

# Samir Canning

Department of Mathematics

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## Employment

- 2024– **SNF Ambizione Fellow**, *ETH Zürich*.
- 2022– **Hermann-Weyl-Instructor**, *ETH Zürich*.

## Education

- 2017-2022 **Ph.D., Mathematics**, *University of California San Diego*, Advisor: Elham Izadi.
- 2013-2017 **B.A., Mathematics**, *Columbia University*.

## Research Interests

Algebraic geometry: intersection theory, moduli spaces of curves, K3 surfaces, and abelian varieties.

## Awards, Fellowships, and Grants

- 2024 SwissMAP Junior Researcher Prize.
- 2024 SNF *Ambizione* grant (590,000 CHF).
- 2022 NSF postdoctoral fellowship (declined to accept Herman-Weyl-Instructorship).
- 2022 Powell Dissertation Fellowship.
- 2021 UCSD Summer Graduate Teaching Scholar.
- 2017 James B. Ax Fellowship.

## Preprints and Publications

1. The motivic structures  $LS_{12}$  and  $S_{16}$  in the cohomology of moduli spaces of curves (with Hannah Larson, Sam Payne, and Thomas Willwacher). [arXiv:2411.12652](https://arxiv.org/abs/2411.12652).
2. Moduli spaces of curves with polynomial point counts (with Hannah Larson, Sam Payne, and Thomas Willwacher). [arXiv:2410.19913](https://arxiv.org/abs/2410.19913).
3. Tautological and non-tautological cycles on the moduli space of abelian varieties (with Dragos Oprea and Rahul Pandharipande). [arXiv:2408.08718](https://arxiv.org/abs/2408.08718).
4. The tautological ring of  $\overline{\mathcal{M}}_{g,n}$  is rarely Gorenstein. [arXiv:2406.10516](https://arxiv.org/abs/2406.10516).
5. Holomorphic forms and non-tautological cycles on moduli spaces of curves (with Veronica Arena, Emily Clader, Richard Haburcak, Amy Li, Siao Chi Mok, and Carolina Tamborini). [arXiv:2402.03874](https://arxiv.org/abs/2402.03874). To appear in *Selecta Mathematica*.

6. Tautological projection for cycles on the moduli space of abelian varieties (with Sam Molcho, Dragos Oprea, and Rahul Pandharipande). arXiv:2401.15768.
7. Extensions of tautological rings and motivic structures in the cohomology of  $\overline{\mathcal{M}}_{g,n}$  (with Hannah Larson and Sam Payne). Forum of Mathematics, Pi. 2024;12:e23. arXiv:2307.08830.
8. The Chow ring of the moduli space of degree 2 quasi-polarized K3 surfaces (with Dragos Oprea and Rahul Pandharipande). J. Reine Angew. Math. 816 (2024), 119–160. arXiv:2307.09284.
9. The bielliptic locus in genus 11 (with Hannah Larson). arXiv:2209.09715. To appear in *Michigan Mathematical Journal*.
10. The eleventh cohomology group of  $\overline{\mathcal{M}}_{g,n}$  (with Hannah Larson and Sam Payne). Forum Math. Sigma 11 (2023), Paper No. e62, 18 pp. arXiv:2209.03113.
11. On the Chow and cohomology rings of moduli spaces of stable curves (with Hannah Larson). arXiv:2208.02357. To appear in *Journal of the European Mathematical Society*.
12. The rational Chow rings of moduli spaces of hyperelliptic curves with marked points (with Hannah Larson). arXiv:2207.10873. To appear in *Annali della Scuola Normale Superiore di Pisa*.
13. The integral Chow rings of moduli of Weierstrass fibrations (with Andrea Di Lorenzo and Giovanni Inchiostro). Trans. Amer. Math. Soc. 377 (2024), no. 4, 2711–2740. arXiv:2204.05524.
14. The integral Picard groups of low-degree Hurwitz spaces (with Hannah Larson). Math. Z. 303 (2023), no. 3, Paper No. 61, 22 pp. arXiv:2110.14727.
15. The Chow rings of moduli spaces of elliptic surfaces over  $\mathbb{P}^1$  (with Bochao Kong). Algebr. Geom. 10 (2023), no. 4, 489–503. arXiv:2110.04928.
16. The Chow rings of low-degree Hurwitz spaces (with Hannah Larson). J. Reine Angew. Math. 789 (2022), 103–152. arXiv:2110.01059.
17. The Chow rings of the moduli spaces of curves of genus 7, 8, and 9 (with Hannah Larson). J. Algebraic Geom. 33 (2024), 55–116. arXiv:2104.05820.
18. Tautological classes on low-degree Hurwitz spaces (with Hannah Larson). Int. Math. Res. Not. IMRN(2024), no. 1, 1–46. arXiv:2103.09902.
19. On a conjecture on the variety of lines on Fano complete intersections. Ann. Mat. Pura Appl. (4), 200(5):2127–2131, 2021. arXiv:2002.04713.

## Other Writing

1. Exercises in *Hyperkahler manifolds* (with Yajnasetti Dutta, Elham Izadi, and David Stapleton). To appear in Proceedings of the ICTP.

## Invited Research Visits

- Jun 2023 Oberwolfach: Recent trends in algebraic geometry.  
 Nov 2021 Institut Mittag-Leffler program on Moduli and Algebraic Cycles.

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## Invited Conference Talks

- Jul 2025 2025 Summer Research Institute in Algebraic Geometry.
- Feb 2025 Birational Geometry: from moduli to geography, Barcelona.
- Sep 2024 Moduli spaces of curves, moduli spaces of graphs and graph complexes, ETH-ITS.
- Apr 2024 Moduli spaces and modular forms on Schiermonnikoog Island.
- Mar 2024 Enumerative Geometry and Arithmetic at the Lorentz Center in Leiden.
- Feb 2024 A Panorama of Moduli Spaces at Goethe University Frankfurt.
- Jan 2024 JMM: Combinatorial perspectives on algebraic curves and their moduli.
- Jun 2023 Helvetic Algebraic Geometry Seminar.
- May 2023 Institut Mittag-Leffler conference on Moduli and Algebraic Cycles.
- Mar 2023  $\overline{\mathcal{M}}_{g,n}$  Conference at Les Diablerets.
- Mar 2023 *admcycles* Conference at Les Diablerets.
- Nov 2022 Resonance Varieties, Topological Invariants of Groups, and Moduli Conference.
- Dec 2021 CMS Winter Meeting Session: Combinatorics and Geometry of Moduli Spaces.
- Nov 2021 Institut Mittag-Leffler workshop on Moduli Spaces and Logarithmic Geometry.
- Oct 2021 Algebraic Geometry Northeastern Series (AGNES).
- Apr 2021 Western Algebraic Geometry Symposium (WAGS).

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## Invited Seminar Talks

- Oct 2024 University of Pisa Algebraic and Arithmetic Geometry Seminar.
- Sep 2024 University of Pennsylvania Algebraic Geometry Seminar.
- Sep 2024 Stonybrook Algebraic Geometry Seminar.
- Sep 2024 Columbia Algebraic Geometry Seminar.
- Sep 2024 ETH Algebraic Geometry and Moduli Seminar.
- May 2024 Zürich Graduate Colloquium.
- May 2024 Brown University Algebraic Geometry Seminar.
- May 2024 Tufts University Algebra, Geometry, and Number Theory Seminar.
- Apr 2024 Australia National University Algebra and Topology Seminar.
- Mar 2024 ETH Zürich Algebraic Geometry and Moduli Seminar.
- Feb 2024 ETH Zürich Algebraic Geometry and Moduli Seminar.
- Jan 2024 Boston College Algebraic Geometry Seminar.
- May 2023 Universiteit Utrecht Algebraic Geometry Seminar.
- May 2023 Universiteit Leiden Algebra, Geometry, and Number Theory Seminar.
- Apr 2023 KTH and Stockholm University Algebra and Geometry Seminar.
- Mar 2023 ETH Zürich Algebraic Geometry and Moduli Seminar.
- Dec 2022 Harvard/MIT Algebraic Geometry Seminar.
- Dec 2022 Brown University Algebraic Geometry Seminar.
- Nov 2022 Cambridge University Algebraic Geometry Seminar.

- Oct 2022 Three lectures in the ETH Zürich Algebraic Geometry and Moduli Seminar.
- May 2022 UC Riverside Algebraic Geometry Seminar.
- Dec 2021 Intercontinental Algebraic Geometry and Moduli Zoominar (ETH Zürich and UBC).
- Jun 2021 University of Washington Algebraic Geometry Seminar.
- May 2021 ETH Zürich Algebraic Geometry and Moduli Seminar.
- Apr 2021 University of Illinois Chicago Algebraic Geometry Seminar.
- Apr 2021 Moduli Across the Pandemic (Boston College).
- Apr 2021 Stanford Algebraic Geometry Seminar.
- Mar 2019 Stanford Student Algebraic Geometry Seminar.
- Mar 2019 MSRI Graduate Student Seminar.

## Teaching

- Fall 2024 Reading course on top weight cohomology of  $\mathcal{M}_g$  (Dao An Khanh) (ETH).
- Spring 2024 Bachelor's thesis supervision (Marco Belli) (ETH).
- Fall 2023 Commutative Algebra (ETH). 86 students.
- Summer 2023 Reading course on commutative algebra (Immanuel Quarch) (ETH).
- Spring 2023 Master's thesis supervision (Lorraine Lambert) (ETH).
- Spring 2023 Bachelor's thesis supervision (Vinzenz Neuner) (ETH).
- Summer 2021 Linear Algebra (UCSD). 94 students.
- 2020-2021 Senior Head Teaching Assistant (UCSD).
- 2019-2020 Junior Head Teaching Assistant (UCSD).
- Fall 2018 Teaching Assistant, Mathematical Reasoning (UCSD).
- Spring 2018 Teaching Assistant, Vector Calculus (UCSD).
- Winter 2018 Teaching Assistant, Modern Algebra II (UCSD).
- Fall 2017 Teaching Assistant, Linear Algebra (UCSD).
- Spring 2017 Teaching Assistant, Representation Theory of Finite Groups (Columbia).
- Fall 2016 Teaching Assistant, Introduction to Modern Analysis I (Columbia).
- Summer 2016 Teaching Assistant, Calculus II (Columbia).
- Summer 2016 Teaching Assistant, Calculus III (Columbia).
- Spring 2016 Teaching Assistant, Introduction to Higher Mathematics (Columbia).
- Fall 2015 Teaching Assistant, Introduction to Modern Analysis I (Columbia).
- Summer 2015 Teaching Assistant, Introduction to Modern Analysis I (Columbia).

## Outreach and Service to the Profession

Full referee reports for *Annals of Mathematics*, *Compositio Mathematica*, *Geometry and Topology*, *International Mathematics Research Notices*, *Mathematische Zeitschrift*, *Michigan Mathematical Journal*, *Proceedings of the AMS*, and *Selecta Mathematica*.

- July 2024 Problem session advisor at Abramovich's LMS lecture series.

- July 2023 Research group leader at AGNES summer school.
- July 2021 Exercise session leader at Trieste Algebraic Geometry Summer School.
- 2020-2022 Volunteer tutor at East Palo Alto Tennis and Tutoring.
- Spring 2018 Graduate Student Mentor, Algebraic Curves.
- Fall 2018 Volunteer tutor at San Diego Refugee Tutoring.
- 2018-2020 President of the UCSD Mathematics Graduate Student Council.
- 2019-2020 Alternate representative in the Graduate Student Association UCSD.

## Organizational Activities

- Fall 2024 Seminar on Toroidal Compactifications of Moduli of Abelian Varieties.
- 2020-2021 American Graduate Student Algebraic Geometry Seminar.
- Summer 2020 Student Algebraic Geometry Seminar: Geometric Invariant Theory.
- Spring 2020 Student Algebraic Geometry Seminar: Moduli of Curves.
- Winter 2020 Student Algebraic Geometry Seminar: Moduli of Curves.
- January 2019 Complex Algebraic Geometry 2019 UCSD: student assistant organizer.
- Fall 2018 Student Algebraic Geometry Seminar: Abelian Varieties.
- Spring 2018 Student Algebraic Geometry Seminar: Surfaces.
- Winter 2018 Student Algebraic Geometry Seminar: Dimension Theory.