Ben Kosa

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Research Interests

Human Computer Interaction (HCI), Natural Language Processing (NLP), Computer Vision, and their applications in Accessibility and Sign Language

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SKILLS

PyTorch | Python (Numpy, Pandas, Scikit-Learn, etc) | Julia | C | C++ | JS | ReactJS | Java | Node.js | Express/MySQL | Swift | x86 Assembly | Figma | Airtable | Linux/Command Line Scripting

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EDUCATION

University of Wisconsin – Madison — Madison, WI
PhD in Computer Science — (*September 2024 - June 2030*)
Advised by Dr. Yuhang Zhao

University of Washington – Seattle — Seattle, WA
Bachelor of Science in Computer Science — (*September 2020 - June 2024*)

CSE 446 - Machine Learning	CSE 447 - Natural Language Processing
CSE 455 - Computer Vision	CSE 493Z - Advanced Machine Learning
CSE 528 - Computational Neuroscience	LING 403 - Linguistics of Sign Languages
CSE 493E - Accessibility	CSE 440 - Intro to HCI

ACHIEVEMENTS & CERTIFICATIONS\

- Mary Gates Research Scholarship (2023)
- Recipient of **Dr. Arthur I. Karshmer Award for Assistive Technology Research for Best Submission** to 2023 CSUN AT Conference
- Dean's list 2020—2023
- Washington State Opportunity Scholarship Recipient (Sept 2020 — June 2023)
- Leo Maddox Foundation Scholarship Recipient
- Social and Behavioral Responsible Conduct of Research (June 2022) – CITI Program
- Social and Behavioral Research - Basic/Refresher (June 2022) – CITI Program

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PUBLICATIONS AND CONFERENCES

- **Ben Kosa**, Alex Lu, Aashaka Desai, Richard Ladner, Danielle Bragg. "Improving Feature-Based Sign Language Lookup One Feature at a Time." *CHI'24, Under Review (2024)*.
- Hannah Benjamin, Natnail Tolossa, Michaela Brandt**, Ben Kosa,** Poorna Kushalnagar, Raja Kushalnagar."Accessible Informed Consent Process in Interactive ASL Apps." CSUN AT 2024 & *The Journal on Technology and Persons with Disabilities. Under review (2024)*
- Presented "ASL Consent in the Digital Informed Consent Process" at University of Washington Undergraduate Research Symposium.
- **Ben Kosa,** Ai Minakawa, Patrick Boudreault, Christian Vogler, Poorna Kushalnagar, Raja Kushalnagar. "ASL Consent in the Digital Informed Consent Process," CSUN AT 2023 & *The Journal on Technology and Persons with Disabilities. Published (2023*)

RESEARCH EXPERIENCE

Undergrad Researcher | [Make4All Lab](#) | University of Washington – Seattle

Human Computer Interaction & AR Accessibility Research *(Jan'24 - June '24)*

- Working with PhD student Kate Glazko at the University of Washington on her research investigating disability bias in Generative AI.
- Helped perform qualitative analysis and paper writing.

Applied Research Intern | [Microsoft Research](#) | New York, NY

Human Computer Interaction & Applied ML Research for Deaf and hard of hearing *(June'23 - September'23)*

- Advised by Dr. Danielle Bragg (MSR), Dr. Alex Lu (MSR), and Dr. Richard Ladner (University of Washington)
- Led a research project on improving existing feature-based sign language search systems.

Undergrad Researcher | [Artificial Intelligence, Accessibility, and Sign Language Center (AIASLC)](#) | Gallaudet University, Washington D.C.

Human Computer Interaction & Applied Machine Learning Research for Accessibility *(Aug'22 - Sept '23)*

- Worked on research, led by Dr. Raja Kushalnagar, that aims to address the public health disparity amongst the U.S. Deaf population by providing Deaf participants informed consent through ASL and leveraging Machine Learning.
- Research includes developing an iOS prototype using Swift, CoreML, Vision, and Figma to run user studies with Principal Investigators and Deaf. Currently experimenting with custom Sign Language Recognition models in PyTorch to improve sign language navigation in prototype.

Undergrad Research Assistant | [Cognition & Cortical Dynamics Lab](#) | University of Washington – Seattle

Investigating how Sign Language is processed in the brain *(Dec'23 - June'23) & (Sept'23 - June '24)*

- Worked as an undergraduate research assistant on investigating how L1 learners of American Sign Language (ASL) learn fundamental programming concepts and Python.
- Helped run experiment sessions with human participants.
- Helped develop an asynchronous evaluation system that measures the ASL proficiency of participants.

Undergrad Research Assistant | Neural Systems Lab | University of Washington – Seattle

Computational Neuroscience *(Aug'22 - March'23)*

- Worked as an undergraduate research assistant on investigating predictive coding within the human brain. The Neural Systems lab is led by the accredited researcher and professor Dr. Raj Rao and focuses on understanding the brain using computational models and simulations, and applying this knowledge to the task of developing human-like artificial intelligence (AI) and brain-computer interfaces (BCIs).
- Used python and the Julia programming language to do analysis on stimulus and spiking data from mice in the hopes of further supporting the theory of predictive coding within the human brain.

Research Intern | [NSF Research Expereince for Undergrads](#) | Gallaudet University, Washington D.C.

Human Computer Interaction & Accessibility Research *(May'22 - Sept'22)*

- Gallaudet University's Research Experience for Undergraduates (REU) internship is funded by NSF, led by accredited researcher Dr. Raja Kushalnagar, and focuses on Human Computer Interaction and accessibility research.
- Worked on research that aims to address the public health disparity amongst the U.S. Deaf population by providing Deaf participants informed consent through ASL and leveraging Machine Learning.
- Research includes developing an iOS app using Swift, CoreML, Vision, and Figma. Completed all steps of the Research cycle: write and present literature review; develop IRB proposal; develop and conduct an original experiment on a live focus group; and publish paper and poster to CSUN Accessibility Technology Conference, 2023.

Independent Research with Dr. Richard Lander | University of Washington – Seattle

Literature Review of Sign Language Recognition *(Oct'21 - March'22)*

- Worked under the guidance of Dr. Richard Ladner on a literature review of all the available sign language (SL) data that can be used for Sign Language Processing (SLP), or automatic sign language to spoken language translation using ML and Neural Networks.
- Learned about how to write lit reviews, keep track of papers, and the latest-work within the field of Natural Language Processing and Sign Language Processing.

Software Developer | Husky Satellite Lab | University of Washington – Seattle

Space & Satellite Research *(Oct'21 - March'22)*

- Worked on a small team to develop image undistortion software for LOST, the lab's open-source star tracker.
- Used C++, a little bit of Python, and research on camera recognition technology to work on an open-source project to develop software that can correct for lens distortions and undistort detected star centroids. Also using HTML/CSS/JS to help develop the lab's website.
- Gained valuable experience in working with other developers on an open-source project on GitHub with constant projects, research, and deadlines.

PROJECTS

Class Project | CSE 493s (Advanced Machine Learning) | University of Washington – Seattle

Investigate the potential of synthetic data and LLMs for Morpheme Segmentation of morphologically complex low-resource languages *(April'23 - June'23)*

- Worked in a group of 3 to investigate if using synthetically generated Swahili verbs to finetune a pre trained Large Language Model (LLM) would beat current state of the art (SOTA) for automatic morpheme segmentation on Swahili verbs.
- Found that Transformer-based LLMs provide a 10% increase in accuracy in Swahili morpheme segmentation compared to SOTA: Swaregex. Learned how to implement LLaMA for training.
- Will work with Uni. of Washington Ph.D. student Tim Dettmers to continue this research and possibly publish a paper at a NLP conference.

RateMyInternship

Allowing People to Rate Their Internship and Search for Reviews of Any Internship *(April'23 - June'23)*

- Worked on a team of 6 developers to create a website where people can rate and post reviews about different internships.
- Developed web application using CRUD framework (React, MySQL, and Node.js).

VOLUNTEER

GenCyber Camp for Deaf and Hard-of-Hearing High School Students | Gallaudet University

Cybersecurity Teaching Assistant *(July'23)*

- Helped as a camp counselor for a cyber-security camp and helped teach a one week class on the fundamentals of cybersecurity.

President | American Sign Language (ASL) Club at UW | University of Washington

President   *Sept 2020 - May 2021 (Member) | May 2021 - June 2024 (President)*

- Being a Child of Deaf Adult (CODA) and fluent in sign language, I'm was president of the ASL Club at the UW., a club focused on providing an ASL and Deaf culture community for people of all signing backgrounds and experience levels.
- Along with being the face of the club, the main point of communication, and managing the entire club and all of its officers, I hosted two meetings a week and multiple larger-scale community events, socials, and/or workshops per year. Meetings include teaching ASL to beginners to discuss complicated topics concerning the deaf and hard of hearing community.