zinger, *Mirror symmetry for stable quotients invariants*, Mich. Math. J. 63 (2014), no. 3, 571–621
27. A. Zinger, *The genus 0 Gromov-Witten invariants of projective complete intersections*, Geom. Top. 18 (2014), no. 2, 1035–1114
28. A. Popa and A. Zinger, *Mirror symmetry for closed, open, and unoriented Gromov-Witten invariants*, Adv. Math. 259 (2014), 448–510
29. A. Zinger, *On transverse triangulations*, Münster J. Math. 5 (2012), 99–106
30. A. Zinger, *A comparison theorem for Gromov-Witten invariants in the symplectic category*, Adv. Math. 228 (2011), no. 1, 535–574
31. 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
32. A. Zinger, *Genus-zero two-point hyperplane integrals in the Gromov-Witten theory*, Comm. Analysis Geom. 17 (2010), no. 5, 1–45
33. A. Zinger, *The reduced genus-one Gromov-Witten invariants of Calabi-Yau hypersurfaces*, J. Amer. Math. Soc. 22 (2009), no. 3, 691–737
34. J. Li and A. Zinger, *On the genus-one Gromov-Witten invariants of complete intersections*, J. Diff. Geom. 82 (2009), no. 3, 641–690

35. A. Zinger, *Reduced genus-one Gromov-Witten invariants*, J. Diff. Geom. 83 (2009), no. 2, 407–460
36. A. Zinger, *A sharp compactness theorem for genus-one pseudo-holomorphic maps*, Geom. Top. 13 (2009), no. 5, 2427–2522
37. 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
38. A. Zinger, *Standard vs. reduced genus-one Gromov-Witten invariants*, Geom. Top. 12 (2008), no. 2, 1203–1241
39. A. Zinger, *Pseudocycles and integral homology*, Trans. AMS 360 (2008), no. 5, 2741–2765
40. 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
41. A. Zinger, *Intersections of tautological classes on blowups of moduli spaces of genus-one curves*, Mich. Math. 55 (2007), no. 3, 535–560
42. R. Vakil and A. Zinger, *A natural smooth compactification of the space of elliptic curves in projective space*, ERA AMS 13 (2007), 53–59
43. 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
44. 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
45. A. Zinger, *Counting rational curves of arbitrary shape in projective spaces*, Geom. Top. 9 (2005), 571–697
46. A. Zinger, *Enumeration of genus-three plane curves with a fixed complex structure*, J. Algebraic Geom. 14 (2005), no. 1, 35–81
47. A. Zinger, *Enumeration of one-nodal rational curves in projective spaces*, Topology 43 (2004), no. 4, 793–829
48. A. Zinger, *Enumerative vs. symplectic invariants and obstruction bundles*, J. Sympl. Geom. 2 (2004), no. 4, 445–543
49. A. Zinger, *Completion of Katz-Qin-Ruan’s enumeration of genus-two plane curves*, J. Algebraic Geom. 13 (2004), no. 3, 547–561
50. 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
51. 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. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology: structures*, math/2112.13125
2. A. Zinger, *Real topological recursions and WDVV relations*, math/2003.05860
3. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *Normal crossings singularities for symplectic topology, II*, math/1908.09390
4. X. Chen and A. Zinger, *Spin/Pin-Structures and Real Enumerative Geometry*, math/1905.11316v4
5. A. Zinger, *Real Ruan-Tian perturbations*, math/1701.01420
6. M. Farajzadeh Tehrani, M. McLean, and A. Zinger, *The smoothability of normal crossings symplectic varieties*, math/1410.2573v2
7. P. Georgieva and A. Zinger, *Orientability in real Gromov-Witten theory*, math/1308.1347 (superseded by Publ. 11)

### 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