

# Mustafa M. Yildiz

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## EDUCATION

### Rowan University, Glassboro — Bachelor of Science in Computer Science

Sept 2023 - May 2027

Relevant focus areas: software engineering, systems design, distributed systems, human computer interaction, applied research methodologies.

## PROJECTS

### AERI — Atmospheric & Energy Research Intelligence

June 2025 - Current

Architected and built AERI, a multi-suite weather intelligence and research platform combining radar analysis, atmospheric simulation, energy modeling, forensics, and decision intelligence into a unified system used for reasoning under uncertainty rather than single-value prediction.

Developed a research-grade mobile application with advanced modules including Radar, Tomography, Heliosphere (solar activity), Energy modeling, Forensics, Spotter Operations, and Hardware integration, bridging professional meteorology concepts with accessible human-centered interfaces.

Built a mission-based simulation pipeline (ingest → model → simulate → decide) with deterministic replay, scenario ranking, and operational playbooks, allowing users to explore competing outcomes, failure modes, and confidence bounds rather than opaque forecasts.

Engineered the entire platform under a strict sub-\$100 infrastructure budget, prioritizing architectural efficiency, explainability, and long-term maintainability over scale-at-all-costs approaches.

Positioned AERI as a living research system, continuously evaluated for epistemic risk, interpretability, and failure behavior—treating disagreement, partial data, and uncertainty as first-class signals rather than errors.

### AERI LANG — Domain-Specific Language for Scientific Simulation

Jan 2026 - Current

Designed and implemented a domain-specific language for weather, physics, and research simulations with an emphasis on **interpretability, reproducibility, and uncertainty-aware reasoning**.

Built a **sentence-based simulation syntax** and scenario branching system to explore divergent outcomes under partial or conflicting data.

Implemented **native parallel execution, deterministic replay, and checkpoint-based rewind**, enabling traceable and repeatable experiments.

Exposed a stable **SDK and native compilation path** (Python/C++/LLVM) to support application integration and performance experimentation.

## RESEARCH & WRITING

- Group research on **distributed systems**, focusing on **gossip protocols, disagreement, and uncertainty as signal**
- Independent research on **AI systems efficiency**, exploring whether a **lightweight parallel diagnostic worker** can reduce inference energy
- Author of *Envelope Progress* (Substack), writing on **AI reasoning, epistemic risk, and embodied intelligence**

## SELECTED APPS

- Daily Sprint — Scrum Application
- Qurana — Language-Learning Application (shipped)
- Fisherman — Reward Driven Productivity App (shipped)
- ScriptMate — Creative Writing Tool
- Quorfit - Adaptable Workout App

## TOOLS, PLATFORMS & WORKFLOWS

Mobile Development: Expo, React Native, cross-platform builds

Build & Release Tooling: Fastlane, Expo Doctor, App Store deployment workflows

Developer Tooling: Homebrew, CLI-based setup, environment configuration

Debugging & Diagnostics: dependency resolution, runtime inspection, iterative testing

Research Tooling: Python-based experiments, simulations, and reproducible runs

## LANGUAGES

- English (Fluent), Turkish (Fluent)

