# Aaron Moseley

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## EDUCATION

**University of Kentucky - Bachelor of Science in Computer Science and Mathematics, Summa Cum Laude**
*Lexington, KY* *August 2020-May 2024*

- **GPA: 3.97 / 4.0**
- Lewis Honors College, Competitive Programming Team (placed 1st in Kentucky at ICPC Regionals 2024), Undergraduate Science Journal Club
- Department of Computer Science Award for Outstanding Academic Achievement, Dean's List for all 8 semesters
- Undergraduate teaching assistant for classes covering Unix, intermediate C++, computer graphics, and UI development

**Henry Clay High School**
*Lexington, KY* *August 2016-May 2020*

## FEATURED PROJECTS (full portfolio)

**Deep State-Value Estimation for Long-Term Planning**

- A novel reinforcement learning strategy combining deep image analysis models and classical tree-search algorithms
- Shows to improve over standard tree search by up to **10%** in a generic strategy game application

**Hyperbolic Relevance Estimation for Improved Semantic Search**

- Semantic search model developed in Pytorch leveraging SentenceBERT embeddings and hyperbolic geometry
- Shown to improve semantic representations of sentences by a **factor of 2** over baseline Euclidean models

**Hydraulic Erosion Simulation**

- Realistic simulation of gradual hydraulic erosion in real time on randomized or user-defined terrain
- Implements a Perlin noise procedural generation algorithm and allows for user customization

## PROFESSIONAL EXPERIENCE

**Carlson Software - Machine Learning Engineer Intern**
*Maysville, KY* *May 2024 - August 2024*

- Using PyTorch Lightning to discover architecture and training improvements for multiclass image segmentation models applied to satellite imagery, resulting in up to an **18%** improvement in Dice coefficient
- Updating user interface for point-cloud visualization software from Win32 to Qt framework

**University of Kentucky - Medical Imaging/Machine Learning Research Assistant**
*Lexington, KY* *January 2023-January 2024*

- Used PyTorch to develop a novel training approach for image segmentation models, shown to improve over baselines by up to **32.4%** across multiple metrics and datasets
- Full paper accepted to **ISBI 2024**, poster presented at **CCS 2023**
- Received Undergraduate Research Fellowship for Fall 2023

**Infineon Technologies - Computer Engineering Intern**
*Lexington, KY* *May 2023-August 2023*

- Developed physical verification rules in SVRF and designed transistor-level validation cells for unit testing
- Utilized computer engineering expertise to resolve physical verification discrepancies in new hardware devices
- Created comprehensive Vim syntax highlighter for SVRF using Vimscript

**University of Kentucky - Nuclear Physics Research Assistant**
*Lexington, KY* *August 2022-January 2024*

- Used C++ and HDF5Lib to create a high-speed data acquisition system for the NOPTREX experiment investigating gamma radiation emissions from decaying neutrons
- Presented at **NCUR 2023** and **APS April Meeting 2023**, project used to collect data from a particle accelerator at the Japan Proton Accelerator Research Complex

**Lockheed Martin - Software Engineering Intern**
*Lexington, KY* *May 2022-August 2022*

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

## TECHNICAL SKILLS

**Languages:** C++, C#, Python, Java, C, HTML, CSS, JavaScript, PHP, LaTeX, AMPL, Bash, MATLAB, SVRF
**Frameworks/Libraries:** .NET, PyTorch, PyTorch Ligtning, sklearn, D2L, H5py/HDF5Lib, NiBabel, ROOT, Qt, Win32
**Tools:** Google Colab, Git/GitHub/Gitea, Linux, Unity, Arduino, Anaconda, RapidAPI, Vim, Weights and Biases