

JUSTIN ALEXANDER BLOOM

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EDUCATION

Oregon State University, Corvallis, OR
B.S. in Mathematics, minor in Computer Science

Enrolled: September 2016 — March 2020
Graduated magna cum laude

University of Washington, Seattle, WA
PhD in Mathematics
MS in Mathematics

Enrolled: September 2020 — Expected June 2026
Expected June 2026
Masters awarded Spring 2022

RESEARCH

Modular representation theory and tensor triangular geometry
PhD research

University of Washington (Seattle, WA)
Ongoing

- Advisor Prof. Julia Pevtsova. PhD candidate as of December 2023. Research interests include homological algebra, restricted Lie algebras, finite Hopf algebras, and tensor-triangular geometry, all as tools for understanding modular representation theory.
- *Families of Green rings for abelian restricted Lie algebras* (preprint 2025, under review for JPAA).
- *A tensor-triangular property for categories of representations of restricted Lie algebras* (preprint 2024).
- General exam paper on derived differential graded algebra, and modular representations (December 2023).

Secure multiparty computation
Undergraduate Research

Oregon State University (Corvallis, OR)
Summer 2019

- Advisor Prof. Mike Rosulek. Joint work with Lalita Devadas, proceedings paper on garbled circuits and Montgomery multiplication.

STUDENT SEMINARS

UNIVERSITY OF WASHINGTON, SEATTLE

Student Algebra and Representation Theory Seminar
Creator, organizer, speaker

Learning seminar for topics in representation theory.

- Featured talks
 - *Group schemes, restriction, (co)induction, and Frobenius reciprocity* September 29, 2025
 - *What is representation theory?* September 22, 2025

1-2-3 Seminar
Speaker

An example-focused, graduate student led seminar.

- Featured talks
 - *Lie algebras and tensor products* March 28, 2024
 - *Modular Representations or: How I learned to stop worrying and love the Klein four group* February 9, 2024
 - *Support and Structure.* January 13, 2023

Student Algebraic Geometry Seminar
Speaker

Student research seminar

- Featured talk: *Morita equivalence of algebraic stacks and flat families of Hopf algebras.* February 27, 2025

PhD General Exam Presentation

November 13 2023

- Tensor triangulated geometry, global methods for differential graded algebras, and modular representations.

RESEARCH SEMINARS

Algebra Seminar
Speaker

University of Southern California (Los Angeles, CA)
April 28, 2025

- Spoke on recent work on rings of representations and deformations of Hopf algebras.

Algebra and Number Theory Seminar
Speaker

Oregon State University (Corvallis, OR)
October 22nd, 2024

- Spoke on restricted Lie algebras and the restricted nullcone, along with some recent work in representation theory.

Algebra and Algebraic Geometry Seminar
Speaker

University of Washington (Seattle, WA)
October 1, 2024

- Spoke on recent work on deforming tensor products for restricted representations of Lie algebras.

CONFERENCES

Motives, equivariant topology, and tt-geometry

Attendee

University of Warwick (Coventry, UK)

September 1, 2025 - September 5, 2025

- London Mathematical Society school including three mini-courses.

Hopf Algebras and Related Topics

Attendee, speaker

Memorial University (Norris Point, NL)

August 11 2025 - August 15 2025

- Atlantic Algebra Centre workshop, held in the Bonne Bay Marine Station. Spoke on moduli spaces of finite Hopf algebras and cohomology.

Joint Mathematics Meetings 2025

Attendee

(Seattle, WA)

January 8 2025 - January 11 2025

Motivic homotopy, K-theory, and Modular Representations

Attendee, lightning-talk speaker

USC. (Los Angeles, CA)

August 9 2024 - August 11 2024

- Conference held in honor of Eric Friedlander.

Advances in Lie Theory, Representation Theory and Combinatorics

Attendee

UC Berkeley. (Berkeley, CA)

May 1 2024 - May 3 2024

- Workshop at Simons Laufer Mathematical Sciences Institute (SLMath). Held in memory of Georgia Benkart.

Master Class on New Developments in Finite Generation of Cohomology

Virtual attendee

Universität Bielefeld (Bielefeld, DE)

September 25-September 27 2023

- Understanding van der Kallen's recent work on generalizing Friedlander-Suslin's finite generation of cohomology

A Panorama of Homotopy Theory

Attendee

Oxford University (Oxford, UK)

June 5 2023 - June 9 2023

- Conference held in honor of Mike Hopkins. Speakers on motivic, chromatic, and geometric homotopy theory, homotopy type-theory, as well as applications to quantum field theory.

Combinatorial, Computational, and Applied Algebraic Geometry

Attendee

University of Washington (Seattle, WA)

June 27 2021 - July 1 2021

- Conference held in honor of Bernd Sturmfels. Speakers on tropical geometry and applied algebraic geometry.

TEACHING

Instructor at University of Washington:

MATH 209: *Systems of Differential Equations*

Summer 2023

Teaching Assistant at University of Washington:

MATH 504, 505, 506: *Modern algebra*

Winter 2023, Spring 2023, Autumn 2025

MATH 444: *Introduction to Geometries*

Summer 2024

MATH 327: *Introductory Real Analysis*

Autumn 2024

MATH 300: *Introduction to Mathematical Reasoning*

Winter 2025

MATH 208: *Matrix Algebra with Applications*

Spring 2025

MATH 124, 125, 126: *Calculus*

Autumn 2020, Winter 2021, Spring 2021, Winter 2022, Autumn 2023

MATH 120: *College Algebra*

Summer 2021, Autumn 2022

MATH 111, 112: *Algebra with applications*

Autumn 2021, Spring 2022

Tutoring in Seattle

Math Study Center

Summer 2022

Graduate tutor for all levels of undergraduate mathematics, but primarily algebra and calculus

Instructional Center

Winter 2024, Spring 2024

Tutor in algebra and calculus for underrepresented students

Private Tutoring

2022

Tutored for vector calculus and differential equations outside of University of Washington

Outreach

Washington Directed Reading Program

Autumn 2024

Mentor for undergraduate student learning category theory and abstract algebra

University of Washington Math Hour Olympiad

June 2022, June 2024, June 2025

Mathematics competition for young students, grades 6 through 10