

ROBIN TRUAX

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RESEARCH INTERESTS

Social epistemology (especially the zetetic dimensions of collective epistemic phenomena), metaepistemology, and formal epistemology (particularly the connections between epistemic logic and traditional epistemology). Secondary interests include the philosophy of language, logic, discrete mathematics, feminist & political philosophy, and complexity theory, among others.

EDUCATION

University of California, Berkeley	2026 - 2032
Doctor of Philosophy in Philosophy	
University of Oxford	2024 - 2026
Bachelor of Philosophy in Philosophy ¹	
Stanford University	2020 - 2024
Master of Science in Computer Science	
<i>Quantum & classical complexity theory, algorithmic design, etc.</i>	
Bachelor of Arts in Philosophy with Distinction ²	
<i>Traditional & social epistemology, metaphilosophy, logic, etc.</i>	
Bachelor of Science in Mathematics with Distinction ²	
<i>Combinatorics, algebra, geometry, topology, analysis, game theory, etc.</i>	
Major in Political Science with Distinction ²	
<i>Political theory, non-cooperative & asymmetric information game theory, etc.</i>	
University of Washington and North Seattle College	2019 - 2020
<i>Graduate modern algebra, vector calculus, linear algebra, symbolic logic, etc.</i>	

PUBLICATIONS

- [1] A. Henrich, R. Truax. "Petal Projections, Knot Colorings and Determinants". *Involve, a Journal of Mathematics*. Vol. 15 (2022), No. 2, 207–232.
<https://msp.org/involve/2022/15-2/p02.xhtml>
- [2] C. Bennett, L. Martinez, A. Mock, G. Rojas Kirby, R. Truax. "Repetitions of Pak-Stanley Labels in G -Shi Arrangements". *Discrete Mathematics*. Vol. 347 (2024), No. 9, 114064.
<https://www.sciencedirect.com/science/article/pii/S0012365X2400195X>
- [3] A. Acharya, R. Cherivirala, R. Truax, K. Wahal. "Ranked Choice Voting, the Primaries System, and Political Extremism: Theory and Simulations". *Preprint*.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4771773

¹The BPhil in philosophy is a postgraduate degree; it is the Oxford equivalent of the MPhil.

²Distinction is an undergraduate award for the top 15% of each graduating undergraduate class.

AWARDS AND GRANTS

- Doctoral Completion Fellowship** 2024
This grant will support a year of research in the closing stages of my doctoral program.
- Ralph W. Church Fellowship** 2024
This grant will support two years of classwork and research during my doctoral program.
- Clarendon Scholarship** 2024
This scholarship pays full course fees and a living stipend during my time at Oxford. It is awarded to at most one, and usually zero, students in the BPhil in Philosophy program each year.
- Exceptional Master's Student Graduation Award in Computer Science** 2024
This award, which comes with a small financial grant, was given to two graduating students.
- Phi Beta Kappa (Junior Awardee)** 2023
Induction into Phi Beta Kappa is offered to approximately 2% of juniors at Stanford.
- ICERM Travel Scholarship** 2023
This grant provided travel and accommodation for the Joint Mathematics Meetings.
- SACNAS Travel Scholarship** 2022
This grant provided travel and accommodation for the National Diversity in STEM conference.

SELECTED RESEARCH EXPERIENCE

- Dynamics of $\text{Aut}(F_n)$: Wiegold's Conjecture** Northwestern, 2023
Developed a significantly faster and parallelizable algorithm for testing Wiegold's Conjecture on the product replacement graphs of S_n by refining work of Pak and Cooperman.
- Dynamics of $\text{Aut}(F_n)$: The Ergodicity of the Torelli Subgroup** Northwestern, 2023
Extended traditional results on the ergodicity of the automorphism group of the free group F_n on products of Lie groups to the Torelli subgroup. Preprint available.
- Repetitions in Pak-Stanley Labels of Graphs** ICERM, 2022
Discovered and proved novel results on repetitions in the Pak-Stanley labels for graphs using tools from combinatorics, algebra, and chip-firing. Paper published.
- The Game Theory of Ranked-Choice Voting** Stanford, 2022 - 2023
Studied voting systems using tools from social choice theory. Mathematically formalized and studied the properties of ranked-choice voting. Preprint published.
- New Proofs and Analogues of Tokuyama's Formula** Stanford, 2021
Created novel proofs in representation theory and combinatorics. Progressed towards analogues of Tokuyama's Formula for other reductive groups. Expository paper written.
- Split Petal Projections and the Knot Determinant** University of Washington, 2019 - 2021
Developed "split petal projections" and developed an algorithm to compute knot determinants from petal permutations in project with Allison Henrich. Paper published.

SELECTED PRESENTATIONS AND TALKS

Dynamics of $\text{Aut}(F_n)$: The Product Replacement Graph and Wiegold Northwestern University Dynamics Summer School	August 2023
Counting Pak-Stanley Labels in the G-Shi Arrangement Joint Mathematics Meetings	January 2023
Repetitions of Pak-Stanley Labels in the G-Shi Arrangement Joint Mathematics Meetings	January 2023
The Three Rows Game: Repetitions in Pak-Stanley Labels National Diversity in STEM Conference	October 2022
The G-Shi Arrangement: Games on Paths, Trees, and More Summer at the Institute for Computational and Experimental Research in Mathematics	August 2022
The G-Shi Arrangement and the Three Rows Game Summer at the Institute for Computational and Experimental Research in Mathematics	July 2022
G-Shi Arrangements and Parking Functions Summer at the Institute for Computational and Experimental Research in Mathematics	June 2022
The Lindström-Gessel-Viennot Lemma: Tiling, Paths, and Determinants Stanford Undergraduate Mathematics Organization Symposium	March 2022
Towards a Tokuyama's Formula for Symplectic Groups Stanford Undergraduate Research Institute in Mathematics	August 2021
Novel Proofs of Tokuyama's Formula Stanford Undergraduate Research Institute in Mathematics	July 2021
An Introduction to Petal Projections Western Washington Community College Student Mathematics Conference	February 2020
Split Petal Projections, Knot Colorings and Determinants Summer Institute of Mathematics at the University of Washington	August 2019

SELECTED WORK EXPERIENCE

Research in Stanford's Department of Political Science Studied voting systems using computational and formal tools. Developed programs for empirically testing theories about the mathematical properties of ranked-choice voting.	2022 - 2024
Grader in Stanford's Department of Mathematics Evaluated students in courses on discrete math, graph theory, discrete probabilistic methods, probability theory, group theory, functional analysis, algebraic geometry, etc.	2021 - 2024
Community Tutor at North Seattle College Tutored students in subjects ranging from basic algebra to multivariable calculus, linear algebra, differential equations, as well as computer science in both one-on-one and group settings.	2019 - 2020
Individual Tutor Privately tutored students studying calculus, preparing them to pass Advanced Placement exams. Also individually tutored college students in group theory and abstract algebra.	2018 - 2020

WORKSHOPS AND CONFERENCES

Northwestern University Dynamics Summer School Northwestern University	2023
Joint Mathematics Meetings The American Mathematical Society	2023
National Diversity in STEM Conference Society for the Advancement of Chicanos/Hispanics and Native Americans in Science	2022
Summer@ICERM Institute for Computational Combinatorics The Institute for Computational and Experimental Research in Mathematics	2022
Seattle Public Schools Teachers of Mathematics Conference Seattle Public Schools, Virtual	2021
Stanford Undergraduate Research Institute in Mathematics Stanford University	2021
Stanford Directed Reading Program Stanford University	2021
Seattle Public Schools Teachers of Mathematics Conference Seattle Public Schools, Virtual	2020
Mathematics Online Reading Program at Harvard University Harvard University, Virtual	2020
Western Washington Community College Student Mathematics Conference Edmonds College	2020
Summer Institute for Mathematics at the University of Washington The University of Washington	2019

OUTREACH AND SERVICE

I have been involved with a number of outreach and service projects. These include mentoring with the Prison Mathematics Project, creating award-winning animations with over 100,000 views explaining mathematical ideas, leading the Fundamental Group (a peer-tutoring network at Stanford with over 500 people), mentoring students in problem-solving, visiting classes and clubs at various middle and high schools, reviewing for the zbMATH indexing project, and many more.