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
Quantum & classical complexity theory, algorithmic design, etc.

Bachelor of Arts in Philosophy with Distinction[2]
Traditional & social epistemology, metaphilosophy, logic, etc.

Bachelor of Science in Mathematics with Distinction[2]
Combinatorics, algebra, geometry, topology, analysis, game theory, etc.

Major in Political Science with Distinction[2]
Political theory, non-cooperative & asymmetric information game theory, etc.

University of Washington and North Seattle College 2019 - 2020

Graduate modern algebra, vector calculus, linear algebra, symbolic logic, etc.

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

[1] The BPhil in philosophy is a postgraduate degree; it is the Oxford equivalent of the MPhil.
[2] Distinction 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 will pay full course fees and a living stipend during my time at Oxford.

Exceptional Master's Student Graduation Award in Computer Science 2024
This award, which comes with a financial grant, is given to two graduating students each year.

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 acommodation for the Joint Mathematics Meetings.

SACNAS Travel Scholarship 2022
This grant provided travel and acommodation for the National Diversity in STEM conference.

Selected Research Experience

Dynamics of $\mathrm{Aut}(F_n)$: 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 $\mathrm{Aut}(F_n)$: 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 $\mathrm{Aut}(F_n)$: The Product Replacement Graph and Wiegold August 2023
Northwestern University Dynamics Summer School

Counting Pak-Stanley Labels in the G-Shi Arrangement January 2023
Joint Mathematics Meetings

Repetitions of Pak-Stanley Labels in the G-Shi Arrangement January 2023
Joint Mathematics Meetings

The Three Rows Game: Repetitions in Pak-Stanley Labels October 2022
National Diversity in STEM Conference

The G-Shi Arrangement: Games on Paths, Trees, and More August 2022
Summer at the Institute for Computational and Experimental Research in Mathematics

The G-Shi Arrangement and the Three Rows Game July 2022
Summer at the Institute for Computational and Experimental Research in Mathematics

G-Shi Arrangements and Parking Functions June 2022
Summer at the Institute for Computational and Experimental Research in Mathematics

The Lindström-Gessel-Viennot Lemma: Tiling, Paths, and Determinants March 2022
Stanford Undergraduate Mathematics Organization Symposium

Towards a Tokuyama's Formula for Symplectic Groups August 2021
Stanford Undergraduate Research Institute in Mathematics

Novel Proofs of Tokuyama's Formula July 2021
Stanford Undergraduate Research Institute in Mathematics

An Introduction to Petal Projections February 2020
Western Washington Community College Student Mathematics Conference

Split Petal Projections, Knot Colorings and Determinants August 2019
Summer Institute of Mathematics at the University of Washington

Selected Work Experience

Research in Stanford's Department of Political Science 2022 - 2024
Studied voting systems using computational and formal tools. Developed programs for empirically testing theories about the mathematical properties of ranked-choice voting.

Grader in Stanford's Department of Mathematics 2021 - 2024
Evaluated students in courses on discrete math, graph theory, discrete probabilistic methods, probability theory, group theory, functional analysis, algebraic geometry, etc.

Community Tutor at North Seattle College 2019 - 2020
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.

Individual Tutor 2018 - 2020
Privately tutored students studying calculus, preparing them to pass Advanced Placement exams. Also individually tutored college students in group theory and abstract algebra.

Workshops and Conferences

Northwestern University Dynamics Summer School 2023
Northwestern University

Joint Mathematics Meetings 2023
The American Mathematical Society

National Diversity in STEM Conference 2022
Society for the Advancement of Chicanos/Hispanics and Native Americans in Science

Summer@ICERM Institute for Computational Combinatorics 2022
The Institute for Computational and Experimental Research in Mathematics

Seattle Public Schools Teachers of Mathematics Conference 2021
Seattle Public Schools, Virtual

Stanford Undergraduate Research Institute in Mathematics 2021
Stanford University

Stanford Directed Reading Program 2021
Stanford University

Seattle Public Schools Teachers of Mathematics Conference 2020
Seattle Public Schools, Virtual

Mathematics Online Reading Program at Harvard University 2020
Harvard University, Virtual

Western Washington Community College Student Mathematics Conference 2020
Edmonds College

Summer Institute for Mathematics at the University of Washington 2019
The University of Washington

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.