# Suramya Angdembay

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## Education

**University of Southern Mississippi** Aug. 2023 - May 2027
*B.S. Computer Science, B.S. Mathematics* *Current GPA: 3.75/4.0*

**St. Xavier's college, Maitighar** Jun. 2019 - Jun. 2022
*Science* *GPA: 3.85/4.0*

## Technical Skills

**Languages**: C/C++, Python, JavaScript, HTML/CSS
**Tools**: Git/GitHub, Jupyter Notebook, VS Code, Linux, MATLAB, R studio
**Frameworks**: TensorFlow, React, PyTorch, Qiskit

## Honors & Awards

**Honors Keystone Scholar Award** | *University of Southern Mississippi* Aug 2025
- Supports high-achieving juniors/seniors to design and complete an original research project (Senior Honors Thesis)

**Wright W. & Annie Rea Cross Mathematics Research Scholarship** Aug 2025
- Merit-based scholarship supporting undergraduate participation in faculty-led mathematics research
- Issued by the School of Mathematics and Natural Sciences, University of Southern Mississippi

## Experience

**Undergraduate Research Assistant** | *University of Southern Mississippi* Aug. 2024 – Present
- Conducted research on PCA-based dimensionality reduction of user behavior features from the CMU CERT insider threat dataset for unsupervised anomaly detection.
- Optimized parallel computing workflows using Slurm on USM's Magnolia HPC cluster
- Presented research findings at the AMS Southeastern Sectional Meeting at Clemson University

**Research Assistant** | *Institute for Advanced Analytics and Society, USM* Jan. 2026 – Present
- Contributed to research and development for Aquaview, a NOAA-facing ocean data platform designed to support data access, analysis, and decision-making workflows.
- Worked on Aquaview's MCP connector to support analysis-oriented interactions with ocean datasets and improve the platform's ability to serve structured analytical tasks.
- Worked on mixed layer depth (MLD) computation workflows using ocean model forecast data and observational inputs to support analysis within Aquaview.
- Helped develop correction-oriented analysis pipelines for MLD estimation, integrating model output, nearby observations, and provenance-aware reasoning to improve interpretability of ocean predictions.

**AireChemistry Weather API Developer** | *AireChemistry* Jul. 2025 – Dec. 2025
- Designed and implemented a FastAPI-based South Africa weather and air-quality API serving gridded temperature, wind, cloud cover, and $PM_{2.5}$ fields from NumPy-backed data pipelines.
- Developed endpoints for texture and point-based map visualizations, including industrial hotspot GeoJSON layers and mock weather-station time series for major South African cities.
- Engineered data-handling workflow: defined spatial bounds, generated synthetic elevation–weather fields, and optimized array formats for low-latency requests from the AireChemistry dashboard.

**Mathematical Modeling & Optimization Intern** | *Optimal Answers LLC* Jan. 2026 – Present
- Developed structured databases for Gulf Coast Restoration Fund (GCRF) projects, organizing legislative rules, project attributes, and scoring metrics to support optimization-based funding allocation models.
- Designed constraint definitions and decision rules in the excel based optimal application

## Projects

**Insider Threat Detection** | *Python, HPC, ML* Aug. 2024 – Present

- Conducting research under the mentorship of Dr. Haiyan Tian
- Tested principle component analysis(PCA) based machine learning approach in the CERT insider dataset
- Analyzed the effect of dimensionality reduction and noise filtering by PCA on various ML algorithms
- Managed parallel data processing using Slurm for efficient execution on USM Magnolia HPC

**Mathematical modelling for olympic medal prediction** | *Python, ML* Jan. 2025

- Awarded Successful participation in COMAP's 5 day mathematical modeling competition
- Got a Blog post shoutout by the organizers for our unique story
- Used linear regression as a baseline and for feature selection then applied Random Forest Regressor (RFR) for modeling 2028 Olympic medal predictions.
- Applied ARIMAX to test feature transformations and validate assumptions for RFR model.

**Quantum Galton Board Simulator** | *Qiskit* Jul. 2025

- Built a quantum Galton board simulator in Qiskit to model quantum walks and compare them with classical random walks for Wiser quantum Projects 2025.
- Implemented an $n$-level circuit that scales polynomially in gates while reusing qubits to stay compatible with NISQ-era hardware.
- Explored biased coin-flips via rotation gates and visualized the resulting probability distributions.

**eBay University Machine Learning Challenge** | *Python, PyTorch, NLP, Transformers* Nov. 2025

- Developed an end-to-end NLP pipeline for Named Entity Recognition (NER) on German eBay Motors listings to extract structured product attributes from short titles.
- Performed domain-adaptive masked language model (MLM) pretraining on 2M unlabeled listings using XLM-RoBERTa, improving downstream NER performance over baseline models.
- Fine-tuned a transformer-based token classification model with BIO tagging and built an inference pipeline to generate EvalAI-compliant submissions, achieving Rank 23 on public leaderboards

**Wildfire Spread Prediction App** | *TensorFlow, React Native, CNN* Sep. 2024

- Built a CNN-based wildfire spread predictor trained on Google's Next Day Wildfire Spread dataset for USM Hatchathon 2025
- Integrated Google Maps using React Native and deployed the model using FastAPI on AWS EC2.
- Integrated Firebase for user authentication and real-time alert notifications

## Conferences

**AMS Southeastern Sectional Meeting** | *Clemson University* Mar. 2025

- Presented a talk on Insider threat detection using Principal component analysis under the special session on Undergraduate Mathematics and Statistics research III
- Attended sessions on computational mathematics and machine learning

**The International Conference for High Performance Computing** | *SC25 Conference* Nov. 2025

- Selected among 15 participants in ACM SIGHPC immersion program at SC25
- Completed the hands-on HPC/AI crash course by Oak Ridge leadership Computing Facility (OLCF)
- Gave a 5 minutes Lightning talk at Student HQ on the topic of My experience at SC with SIGHPCI

## Programs & Workshops

**CompuCell3D Biological Modeling Virtual Summer School & Hackathon** | *Indiana University* Jul. 2025

- Accepted into a selective international summer school and hackathon on multicell virtual tissue modeling.

**WISER & Womanium Quantum Summer Program** Jun. 2025 – Jul. 2025

- Participated in the Womanium & WISER Quantum Computing Summer program.