

# JUSTIN ALEXANDER BLOOM

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## EDUCATION

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**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 April 2022

## RESEARCH

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**Modular representation theory and tensor triangular geometry** University of Washington (Seattle, WA)  
*PhD research* 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.

### Under review

- *Families of Green rings for abelian restricted Lie algebras* (2025, under review for JPAA).

### Preprints

- *Survey on Dieudonné theory* (expository, 2025)
- *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

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## UNIVERSITY OF WASHINGTON, SEATTLE

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**Student Algebra and Representation Theory Seminar** Learning seminar for topics in representation theory.

*Creator, organizer, speaker*

- Featured talks
  - *Finite flat group schemes and cohomology* November 3, 2025
  - *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

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### Algebra Seminar

*Speaker*

University of Aberdeen (Aberdeen, UK)

November 26, 2025

- Spoke on recent work ‘ $K$ -rigidity in modular representation theory’, and recent related topics in classifying Hopf algebras in positive characteristic.

## RESEARCH SEMINARS cont.

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### 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

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### 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

(Bielefeld, DE)

Universität Bielefeld

*Virtual attendee*

September 25-Septaember 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

University of Washington (Seattle, WA)

*Attendee*

June 27 2021 - July 1 2021

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

## TEACHING

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### Instructor at University of Washington:

**MATH 209:** *Systems of Differential Equations*

Summer 2023

## TEACHING cont.

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### Teaching Assistant at University of Washington:

<b>MATH 504, 505, 506:</b> <i>Modern algebra</i>	Winter 2023, Spring 2023, Autumn 2025
<b>MATH 444:</b> <i>Introduction to Geometries</i>	Summer 2024
<b>MATH 327:</b> <i>Introductory Real Analysis</i>	Autumn 2024
<b>MATH 300:</b> <i>Introduction to Mathematical Reasoning</i>	Winter 2025
<b>MATH 208:</b> <i>Matrix Algebra with Applications</i>	Spring 2025
<b>MATH 124, 125, 126:</b> <i>Calculus</i>	Autumn 2020, Winter 2021, Spring 2021, Winter 2022, Autumn 2023
<b>MATH 120:</b> <i>College Algebra</i>	Summer 2021, Autumn 2022
<b>MATH 111, 112:</b> <i>Algebra with applications</i>	Autumn 2021, Spring 2022

### Tutoring in Seattle

<b>Math Study Center</b>	Summer 2022
<i>Graduate tutor for all levels of undergraduate mathematics, but primarily algebra and calculus</i>	
<b>Instructional Center</b>	Winter 2024, Spring 2024
<i>Tutor in algebra and calculus for underrepresented students</i>	
<b>Private Tutoring</b>	2022
<i>Tutored for vector calculus and differential equations outside of University of Washington</i>	

### Outreach

<b>Washington Directed Reading Program</b>	Autumn 2024
<i>Mentor for undergraduate student learning category theory and abstract algebra</i>	
<b>University of Washington Math Hour Olympiad</b>	June 2022, June 2024, June 2025
<i>Mathematics competition for young students, grades 6 through 10</i>	