

# Braden K. Webb

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## WORK EXPERIENCE

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### Machine Learning Research Associate

May 2023 - Present

*AI & Data Analytics Division, Pacific Northwest National Laboratory*

*Remote from Boston, MA*

- Fine-tune LLMs and implement RAG pipeline to extract actionable data from cybersecurity threat reports
- Define PostgreSQL schemas for data ingestion into AWS-hosted Elasticsearch indices via Apache NiFi
- Automate mappings between related taxonomies for cyber-physical threat sequence modeling and graph generation
- Pattern-of-life modeling and algorithmic anomaly detection through novel graph analytics for national security threat prevention on the Sigma+ program; sponsors include DARPA and other government agencies
- Develop front-end UI in TypeScript for algorithm result visualization and Android app plugin in Java

### Machine Translation Research Assistant

Sep. 2022 - May 2023

*MaTRIX Labs, Department of Computer Science, Brigham Young University*

*Provo, UT*

- Built data cleaning pipeline for dynamically processing and aligning translation memory files for 90+ languages
- Prepared multilingual machine translation corpus for publication
- Trained 24-language neural MT model to investigate effects of tagging the language family on translation quality
- Harnessed distributed HPC GPUs to train 800M-parameter encoder-decoder transformer from scratch, matching state-of-the-art performance on several language pairs across multiple metrics
- Launched development on transformer-based speech-to-speech translation system

### NLP Research Assistant

April 2022 - Jan. 2023

*DRAGN Labs, Department of Computer Science, Brigham Young University*

*Provo, UT*

- Fine-tuned generative LLMs with domain-specific text obtained through extensive web-scraping
- Developed novel metric for evaluating relevance of procedurally generated NPC dialogue to quest objectives, and validated its correlation to human preferences through surveys and user studies resulting in academic publication

### Single Sign-On Technology Consultant

June 2021 - April 2022

*Qualtrics International, Inc.*

*Remote*

- Provided support integrating SAML, CAS, LDAP, and Google OAuth SSO protocols, successfully completed 50+ B2B client tickets

### Computational Research Assistant

Dec. 2020 - April 2022

*Department of Mathematics, Brigham Young University*

*Provo, UT*

- Evaluated open-source tools for English to IPA transliteration, detected and traced surname transcription errors in historic census data, and processed millions of records using Pandas, NumPy, and Epitean

## EDUCATION

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### B.S. Mathematics | Brigham Young University

April 2023

*Minors: Computer Science, Linguistics, & Logic*

*Provo, UT*

- GPA: 3.9/4.0, 4-Year Full-Tuition Academic Scholarship, National Merit Scholarship
- Coursework including deep learning, predictive modeling, natural language processing, algorithm design & analysis

## PUBLICATIONS

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- [1] A. Shurtz, L. Sorenson, **B. Webb**, et al. *MMMC: A Massively Mult-way-aligned Multilingual Corpus*. In progress.
- [2] **B. Webb**, R. Meyur, S. Purohit. *IEEE Big Data '24*. Under review. [Link](#)
- [3] R. Meyur, S. Purohit, **B. Webb**. *AAAI-24 Workshop on AICS*, Feb 26, 2024, Vancouver, Canada. [Link](#)
- [4] T. Ashby, **B. Webb**, et al. *CHI '23*, April 23-28, 2023, Hamburg, Germany. [Link](#)

## SKILLS

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**Computer Languages:** Python, TypeScript, C++, Java, SQL, R (limited)

**ML Frameworks:** PyTorch, JAX, NumPy, Pandas, SciPy, spaCy, scikit-learn, Hugging Face, OpenNMT, NLTK, Neo4j

**Other Tools:** Docker, Unix shell, Git, Android, Azure AI Services, Excel, Slurm, SSO, L<sup>A</sup>T<sub>E</sub>X, AWS (EC2 & SageMaker)

**Foreign Languages:** Slovak (proficient), Czech (proficient), Russian (basic reading ability)