

# D. Estes McKnight

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Motivated software developer with 4 years of machine learning development and research experience.

Eager to leverage skills in Python, SWE, NLP, modelling, and more.

## EMPLOYMENT

Physics Dept., University of Alberta ..... Edmonton, Alberta

**Research Machine Learning Developer** Feb 2025–

- Prepared space weather libraries, datasets, and algorithms for downstream machine learning.
- Trained models to clean/label auroral image datasets. Used PyTorch, pandas, wandb, and scikit-learn.

Computing Science Dept., University of Alberta ..... Edmonton, Alberta

**NLP Researcher** Jan 2023–Jan 2024

**Graduate Research Assistant** Apr 2020–Oct 2022

- ML, data science, & NLP research. Published & presented papers, incl. at the NLP-top-3-venue NAACL
- Designed/analyzed/trained hundreds of user models on multimillion-scale datasets with Python, PyTorch, pandas/Dask, scikit-learn, statsmodels, NLTK, and wandb. Indexed data with ElasticSearch.
- Communicated findings via reports, presentations, and papers with JASP (SPSS alt.), matplotlib, & LaTeX.
- Used Python, Flask, JavaScript, HTML, and CSS to design response-annotation webpages hosted on GCP

**Graduate Teaching Assistant** Aug 2019–Apr 2020

MiTek USA, Inc. .... St. Louis, Missouri

**Backend Software Engineering Intern** May–Aug 2018

- Refactored SQL CRUD tests with C# and mocked with NSubstitute to eliminate dependencies.

**Frontend Software Engineering Intern** May–Aug 2017

- Used C#, WPF, and Entity Framework to create an incident report-editing application that interfaced with the company's e-mail databases. Application part of manager's workflow a year later.

Iowa State University VR Applications Center ..... Ames, Iowa

**Research Intern** May–Aug 2016

## CONTRACT WORK

Ballpark Housing ..... Edmonton, Alberta

**Backend/NLP Development** May–Jul 2024

- Collaborated to design an LLM-based RAG system using Pinecone and OpenAI's GPT-4. Prepared a scraping server and PostgreSQL database on GCP using SQLAlchemy.

Alberta Machine Intelligence Institute ..... Edmonton, Alberta

**ML Educational Material Development** Jun–Aug 2023

## EDUCATION

University of Alberta 2019–2022

**M.Sc. Computer Science** research-based, *GPA 4.0*

Research in NLP and machine learning with Prof. Alona Fyshe's Representations Lab

University of Oklahoma 2014–2019

**B.S. Mathematics** *magna cum laude*

**B.S. Computer Engineering** *GPA 3.7*, with **Minor in Computer Science**

## LANGUAGES AND TECHNOLOGIES

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Languages	Proficient in <u>Python</u> , <u>Java</u> , <u>C++</u> , <u>C#</u> , & <u>SQL</u> . Familiar with <u>R</u> , <u>MATLAB</u> , <u>JavaScript</u> , & <u>Bash</u>
SWE	Version Control ( <u>Git</u> , <u>TFS</u> ), Cloud ( <u>GCP</u> ), ORM ( <u>SQLAlchemy</u> , <u>Ent. Framework</u> ), CI/CD ( <u>GH Actions</u> ), REST ( <u>FastAPI</u> ), MVVM/MVC ( <u>WPF</u> , <u>Swing</u> ), Containerization ( <u>Docker</u> )
ML/Data Sci.	<u>PyTorch</u> , <u>Pandas</u> , <u>Dagster</u> , <u>NumPy</u> , <u>SciPy</u> , <u>statsmodels</u> , <u>transformers</u> , <u>Pinecone</u> & <u>wandb</u>

## SELECTED PROJECTS

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- Developed a Python bitfield/serialization library for ROM-hacking with CI/CD, PyTest, and Sphinx docs
- Created a GCP-hosted self-updating website to track statistics for a multi-month 1500-vote video-game music contest using a **LASPy** (Debian, Apache, SQLite, and Python) stack and BeautifulSoup4
- Worked with a cross-Canada team to discover online depressive language trends during COVID-19 in various cities. Used ElasticSearch, GloVe and VADER on scraped geocoded tweets and Reddit posts. Wrote bash/Python scripts for others to collect additional data

## LEADERSHIP

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- President of **UAlberta's Computing Science Graduate Students' Association** (Sum. 2021–Sum. 2022)
- President of **UOklahoma's Math Club** (Fall 2016–Spring 2019), VP (Spring 2016), Treasurer (Fall 2015)
- Captain of **UOklahoma's ACM-ICPC Programming Competition Club** (Fall 2017–Spring 2019)

## PUBLICATIONS

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### Forthcoming

- **McKnight** et al. "Adult age and object-similarity judgment: Differences between 25–35- and 50–60-year-olds concerning interpretable neural-embedding dimensions".
- **McKnight** & Fyshe "Taxonomic–thematic preference differences between adults and young children through sparse object-similarity embeddings".

### Published

- **McKnight** & Fyshe. "Characterizing Human and Zero-Shot GPT-3.5 Object-Similarity Judgment". *Find. 2024 Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*, 2024.  
[https://demcknight.com/served\\_files/919-characterizing-human-and-zero.pdf](https://demcknight.com/served_files/919-characterizing-human-and-zero.pdf)
- **McKnight**. "Age-Related Differences in Object-Similarity Judgment". Master's thesis, The University of Alberta, 2022.  
<https://doi.org/10.7939/r3-mz1n-v607>
- Davis, **McKnight**, et al. "Quantifying Depression-Related Language on Social Media During the COVID-19 Pandemic". *International Journal of Population Data Science (IJPDS)*, 2020.  
<https://doi.org/10.23889/ijpds.v5i4.1716>
- Stewart, Epstein, Troup, **McKnight**. "A Mathematician's Deliberation in Reaching the Formal World and Students' Views of the Eigentheory". *Proc. 11th Congress of the European Society for Research in Mathematics Education (CERME)*, 2019.  
<https://hal.science/hal-02459875/>
- Stewart, Epstein, Troup, **McKnight**. "An Analysis of a Mathematician's Reflections on Teaching Eigenvalues and Eigenvectors: Moving between Embodied, Symbolic and Formal Worlds of Mathematical Thinking". *Proc. 22nd Annual Conference on Research in Undergraduate Mathematics Education (RUME)*, 2019.  
<http://sigmaa.maa.org/rume/crume2019/Papers/147.pdf>