

EDUCATION

University of Washington – 3.87 GPA

09/22 – 06/25

BS in Mathematics and CS, Accelerated Honors Math, Math Departmental Honors, UWSO First Violin Section

RESEARCH EXPERIENCE

University of Washington – Independent, advised by: Dr. Stefan Steinerberger

Sep. 2024 – Present

Practical algorithm for graph embedding. Graph Theory, Algorithms, Combinatorics. [Link](#).**Goal:** Design a specialized algorithm optimized for embedding cage graphs.

- **Invented and Implemented** algorithm in [C](#) with visualization and verification in [SageMath](#).
- **Co-authored** the research paper [P1] with fellow Mathematics major Austin Ulrigg.

Ubiquitous Computing Lab – Advisor: Dr. Shwetak Patel

Jun. 2024 – Present

Mathematical models for urban sound localization and battery-free autonomous flight control.**Goal:** Low-cost, low-power environmental monitoring to predict disasters like wildfires.**Statistical lifecycle assessment models for consumer and industrial electronics.****Goal:** Democratize access to environmental impact estimates and empower sustainable consumption.

- **Co-authored** the ACM IMWUT 2025 paper by designing statistical and [Computer Vision](#) models.

ICTD Lab – Advisor: Dr. Richard Anderson

Sep. 2022 – May 2024

Digital phone directory for subsistence farmers in rural Tanzania. [Link](#).**Goal:** Study the economic impacts of digital agricultural information systems in Sub-Saharan Africa.

- **Led** UW SWE team in multi-million-USD, multi-year collaboration with Cornell, EDI Global, and IRDP.
- **Presented** live [T1,2] and video talks [T3] about the 10K farmers we helped across 5 districts in Tanzania.
- **Co-first-authored** the paper [P2] accepted to ACM SIGCHI 2024 and led statistical analysis.

FAVORITE PUBLICATIONS

[P2] – [Peer Reviewed and Published](#), Co-first[Economics](#), [ICTD](#)

Ananditha Raghunath, **Alexander Metzger**, Hans Easton, XunMei Liu, Fanchong Wang, Yunqi Wang, Yunwei Zhao, Hosea Mpogole, and Richard Anderson. 2024. eKichabi v2: Designing and Scaling a Dual-Platform Agricultural Technology in Rural Tanzania. In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24), May 11-16, 2024, Honolulu, HI, USA. ACM, New York, NY, USA, 16 pages.

[P1] – [Submitted to Discrete Mathematics](#), Co-first[Algorithms](#), [Graph Combinatorics](#)

Alexander Metzger and Austin Ulrigg. An Efficient Genus Algorithm Based on Graph Rotations.

TOP TALKS

[T4] – [Graph Algorithms, Discrete Combinatorial Optimization, and Genus](#)

May 2025

University of Washington Undergraduate Research Symposium, Seattle, WA

[T4] – [Computational Linguistics for Machine Aided Pronunciation Learning](#)

Oct. 2024

University of Washington Computational Linguistics Group, Seattle, WA

[T3&2] – [eKichabi v2: Designing and Scaling a Dual Platform Technology in Rural Tanzania](#)

May 2024

ACM SIGCHI Video Presentation, Remote AND Design Use Build's Para.chi Event, Seattle, WA

[T1] – [Designing and Deploying Digital Information Systems in Sub-Saharan Africa](#)

Oct. 2023

University of Washington CHANGE Seminar, Seattle, WA

WORK EXPERIENCE

Koel Labs – Founder and CEO	Aug. 2024 – Present
<ul style="list-style-type: none">◦ Raised \$100K in funding from Microsoft and partners [H3,5,6] for computational linguistics research.◦ First authoring machine learning papers and talks [T4] on novel mathematical modeling of speech.	
Gooey.AI – Software Engineer	Jun. 2023 – Sep. 2024
<ul style="list-style-type: none">◦ Mentored team of 4 interns through merging 70 pull requests touching 1000s of daily active users.◦ Deployed ML solutions to 10M+ farmers across 5+ countries, demoed to 193 world leaders at the UN.	

LEADERSHIP

Seattle Tutoring Partners – Founder and Research Mentor	May 2022 – Present
<ul style="list-style-type: none">◦ Mentoring K-12 students through Calculus, Stats, Algebra, and internationally recognized research.◦ Serving 500+ youth musicians and 10K+ aspiring scientists through custom mathematical software.	
Cascade Enrichment – Technical Lead	Sep. 2022 – Sep. 2024
<ul style="list-style-type: none">◦ Managed math curriculum for 30+ tutors and online math assessment platform for 100+ students.	
Design Build Fly – Lead Computer Scientist	Sep. 2023 – Sep. 2024
<ul style="list-style-type: none">◦ Coordinated aerodynamic modeling and optimization team of 30; secured international 3rd place [H2].	
Akvelon, Inc. – Intern Software Development Manager	Jun. 2023 – Aug. 2023
<ul style="list-style-type: none">◦ Led team of 4 to make open-source accessibility contributions to 7 Microsoft data analysis tools [H1].	

HONORS AND DISTINCTIONS

[H6] Meta+8VC Next Llama Stack Hackathon: 1st Place, \$1K Prize	2025
[H5] Microsoft Imagine Cup: Semifinalist, \$5K cloud credits	2025
[H4] CRA Outstanding Undergraduate Researcher Award: Honorable Mention	2025
[H3] Mozilla Builders Accelerator: \$39K research grant, \$35K cloud credits	2024
[H2] Design Build Fly Annual Competition: International 3rd Place	2024
[H1] Akvelon Mentor’s Choice: Outstanding Leadership	2023

MATH SKILLS

Computational Tools: Mathematica, SageMath, Matlab, PyTorch, C/C++	3+ years
Classes: Abstract+Linear Algebra, Combinatorics, Probability, Numerical Analysis, Stats	3+ years
Applied: Aerodynamics, Antenna Design, Machine Learning, Economics, Teaching	3+ years
Research: Study Design, Clinical Trials, Paper Writing, Grant Applications, Presentation	3+ years