

ISAIAH MILKEY

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EDUCATION

ARIZONA STATE UNIVERSITY, BARRETT HONORS COLLEGE

Bachelor of Science in Computer Science

Master of Science in Computer Science

Tempe, AZ

Expected May 2026

Expected May 2027

- GPA: 3.64

- Relevant Courses:** Foundations of Machine Learning, Deep Learning Structures, Artificial Intelligence, Natural Language Processing, Data Structures and Algorithms, Applied Linear Algebra

SKILLS

Programming Languages: Python, C++, SQL, R

Frameworks: PyTorch, Numpy, Pandas, scikit-learn, Hugging Face

Tools: Git, Matlab, SolidWorks, Linux, Jupyter, VS Code

Other: Data Visualization (Seaborn, Matplotlib), Adobe Creative Suite

RESEARCH EXPERIENCE

Agentic AI Researcher

Tempe, AZ

LENS Lab, Arizona State University

Aug 2025 – Present

- Designed multi-agent collaboration architectures using **Agentic AI** to improve reasoning and scalability in LLM systems.
- Implemented **retrieval-augmented generation (RAG)** with **graph-based memory**, enhancing context recall and task efficiency.
- Developed and evaluated **hierarchical memory models** (long-term, contextual, entity-level) for dynamic reasoning tasks.

Perovskite Materials Researcher

Tempe, AZ

Rolston Lab, Arizona State University

May 2025 – Present

- Led hybrid **materials informatics** project integrating ML and LLMs to classify **perovskite stability** from UV-Vis spectra.
- Implemented a **memory framework** and **Prompt-Tuning** to increase accuracy on small LLaMA-2-7b model by **8%**.
- Built **end-to-end scikit-learn pipeline** for preprocessing, feature extraction, and model benchmarking on limited samples.
- Correlated optical and structural features with degradation behavior using **data mining and regression analysis**.

TECHNICAL EXPERIENCE

Open-Source Wikipedia Translator (Capstone Project)

Aug 2025 - Present

- Collaborating with a team on an **open-source project** that translates Wikipedia articles to less represented languages.
- Used **BeautifulSoup** to parse **HTML** and extract, clean, and organize article sections, converting them into structured **JSON/Pydantic** objects for backend and frontend integration.
- Contributed to the system's end-to-end workflow, enabling seamless data exchange between the **FastAPI backend** and **Electron-based frontend** for efficient multilingual content rendering.

MilkBot – Modular LLM Agent with Tool Use & RAG

Aug 2025 - Dec 2025

- Built a **modular LLM agent** that classifies queries into multiple domains and dynamically routes them through specialized reasoning and tool-based pipelines.
- Increased accuracy from 30% → 60%** on a joint math, coding, planning, and prediction QA dataset.
- Implemented **tool-augmented inference** using **RAG** (LangChain vector DB), Wikipedia scraping, planning-based reasoning, self-consistency, and LLM-based verification.
- Designed domain-specific workflows for **math, coding, planning, and prediction tasks**, including an LLM-driven calculator and automated batch evaluation.

CT Scan Battery Deformation Clustering

Aug 2025 - Dec 2025

- Developed an **unsupervised ML pipeline** using PCA and K-Means to identify subtle manufacturing build variations in cylindrical lithium-ion battery CT data.
- Reduced 14 high-dimensional CT-derived geometric features to **8 principal components retaining 96.1% variance**, enabling efficient clustering.
- Achieved **93.8% separation of a known anomalous production batch** (122/130 cells) and an ARI of 0.31 against ground-truth batch labels.
- Identified **core geometry features** (core circularity and area) as primary drivers of structural variation relevant to battery quality assessment.