Austin Ulrigg

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University of Washington
https://austinulrigg.github.io/

Education

2023–2026 **B.Sc. in Mathematics**, *University of Washington*, Seattle, *3.88 GPA*

2023–2026 **Minor in Philosophy**, *University of Washington*, Seattle

2020–2022 **Associates in Science**, *Centralia College*, Centralia, WA

2018–2022 **High School Diploma**, *Centralia High School*, Centralia, WA

Research and Publications

Spring/Winter 2024-2025 **A Practical Genus Algorithm**, *University of Washington*, Seattle

With Alexander Metzger, I co-authored a paper on an algorithm that determines the orientable genus of an arbitrary graph G with n vertices in $O\left(2^{n^2+3n}/n^{n+1}\right)$ steps. The paper was submitted to *Discrete Mathematics* on 11/25/2024. `https://arxiv.org/abs/2411.07347`

Fall 2024 **Washington Experimental Math Lab (WMXL)**, *University of Washington*

Under the guidance of Dr. Stefan Steinerberger, I collaborated with a team of graduate and undergraduate students to study the dynamical system in this research paper.

Spring 2024 **Washington Experimental Math Lab (WXML)**, *University of Washington*

Under the guidance of Dr. Hadrian Quan I worked with a group of undergraduates and a graduate student mentor studying wave propagation on graphs. We investigated graph path homotopy, and spectral analysis of the graph Laplacian and graph products.

Outreach and Service

- **Math Student Council, University of Washington, 2024-2025** Supported math majors through events, resources, and student representation. Organized study halls, social events, and networking opportunities, and facilitated communication between students and faculty.
- **Teaching Assistant, MATH209 Linear Analysis, University of Washington, September 2024 - June 2025** Assisted with linear analysis topics, including ODEs and BVPs for classical PDEs (heat, wave, Laplace). Supported students' understanding of key concepts and graded assignments.
- **CLUE Mathematics Tutor, University of Washington, September 2024 - June 2025** Tutored a variety of math courses, from introductory levels to advanced topics like abstract algebra and complex analysis, helping students with problem-solving, conceptual understanding, and exam prep.
- **Math and Science Tutor, Centralia College, May 2020–June 2022** Tutored Calculus 1-3, Intermediate Statistics, and Human Biology. Managed tutoring center operations, collaborated with professors, and fostered an inclusive learning environment.
- **May–June 2024** Contributed 12 pages to the solution manual for *Pearls in Graph Theory* by Nora Hartsfield and Gerhard Ringel, available at Pearls in Graph Theory Solutions.
- **Jan 2023–Present** Volunteer tutor with over 100,000 posts in a global online community of 200,000+ members, fostering mathematical discussion and providing math assistance.
- **Summer Credit Retrieval Assistant, Centralia High School, Summer 2017 & 2018**

Honors and Awards

- 2025- **Husky 100 Nominee**
- 2023- **Nominated as a Math Alliance Predoctoral Scholar**
- 2022- **#1 Ranked Student in Centralia High School Class of 2022**
- 2022- **Centralia College Outstanding Student of the Year Nominee**
- 2021- **Phi Theta Kappa Honor Society**
- **Dean's List Fall 2023, Spring 2024, Winter 2025**
- 2022- **Awarded $12,000 in Scholarships from Multiple Sources**

Talks and Presentations

- **May 2025. Speaker, UW Undergraduate Research Symposium**
  Presented *A Practical Genus Algorithm*, a new approach to genus computation using an $O\left(2^{n^2+3n}/n^{n+1}\right)$ time complexity algorithm. The talk emphasized the theoretical advancements in narrowing the genus range and how these results can impact broader mathematical and computational fields.
- **February 2025. Speaker, Husky Math Talk University of Washington**
  Presented *A Practical Genus Algorithm*, outlining a method for genus computation with an $O\left(2^{n^2+3n}/n^{n+1}\right)$ time complexity. This talk focused on the algorithm's practicality, showing how it efficiently prunes invalid rotation systems and refines the genus range, discovering unknown graph genera.
- **2024-2025. Speaker, Undergraduate Reading Groups in Topology and Algebra**
  Organized and led reading groups in topology and algebra, preparing undergraduates for graduate-level math. Facilitated discussions, assigned problems, and guided students in advancing their understanding.
- **July 2024. Instructor and Organizer, Advanced Linear Algebra Reading Group**
  Led a 25+ member reading group on *Linear Algebra Done Right*, covering chapters on quotient spaces, dual spaces, multilinear algebra, tensors, and inner product spaces. Organized meetings, assigned and graded problem sets, and provided additional resources.
- **June 2024. Speaker, Euler Characteristic of a Torus and the Utilities Problem**
  Delivered a talk to 30 advanced high school students on surfaces with different genera and Euler's formula for polyhedra and planar graphs. Explained the utilities problem and its solution on a torus.
- **March 2024. Instructor and Organizer, Complex Analysis Reading Group**
  Facilitated a reading group of 30+ undergraduates on Stein & Shakarchi's *Complex Analysis*, covering chapters on fundamentals of complex functions and integrals. Organized meetings, graded problem sets, and directed students to additional learning materials.
- **July 2023. Instructor and Organizer, Advanced Calculus Reading Group**
  Led a 15-member group through Folland's *Advanced Calculus*, covering key topics such as differentiation, integration, and multivariable calculus. Organized meetings, assigned problem sets, and provided resources for further study.