

# ADVAITH MALKA

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## EDUCATION

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Virginia Tech – Blacksburg, VA  
Bachelor of Science – Computer Science

May 2027  
GPA: 3.96/4.0

## EXPERIENCE

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Undergraduate Research Assistant

August 2025 – Present

ROLE Lab – Blacksburg, VA

- Integrated **RAG** with special **uncertainty tokens**, reducing unnecessary LLM retrieval by **~30%**.
- Built a **RAG evaluation** pipeline using **vLLM** and **ElasticSearch** to benchmark LLMs on **30K+** queries.
- **Automated** end-to-end data processing pipelines to **standardize 6** major academic datasets for experimentation.

Cybersecurity and AI Intern

May 2025 – August 2025

RTX – Cedar Rapids, IA

- **Developed** an **AI agent** using **RAG** to generate **context-aware** code, accelerating development by **~70%**.
- **Containerized** the RAG agent with **Docker**, improving **scalability** and ease of deployment.
- Researched and built cybersecurity tools to **optimize** fuzzing pipelines and **enhance** vulnerability detection.

Undergraduate Research Assistant

February 2025 – June 2025

EEG2Text – Blacksburg, VA

- Maintained codebase for **EEG2Text** research paper by Professor Wang and colleagues.
- Refactored and optimized **2000+** lines of code for improved readability and modularity.
- Identified and resolved **5+** issues by debugging and writing testing scripts using multimodal EEG data.

Co-Founder & Tutor

September 2023 – June 2025

Precision Prep Tutoring – Aldie, VA

- Increased student **SAT/SOL** scores by **15%** and generated **\$5,000+** in revenue through personalized instruction.
- Designed lesson plans, focusing on **active recall** and **spaced repetition** techniques.
- Managed website, marketing, and payroll for employees.

## PROJECTS

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**RF Propagation & Ray Tracing Simulator** | *Unreal Engine, NVIDIA Sionna, C++, TensorFlow* Sept. 2025 – Present

- Engineered a **low-latency** bridge using **pybind11** to embed a Python interpreter within UE5 C++, executing **NVIDIA Sionna** raytracing on background threads to prevent game-thread blocking.
- **Architected** a real-time data pipeline that extracted UE5 static mesh buffers and serialized the geometry into PLY files for **real-time** Sionna scene ingestion.
- **Achieved** a stable **18-20** path solves per second by streaming multi-path solver polyline results to UE5 Blueprints.

**BioSegment - Mitochondria and Cristae Segmentation Models** | *PyTorch, ReactJS, Flask*

March 2025

- Built a **PyTorch** pipeline for **mitochondria/cristae segmentation** from EM images, cutting manual analysis by **95%**.
- Applied **image augmentation** and **early stopping** techniques to achieve **>0.8 IOU** on segmentation masks.
- Built a **full stack** React/Flask web tool to **visualize** segmentation masks from uploaded EM images.

**Distributed Product Data Ingestion System** | *AWS EC2, Flask, Selenium, Pandas, OpenAI API*

March 2025

- Deployed a data pipeline on **AWS EC2** to **automate** ingestion and **normalization** of real-time product data.
- Leveraged an **LLM** to synthesize unstructured HTML into standardized JSON metadata objects.
- Engineered a fault-tolerant Python agent processing **150,000+** interaction events with automated error recovery.

## SKILLS

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**Programming languages:** Python • JavaScript • C • C++ • Java • SQL • HTML • CSS • MATLAB

**AI/ML:** PyTorch, TensorFlow, vLLM, LangChain, LlamaIndex, Hugging Face, Scikit-Learn, Pandas, ChromaDB

**Cloud, Web & Tools:** AWS (EC2), Docker, Git, REST APIs, React, Node.js, Flask, ElasticSearch, Linux