Dawn E. McKnight

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EDUCATION

University of Alberta 2019-2022

M.Sc. Computer Science research-based, *GPA 4.0*
Research in NLP and machine learning under Dr. Alona Fyshe
Best thesis nominee: "Age Differences in Similarity Judgment through Neural Embeddings"

University of Oklahoma 2014-2019

B.S. Mathematics *magna cum laude*
B.S. Computer Engineering *GPA 3.7*, with **Minor in Computer Science**
Undergraduate research in linear algebra pedagogy under Dr. Sepideh Stewart

EMPLOYMENT

University of Alberta **Edmonton, Alberta**
ML/NLP Graduate Research - RA Fellowship & TA Fall 2019–Spring 2023

- Machine learning and natural language processing research using PyTorch/Keras, neural embeddings, word vectors, data scraping, and sentiment analysis
- TA for CMPUT 566 Machine Learning; 272 Discrete Maths; 355 Games, Puzzles, Algorithms
  Delivered lectures to 100+ students, helped prepare assignments/exams, and created reference sites
- Prepared Jupyter chapters for NeuroMatch Academy's Deep Learning course

MiTek USA, Inc. **St. Louis, Missouri**
Software Engineering Intern Summers 2017, 2018

- Developed an incident report-viewing/editing application using C#, WPF, and Entity Framework that interfaced with the company's e-mail servers. Application still in use by the company the following year
- Refactored SQL CRUD tests with C# and mocked with NSubstitute to eliminate dependencies

Iowa State University VR Application Center **Ames, Iowa**
Research Intern Summer 2016

- Collaborated to create a military simulation for the U.S. Army in Unity with C# as part of an Intelligent Team Tutoring project. Designed 3D models with Blender and AutoCAD

LANGUAGES AND TECHNOLOGIES

- Proficient in *Java*, *C++*, *C#*, and *Python*. Familiar with *Bash*, *SQL*, *MATLAB*, *JavaScript*, and *LaTeX*
- Uses paradigms and tools such as *Torch/PyTorch*, *Keras*, *Git*, *TFS*, *JavaDoc*, *Doxygen*, and *UML*

SELECTED PROJECTS

- Determined differences between younger and older adults in performing object-similarity judgment by designing a novel **interpretable neural network embedding** model using **PyTorch**
- Generated **image metadata** to classify butterfly images using previously unapplied state-of-the-art means of **topological data analysis**; compared performance of various **classification algorithms** using this data
- Programmed an **mbed microcontroller** using **C++** and designed **signal amplification circuitry** to create a musical note-identification training game alongside other projects involving control registers and subsystems
- Developed a **CUDA-parallelized** program in **C++** to construct 3D-printable triangular mesh approximations
- Created a **Java** chess application that supports user-created skin libraries, then ported it to **Android**
- 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**

LEADERSHIP AND AWARDS

- Master's thesis nominated for the **Best Department Thesis** award by defence committee
- **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)
- **OU Presidential Honor Roll** (Fall 2015, Springs 2017, 2018, 2019), **Dean's Honor Roll** (all but Fall 2018)

PUBLICATIONS

- "Adult age and object-similarity judgment: Differences between 25–35- and 50–60-year-olds concerning interpretable neural-embedding dimensions". Forthcoming, 2023.
- "Taxonomic–thematic preference differences between adults and young children through object-similarity neural embeddings". Forthcoming, 2023.
- "Age-Related Differences in Object-Similarity Judgment". Master's thesis, The University of Alberta, 2022. https://era.library.ualberta.ca/items/1b3e4006-c1dc-4aaa-864a-3fe8be783c5f
- "Quantifying Depression-Related Language on Social Media During the COVID-19 Pandemic". *International Journal of Population Data Science*, 2020. https://doi.org/10.23889/ijpds.v5i4.1716
- "A Mathematician's Deliberation in Reaching the Formal World and Students' Views of the Eigentheory". *The 11th Congress of the European Society for Research in Mathematics Education*, 2019. https://hal.science/hal-02459875/
- "An Analysis of a Mathematician's Reflections on Teaching Eigenvalues and Eigenvectors: Moving between Embodied, Symbolic and Formal Worlds of Mathematical Thinking". *The 22nd SIGMAA on Research in Undergraduate Mathematics Education Conference*, 2019. http://sigmaa.maa.org/rume/crume2019/Papers/147.pdf
- "The Development of Interactive Applications to Assist with a Linear Algebraic Curriculum". Undergraduate honors thesis, the University of Oklahoma, 2019. https://dem1995.github.io/files/McKnightHC-LAApps.pdf?raw=true