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RESEARCH INTERESTS

- † Algebraic geometry, algebraic combinatorics, motivic homotopy theory, enumerative geometry
- † Formalization, computational algebra, machine learning for math, AI for math.

EDUCATION

University of Washington

September 2023 – Present

- Ph.D. candidate in Mathematics. Advisors: Jarod Alper and Sara Billey
- Honors: **Simons Dissertation Fellowship in Mathematics (2026)**, McFarlan Fellowship, Provost's Fellowship, Tseng Fellowship, Simpson Center DH Fellowship, Jinmoncom 2025 Best Paper Award and Student Encouragement Award, UW Jane Street Fellowship

University of California, Berkeley

Fall 2026

- Visiting Student Researcher, Department of Mathematics. Faculty sponsor: Hannah K. Larson

University of Pennsylvania

August 2020 – May 2023

- M.A. in Applied Mathematics and Computer Science
- B.A. in Mathematics and Linguistics
- Honors: Summa Cum Laude, Dean's List (2021–2023), Distinction in Mathematics, Freiwald Scholars Award (2020)

PUBLICATIONS

Pure Mathematics

- **Michael Ruofan Zeng**. *The Integral K_0 -Ring of the Stack of Hyperelliptic Curves*. Manuscript in preparation. 2026.
- Martin Bishop, Arkamouli Debnath, Michele Pernice, and **Michael Ruofan Zeng**. *The K_0 -Ring of $\overline{\mathcal{M}}_{1,3}$ via Patching*. Manuscript in preparation. 2026.
- Thomas Brazelton, Andrés Jaramillo-Puentes, Howard Nuer, and **Michael Ruofan Zeng**. *An Enriched Count of Lines in a Pencil of Quartic Surfaces and Related Problems*. Manuscript in preparation. 2026.
- Elena Hafner and **Michael Ruofan Zeng**. *Spanning Configurations: Cohomology, Geometry, and Combinatorics*. Manuscript in preparation. 2026.
- 5. Arkamouli Debnath and **Michael Ruofan Zeng**. *Oriented Cohomology Rings of Some Moduli Spaces via Blowups*. 2026. arXiv: 2604.14536 [math.AG].
- 4. **Michael Ruofan Zeng**. *The Grothendieck group of the variety of spanning line configurations*. 2025. arXiv: 2512.22769 [math.CO].
- 3. Thomas Brazelton, David Chan, Benjamin Mudrak, Ben Spitz, Chase Vogeli, Chenglu Wang, **Michael R. Zeng**, and Sasha Zotine. *C_p -Mackey functors in Macaulay2*. 2025. arXiv: 2509.05456 [math.AT].
- 2. Dalton Bidleman, Timothy Duff, Jack Kendrick, and **Michael R. Zeng**. *Brackets and projective geometry in Macaulay2*. 2025. arXiv: 2504.00889 [math.AG].

1. Megumi Harada and Martha Precup. Torus fixed point sets of Hessenberg Schubert varieties in regular semisimple Hessenberg varieties. In: *Osaka Journal of Mathematics* **60** (2023), pp. 637–652. arXiv: [2112.13250 \[math.AG\]](#). With an appendix by **M. R. Zeng**.

AI for Mathematics

4. Ting Gong, Yong Yang, and **Michael Ruofan Zeng**. *Alternating Groups and Embeddings into Groups Invariably Generated by Two Prime-Order Elements*. 2026. arXiv: [2608.00703 \[math.GR\]](#).
3. Ting Gong, **Michael Ruofan Zeng**, and Yong Yang. *Albilich: Steerable Proof-State Orchestration for LLM-Based Mathematical Research with CAS Integration*. 2026. arXiv: [2607.27705 \[cs.AI\]](#).
2. Rohan Pandey, **Michael Ruofan Zeng**, Weikun K. Zhang, Kaijie Jin, Naomi Morato, Archit Ganapule, Bhaumik Mehta, and Jarod Alper. “FactorLibrary: From Polynomials to Circuits via Recursive Subgoals”. In: *3rd AI for Math Workshop (ICML 2026): Toward Self-Evolving Scientific Agents*. 2026. arXiv: [2606.25394 \[cs.LG\]](#).
1. Weikun K. Zhang, Rohan Pandey, Bhaumik Mehta, Kaijie Jin, Naomi Morato, Archit Ganapule, **Michael Ruofan Zeng**, and Jarod Alper. *CircuitBuilder: From Polynomials to Circuits via Reinforcement Learning*. 2026. arXiv: [2603.17075 \[cs.LG\]](#).

AI for Languages

3. Paul S. Atkins and **Michael R. Zeng**. Quantitative Orthographic Analysis of the Ogura *Shikishi*. In: *manuscript cultures* **26.1** (June 2026), pp. 1–60. DOI: [10.15460/s8e93666](#).
2. **Michael R. Zeng**, Herman Chau, and Paul S. Atkins. *Jibo-labeled classical hiragana image dataset*. Version v1. Zenodo, 2026. DOI: [10.5281/zenodo.18765466](#).
1. Herman Chau, **Michael R. Zeng**, and Paul Atkins. “Deriving orthographic data from classical Japanese texts with machine-learning methods”. In: *Proceedings of IPSJ SIG Computers and the Humanities*. 2025.

TALKS

Research Talks

UW Student AG Seminar	<i>April 2026</i>
UW Combinatorics and Geometry Seminar	<i>March 2026</i>
Lightning Talk at WAGS, University of Oregon	<i>November 2025</i>
Japan Association for Digital Humanities 2025, University of Osaka	<i>September 2025</i>
Simpson Center Digital Humanities Scholars, University of Washington	<i>June 2025</i>
Macaulay2 Workshop at Tulane University: Lightning Talks	<i>April 2025</i>
Combinatorics and Geometry Seminar: Lightning Talks, University of Washington	<i>March 2025</i>

Expository Talks

OSU RTG Workshop on Affine Combinatorics and Quantum K -Theory: Background Talk 1	<i>May 2026</i>
1-2-3 Seminar: Fantastic Shapes and How to Count Them	<i>February 2026</i>
Student AG Seminar: The Chow Ring of the Stack of Smooth Plane Cubic Curves	<i>June 2025</i>
Writing Milestone Seminar: Flags, Spanning Lines, and Grothendieck Shenanigans	<i>April 2025</i>
1-2-3 Seminar: Chow Groups, Quotients, and Equivariant Intersection Theory	<i>January 2025</i>
1-2-3 Seminar: 27 Lines on a Cubic Surface – via Classifying Spaces?	<i>February 2024</i>
Student AG Seminar: A Leisurely Introduction to Algebraic K -Theory	<i>December 2023</i>

SEMINARS

Organized

Writing Milestone Seminar (with Z. Chowdhury) [Link]	<i>SP 2025</i>
Algebraic Curves Learning Seminar (with G. Inchiostro) [Link]	<i>WI 2025</i>
Intersection Theory (with S. Kovács and A. Debnath) [Link]	<i>SP 2024</i>

Participated

eCHT Quadratic Curve Counting Seminar	<i>FL 2024</i>
eCHT Kan Seminar	<i>FL 2024</i>
eCHT Algebraic Vector Bundles Seminar	<i>FL 2023</i>

CONFERENCES & WORKSHOPS

Organized

UW 2026 Lean Hackathon, University of Washington	<i>May 2026</i>
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Participated

SLMath Summer School on Moduli of Varieties, Berkeley	<i>July 2026</i>
ICARM Summer School on Formalization in Lean	<i>July 2026</i>
3rd AI for Math Workshop: Toward Self-Evolving Scientific Agents, at ICML 2026, Seoul	<i>July 2026</i>
CMND 2026 Thematic Program: Algebraic Combinatorics and Applications	<i>June 2026</i>
ICARM Workshop on Algebraic Geometry and Machine Learning, Pittsburgh	<i>June 2026</i>
M0,nttréal ISM Discovery School: Combinatorics of Moduli of Curves, UQAM	<i>May 2026</i>
Graduate Student Topology and Geometry Conference, Rutgers University	<i>April 2026</i>
Graduate Student Combinatorics Conference, University of Illinois Chicago	<i>March 2026</i>
Western Algebraic Geometry Symposium at UCSD	<i>March 2026</i>
Workshop on Mirror Symmetry and Related Topics, Kyoto University	<i>December 2025</i>
Jinmoncom 2025: 人文科学とコンピューターシンポジウム, Kyushu University	<i>December 2025</i>
ICERM Workshop: Webs in Algebraic Combinatorics	<i>December 2025</i>
Western Algebraic Geometry Symposium at University of Oregon	<i>November 2025</i>
Japanese Association for Digital Humanities, University of Osaka	<i>September 2025</i>
Summer Research Institute in Algebraic Geometry at Colorado State University	<i>July 2025</i>
Macaulay2 Workshop at University of Wisconsin-Madison	<i>July 2025</i>
CMND Thematic Program in Discrete Groups in Topology and Algebraic Geometry	<i>June 2025</i>
Western Algebraic Geometry Symposium at University of British Columbia	<i>April 2025</i>

Macaulay2 Workshop at Tulane University	April 2025
Western Algebraic Geometry Symposium at University of Arizona	November 2024
Park City Math Institute 2024: Motivic Homotopy Theory	July 2024
iWoAT: International Workshop on Algebraic Topology at Fudan University	June 2024
iWoAT: International Workshop on Algebraic Topology at SUSTech	December 2023
Western Algebraic Geometry Symposium at WUSTL	October 2023
iWoAT: International Workshop on Algebraic Topology at Peking University	July 2023
Macaulay2 Workshop at the University of Minnesota	June 2023
Minicourse on Mapping Class Groups of 4-Manifolds at UChicago	August 2022
ISM Discovery School: Geometry and Combinatorics of Hessenberg Varieties	June 2022

SERVICE & MENTORING

University of Washington Math and AI Lab (webpage)

Acting Director	June 2026 - Present
Project leader for <i>CayleyPy: Search on Massive Combinatorial Graphs</i> [Github]	Ongoing
Project leader for <i>Reinforcement Learning for Polynomials</i> [Github]	Ongoing

Washington Experimental Math Lab (WXML)

Mentor for <i>Creating 3D Prints and Animations to Help Teach Calculus</i> (with Andrew Loveless) [Gallery]	SP 2025
Mentor for <i>What Mathematical Functions Can Neural Networks Learn?</i> in the Math AI Lab (with Jarod Alper)	WI 2025

Directed Reading Program (WDRP)

Mentor for <i>An Excursion in Representation Theory</i>	SP 2025
Mentor for <i>Enumerative Geometry, Incidence Geometry, Projective Geometry</i>	SP 2024
Mentor for <i>Lie Groups Are Not a Lie: They Are Everywhere</i>	WI 2024

TEACHING

MATH 208 C Matrix Algebra — Instructor of Record	SU 2025
In-person lectures with Panopto recordings; 84 enrolled students.	
MATH 581 C Intersection Theory — Co-lecturer	SP 2024
Supervised by S. Kovács; co-lectured with A. Debnath. Notes available at course website.	

University of Washington — Teaching Assistant

Grader for MATH 425 Real Analysis II	WI 2026
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TA for MATH 208 Linear Algebra	<i>FL 2025</i>
Grader for MATH 327 Introduction to Real Analysis	<i>SP 2025</i>
TA for MATH 111 Algebra with Applications (2 sections)	<i>WI 2025</i>
TA for MATH 126 Calculus with Analytic Geometry III (2 sections per quarter)	<i>SP, FL 2024</i>
Grader for MATH 300 Introduction to Mathematical Reasoning	<i>SU 2024</i>
TA for MATH 125 Calculus with Analytic Geometry II (2 sections per quarter)	<i>FL 2023, WI 2024</i>

Other Institutions

TA for CIS 5150 Linear Algebra for Computer Science, University of Pennsylvania	<i>FL 2022</i>
TA for MATH 429 Linear Algebra, Washington University in St. Louis	<i>FL 2019</i>

TECHNICAL SKILLS & LANGUAGES

Software & programming

- Python, C++, Java, R, $\text{\LaTeX}$, Mathematica, Macaulay2, SageMath; Blender, ArcGIS

Modern languages

- Chinese—Mandarin (native), English (professional)
- Japanese (professional), Cantonese (professional), German (intermediate)
- Russian (basic conversations), Korean (basic conversations)

Ancient languages

- Classical Chinese (advanced), Classical Japanese (advanced)
- Ancient Greek (basic), Old English (intermediate)

Up to date as of August 2026.