Alexander Metzger
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EDUCATION

University of Washington − *3.87 GPA*   09/22 − 06/26

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 MobiSys 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.

TALKS

[T4] − *Graph Algorithms, Discrete Combinatorial Optimization, and Genus*   May 2025

Universifty 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
- **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 internationaly 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

[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