# Aaron Moseley

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https://aaronmoseley.github.io/
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## TECHNICAL SKILLS

**Languages:** C++, C#, Python, Java, C, HTML, CSS, JavaScript, PHP, LaTeX, AMPL, Bash, MATLAB, SVRF
**Frameworks/Libraries:** .NET, PyTorch, sklearn, D2L, H5py/HDF5Lib, NiBabel, ROOT
**Tools:** Google Colab, Git/GitHub, Linux, Unity, Arduino, Anaconda, RapidAPI, Vim, Weights and Biases

## EDUCATION

**University of Kentucky - Bachelor of Science in Computer Science and Mathematics**
Lexington, KY, August 2020-May 2024 (Anticipated)

- **GPA: 3.96 / 4.0**
- GRE: 169 Quantitative, 160 Verbal, 5.0 Writing
- Lewis Honors College, Competitive Programming Team, Undergraduate Science Journal Club
- Dean's List Fall 2020-Spring 2023, Provost Scholarship, Lester Engineering Scholarship

**Liberal Arts Academy at Henry Clay High School**
Lexington, KY, August 2016-May 2020

- Unweighted GPA: 3.97 / 4.0, ACT: 35
- National AP Scholar, National Merit Scholar Commended Student, National Honors Society

## RESEARCH EXPERIENCE

**University of Kentucky - Medical Imaging/Machine Learning Research Assistant**
Lexington, KY - January 2023-Current

- Developing medical image segmentation model for LiTS dataset based on UNet architecture
- Created novel joint training approach that significantly improved performance of segmentation model across multiple metrics
- Using PyTorch, Google Colab, D2L, and Weights and Biases to create and evaluate image analysis model
- Submitted paper to SPIE Medical Imaging 2024

**University of Kentucky - Nuclear Physics Research Assistant**
Lexington, KY - August 2022-Current

- Poster: https://drive.google.com/file/d/1BaTLfLOXwSeDJRlBpeBJ-i0gPy_Hdnof/view?usp=share_link
- Utilized C++, ROOT framework, and H5py to create high-speed data acquisition system for NOPTREX experiment investigating gamma radiation emissions from decaying neutrons
- Firmware and software validated in successful test at Japan Proton Accelerator Research Complex, will be used in future experiment at Los Alamos National Laboratory
- Presented project at NCUR 2023, APS April Meeting 2023, and University of Kentucky Undergraduate Research Showcase 2023

## PROFESSIONAL EXPERIENCE

**Infineon Technologies - CAD Engineer Intern**
Lexington, KY - May 2023-August 2023

- Developed physical verification rules in SVRF and designed validation cells for unit testing using Cadence Virtuoso
- Created comprehensive Vim syntax highlighter for SVRF using Vimscript
- Resolved support requests from chip designers regarding physical verification system

**Lockheed Martin Missiles and Fire Control - Engineering and Technology Intern**
Lexington, KY - May 2022-August 2022

- Built data analysis and report automation tools using .NET framework and Microsoft Excel
- Completed projects creating $33,000 in annual savings and reducing time spent generating reports by 90%
- Held secret-level US security clearance (renewable until August 6, 2024)

## TEACHING EXPERIENCE

**University of Kentucky - Introduction to Software Engineering (CS216) Teaching Assistant**
Lexington, KY - August 2022-December 2022, January 2023-May 2023

- Regularly lectured multiple lab sections on topics including intermediate C++, Unix, and Bash
- Provided individualized help for students during lab and outside of class time
- Held weekly office hours and graded classwork and exams for more than 30 students

**University of Kentucky - Introduction to Program Design (CS215) Teaching Assistant**
Lexington, KY - January 2022-May 2022

- Provided lab instruction covering introductory C++ in conjunction with course instructor
- Held office hours and graded coursework and exams for over 25 students

## FEATURED PROJECTS (full portfolio at https://aaronmoseley.github.io/)

**Hyperbolic Semantic Search**

- https://github.com/AaronMoseley/HyperbolicSemanticSearch
- Semantic search model developed in Pytorch leveraging SentenceBERT embeddings and hyperbolic geometry
- Can better represent and calculate the similarity between sentences when compared to baseline models
- Results in improvement over standard Euclidean models by a factor of 2

**Phantom Mansion: First Place Winner MLH Hackathon**

- https://devpost.com/software/phantom-mansion
- Roguelike game that uses graph traversal algorithms to randomly generate levels and control enemy AI
- Includes multiple difficulty levels that impact level generation and enemy behavior
- Presented at University of Kentucky E-Day 2023

**Hydraulic Erosion Simulation**

- https://github.com/AaronMoseley/HydraulicErosion
- Realistically simulates hydraulic erosion on randomized or user-defined terrain
- Implements a Perlin noise procedural generation algorithm that allows for user customization
- Visualizes gradual erosion in real-time and creates report detailing its effects on the terrain

## VOLUNTEERING

**University of Kentucky Merit Weekend**
Lexington, KY - Spring 2023

- Volunteered at multiple Merit Weekend sessions
- Helped incoming College of Engineering freshmen register for classes
- Estimated Time Commitment: 8 hours

**All-Sports Camp**
Lexington, KY - Summer 2021

- Worked to provide a free summer camp for children in Lexington
- Taught elementary and preschool-age children multiple sports including soccer, football, basketball, and kickball
- Estimated Time Commitment: 20 hours

**God's Pantry**
Lexington, KY - Summer/Winter 2020

- Regularly provided groceries to Lexington's underprivileged community
- Worked during COVID pandemic to ensure at-risk people receive food
- Estimated Time Commitment: 25 hours