

Sosna Worku Achamyeleh

sosna.achamyeleh@gwu.edu | +1 202 468 5422 | linkedin.com/in/sosna-achamyeleh | sossyh.github.io | Alexandria, VA, USA

PROFESSIONAL SUMMARY

AI researcher interested in understanding how machines learn from complex visual and multimodal data. My work has been shaped by applying deep learning to real-world challenges, including medical image analysis and intelligent systems for healthcare applications. I enjoy exploring computer vision and trustworthy AI, with the goal of building reliable systems that can support meaningful decisions and improve how technology interacts with the real world.

Research Interests: Computer Vision, Vision Foundation Models, Multimodal AI, Deep Learning, Medical AI, Representation Learning, Trustworthy AI, Large-Scale AI Systems

EDUCATION

The George Washington University

M.S. in Artificial Intelligence & Machine Learning

Formerly enrolled in M.S. in Computer Science (Machine Intelligence & Cognition specialization)

Washington, DC, USA

Aug 2025 – Expected May 2027

- **GPA:** 3.78/4.00
- **Black in Robotics + 3M Tuition Fellowship (\$26,115):** Recipient of a tuition fellowship awarded to one of the top two applicants.
- **Coursework:** Design & Analysis of Algorithms, Machine Learning, Neural Networks & Deep Learning, Trustworthy AI, Computer System Architecture, Advanced Software Paradigms

Addis Ababa University

B.S. in Software Engineering and Computing Technology (Software Engineering Stream)

Addis Ababa, Ethiopia

Oct 2019 – Jul 2024

- **GPA:** 3.62/4.00 (Great Distinction)
- **Coursework:** Natural Language Processing, Fundamentals of Artificial Intelligence, Machine Learning and Big Data, Data Structures & Algorithms, Object-Oriented Programming, Operating Systems, Human-Computer Interaction

PROFESSIONAL DEVELOPMENT

Neuromatch Academy

Deep Learning Course

Jul 2026

- Completed an intensive course on building and analyzing deep learning models using Python and PyTorch, covering neural networks, computer vision, transformers, generative models, optimization, and reinforcement learning.
- Collaborated in a six-member team project comparing visual representations learned by deep neural networks with human brain responses from fMRI data to study how AI models process visual information.

Africa to Silicon Valley (A2SV)

Data Structures & Algorithms Program

Oct 2022 – Oct 2023

- Completed an intensive program focused on data structures, algorithms, competitive programming, and developing problem-solving skills for technical challenges.

Aspire Leaders Program

Leadership Program Participant

Apr 2023 – Oct 2023

- Participated in a global leadership program founded at Harvard University focused on communication, leadership development, professional growth, and engagement with an international cohort.

RESEARCH AND PROFESSIONAL EXPERIENCE

Software Developer

Phoenixopia Solutions PLC | Addis Ababa, Ethiopia

Mar 2025 – Jul 2025

- Developed responsive client-side web applications using Next.js and Tailwind CSS with a focus on usability, performance, and maintainability.
- Implemented client-side routing and optimized page performance using Next.js Link and Image components.
- Integrated backend REST APIs to retrieve and display dynamic data within web applications.

Junior Machine Learning Engineer (Volunteer)
Omdena San Jose Chapter | Remote (San Jose, CA, USA)

Oct 2024 – Mar 2025

- Contributed to a predictive modeling project focused on estimating the risk of Coronary Artery Disease (CAD) and Heart Failure using National Health and Nutrition Examination Survey (NHANES 2017–2020) data.
- Led a team of 25 junior machine learning engineers in developing data preprocessing workflows, including missing data handling using Multivariate Imputation by Chained Equations (MICE) and feature selection using Recursive Feature Elimination (RFE).
- Conducted exploratory data analysis using Matplotlib and Seaborn to investigate relationships between health indicators and disease outcomes.
- Developed and evaluated machine learning models including Random Forest, XGBoost, and Logistic Regression; XGBoost achieved the highest performance with 88% accuracy, 0.86 precision, 0.84 recall, and 0.85 F1-score.
- Mentored team members on data preprocessing techniques, machine learning workflows, and model evaluation approaches.

Software Engineer Intern

Mar 2023 – Jun 2023

Escalate Africa Software Development S.C. | Addis Ababa, Ethiopia

- Developed a hospital and doctor recommendation system for Addis Ababa, Ethiopia, providing personalized recommendations based on user-reported symptoms.
- Collaborated with a 15-member development team to design and integrate frontend and backend components.
- Developed RESTful APIs using ASP.NET Core, achieving response times below 90 ms under 500 concurrent requests.
- Improved software reliability and maintainability by implementing Clean Architecture principles and Test-Driven Development (TDD), achieving 100% unit test coverage across 50+ modules.

TEACHING EXPERIENCE

Assistant Lecturer (Part-time, Computer Programming)

Mar 2025 – Aug 2025

Addis Ababa University | Addis Ababa, Ethiopia

- Delivered lectures and laboratory sessions for an undergraduate Computer Programming course covering Python programming, loops, functions, object-oriented programming, and algorithms.
- Guided students in designing algorithms using flowcharts and translating them into working Python programs through practical assignments.
- Supervised group projects and provided hands-on guidance in coding, debugging, and improving software solutions.
- **Tools:** Python, Google Colab

Teaching Assistant (Data Structures and Algorithms)

Jul 2024 – Aug 2024

AddisCoder | Addis Ababa, Ethiopia

- Assisted 99 high school students across Ethiopia in learning programming fundamentals, data structures, and algorithms.
- Delivered mini-lectures and provided hands-on support during laboratory sessions to help students understand programming concepts.
- **Tools:** Python, Jupyter Notebook

Back-end Development Instructor (Volunteer)

Feb 2024 – Mar 2024

Ethioware EdTech Initiative

- Trained 54 women across multiple African countries in backend software development through project-based instruction.
- Guided students in building backend applications using C#, ASP.NET Core, PostgreSQL, GitHub, and development tools.
- **Tools:** C#, ASP.NET Core, PostgreSQL, VS Code, GitHub

Teaching Assistant (Programming and Web Development)

Aug 2022

American Spaces | Bahir Dar, Ethiopia

- Taught programming fundamentals and static web development to 15 students through hands-on lessons.
- **Tools:** HTML, CSS, JavaScript, VS Code

SELECTED PROJECTS

Reliability and Explainability of Vision Transformers Under Medical Distribution Shift

Jun 2026 – Present

- Investigated whether deep learning models for medical image classification maintain reliable performance when evaluated across different healthcare datasets, focusing on robustness, uncertainty, and explainability.
- Trained and compared Vision Transformer and convolutional neural network architectures using medical chest X-ray

datasets, applying PyTorch-based deep learning workflows for model development and evaluation.

- Analyzed model behavior using performance metrics, calibration methods, uncertainty estimation, and explanation techniques including attention-based visualization and GradCAM.
- Evaluated the trade-off between predictive performance and reliability, highlighting challenges in deploying AI models under real-world clinical distribution shifts.

Investigating Face-Selective Visual Information Using Deep Neural Network Ablation

Jul 2026 – Present

- Studied how artificial neural networks represent visual information by comparing deep neural network features with human brain responses measured through fMRI.
- Built voxel-wise encoding models using pretrained vision networks and fMRI responses from the Algonauts 2021 dataset to analyze relationships between model representations and visual brain regions.
- Compared AlexNet and face-specialized ResNet50 representations to examine how network architecture and training objectives influence learned visual features.
- Investigated targeted neural network ablation to identify whether specific artificial units contribute selectively to face-related visual processing.

Benchmarking Classical and Transformer-Based NLP Models for Stress Detection

Jan 2026 – May 2026

- Investigated the effectiveness of traditional machine learning and transformer-based approaches for detecting stress from social media text using the Dreddit Reddit dataset.
- Built and compared Naive Bayes, Logistic Regression with TF-IDF features, and DistilBERT models using Python, Scikit-learn, and Hugging Face Transformers.
- Designed robust evaluation experiments using six stratified train/validation/test splits and statistical significance tests including McNemar's test, Wilcoxon signed-rank test, and Nadeau–Bengio corrected t-test.
- Found that DistilBERT achieved the strongest performance with a macro F1-score of 0.793 and ROC-AUC of 0.880, outperforming classical approaches.

Threat Detection in Spoken Amharic Language

Sep 2023 – Jun 2024

- Developed a real-time speech classification system to identify threatening and non-threatening spoken Amharic content, addressing the lack of available resources for Amharic language technologies.
- Built and annotated an audio dataset of 5,800 recordings and applied augmentation techniques including time stretching, pitch shifting, noise addition, and time shifting using Python-based audio processing tools.
- Extracted acoustic representations using Mel-Frequency Cepstral Coefficients (MFCCs), Chroma features, spectral features, and Zero-Crossing Rate (ZCR), then evaluated CNN, RNN, and LSTM architectures.
- Achieved the strongest performance using a CNN-based model, demonstrating the feasibility of deep learning approaches for real-time Amharic speech threat detection.

AWARDS AND ACHIEVEMENTS

- Awarded Best Poster Presentation (Team Award) at Addis Ababa University Research Week 2024 for the project *Threat Detection in Spoken Amharic Language*. [\[Link\]](#)
- Selected as a Top 2% Finalist for the 2023 Cohort of the Aspire Leaders Program from a global pool of participants. [\[Link\]](#)
- Awarded \$1,250 for Eskalate LLC's third impactful real-world group project through the A2SV internship program. [\[Link\]](#)
- Selected among the top 40 students in Ethiopia to represent the country in Huawei's Seeds for the Future program in 2021. [\[Link\]](#)

POSTERS AND PRESENTATIONS

- Presented a research poster titled *Benchmarking Classical and Transformer-Based NLP Models for Stress Detection* at the George Washington University SEAS Research & Development and Senior Design Showcase, April 2026.
- Presented a research poster titled *Threat Detection in Spoken Amharic Language* at Addis Ababa University Research Week, May 2024.

LEADERSHIP EXPERIENCE

Head of Communications Education

Nov 2023 – Mar 2025

Africa to Silicon Valley (A2SV) | Addis Ababa, Ethiopia

- Led the Communications Education program, designing and delivering training that helped students strengthen professional communication, presentation, and technical interview skills.
- Mentored and taught 205 university students from more than 20 African countries through interactive lectures, workshops.