

Akira Willox¹
Curriculum Vitae

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Current mathematical interests: Representation Theory of the Symmetric Group and Algebraic Geometry

EDUCATION

University of Wisconsin–Madison **September 2024–May 2028 (expected)**
B.S., Mathematics (Honors) and Engineering Physics
GPA: 3.92/4.0, Dean’s List (all semesters)

RELEVANT COURSEWORK

- Representation Theory (Independent Study)
 - Advisor: Joshua Mundinger
 - Covered Etingof et al. *Introduction to Representation Theory* ch. 1–4, Okounkov–Vershik “A New Approach to Representation Theory of Symmetric Groups. II”.
 - Proved that Young tableaux and complex irreps of the symmetric group have isomorphic branching graphs via the action of Coxeter generators on Gelfand–Tsetlin basis vectors.
- Linear Algebra (Independent Study)
 - Advisor: Matthew Bloss
 - Read all of Hoffman & Kunze; independently developed a method to compute A001970 (number of $n \times n$ Jordan forms over characteristic-0 fields \bar{k}) using recursive counting of submatrices.
- Abstract Algebra I[†] and II[†] (*Dummit & Foote*)
- Analysis I[†] and II^{*†} (*Rudin; Roos & Andreas*)
- Topology I^{*†} (*Munkres*)
- ODEs^{*†} (*Hirsch, Smale, and Devaney*)

* In progress
† Honors

DIRECTED READING PROJECTS

Finite Character Theory UW–Madison, **Spring 2025**
Covered James–Liebeck chapters 1–19 (finite groups; characters; orthogonality relations)
Presented an application to molecular vibrations with Christos Kokinakos and Viktor Velev

Geometric Invariant Theory UW–Madison, **Fall 2025**
Read ch. 1–3 of Newstead *Introduction to Moduli Problems and Orbit Spaces*

TEACHING EXPERIENCE

Lead Math Tutor, Achievement Connections | Madison, WI **October 2025–present**
One-on-one high school tutoring in Algebra I and Geometry to address opportunity gaps

Online Tutor **April 2023–present**
Volunteer video tutoring in mathematics (High School Algebra I–Calculus III)

SKILLS

- Programming: Python, Java

OTHER

Math Club **Fall 2025–present**
Attended weekly symposia on various topics

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