

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 [T_{1,2}] and video talks [T₃] about the 10K farmers we helped across 5 districts in Tanzania.
- Co-first-authored the paper [P2] accepted to ACM CHI 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 CHI 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
- 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
- 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
- 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
- Managed math curriculum for 30+ tutors and online math assessment platform for 100+ students.
- Design Build Fly – Lead Computer Scientist** Sep. 2023 – Sep. 2024
- Coordinated aerodynamic modeling and optimization team of 30; secured international 3rd place [H2].
- Akvelon, Inc. – Intern Software Development Manager** Jun. 2023 – Aug. 2023
- Led team of 4 to make open-source accessibility contributions to 7 Microsoft data analysis tools [H1].

HONORS AND DISTINCTIONS

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| [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

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| 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 |