

# Jay Blankenship

1128 Cary Rd, Algonquin, IL 60102 • (815) 347-4790

[Jayblankenship@outlook.com](mailto:Jayblankenship@outlook.com)

## Professional Summary

Experienced software engineer with a Master's in Machine Learning and Artificial Intelligence and over three years of professional experience building high-performance AI-driven and full-stack systems. Expert in C++, Python, and neural network implementation, with strong skills in reinforcement learning, algorithm optimization, and solving complex technical challenges. Proficient in designing **efficient generative algorithms**, developing **highly optimized networked applications**, and building **cloud-ready architectures using modern, cutting-edge frameworks**. Delivered solutions with **architectures designed for easy future feature expansion and rapid deployment through CI/CD integrations**. Skilled in **low-level memory management, shared memory design to avoid race conditions, pointer manipulation**, and applying expert C++ performance techniques to JavaScript via SharedArrayBuffers and Web Workers to achieve exceptionally efficient solutions. **Specialist in identifying race conditions, performance bottlenecks, and architectural inefficiencies across all levels of a system, from hardware-conscious, low-level operations to high-level web and application architectures, consistently implementing optimizations and solutions that exceed expectations and consolidate multi-system architectures into robust, scalable designs.**

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## Technical Skills

- **Programming Languages:** C++, Python, C, C#, Java, SQL, Perl, Javascript, Typescript, HTML, css, xml, F#, PHP, Kotlin
  - **AI/ML Technologies:** Neural Networks, Large Language Models, Reinforcement Learning, Q-Learning, Markov Decision Processes, TensorFlow, PyTorch
  - **Development:** Unreal Engine 5 (5.2–5.5), Scripting, AI, Neural Networks, Procedural Content Generation, Neural Network integration, Mobile Development, Shell scripting, Linux, Databases
  - **Tools & Platforms:** Visual Studio, Git, Perforce, Linux, AWS, CloudFlare, Docker, Google Analytics
  - **Technologies:** Multithreading, Network Programming, Shader / GPU Programming, 3D Math, Data Pipeline Automation, CI/CD
  - **Specialized Skills: Hardware/Software-Conscious Optimization, GPU Acceleration, Low-level Memory Management, Parallel & Multi-threaded Algorithms:** Applied low-level optimization in C++ (Pointer/Memory Manipulation) and WASM to achieve sub-millisecond latency in performance-critical systems.
  - **Methodologies:** Agile, Code Reviews, Debugging, Performance Optimization
- Sole Lead Software Engineer (Independent Contractor)**

## 9/2024 – Present

Design, architect, and deliver self-sustaining software systems as a sole developer, focused on eliminating ongoing maintenance, minimizing future development needs, and enabling long-term operational independence. Own the full lifecycle from system architecture through production delivery, optimization, and knowledge transfer.

- Architect end-to-end software systems that meet functional, technical, and operational constraints while intentionally reducing long-term developer dependency.
- Deliver production-ready solutions designed to operate reliably without continuous engineering involvement.

## High-Performance, Zero-Maintenance Web Platforms

- Engineered fully static, owner-managed JAMstack platforms delivering dynamic, app-like experiences without backend infrastructure or ongoing development requirements.
- Achieved elite Core Web Vitals (Performance 93, Accessibility 96, SEO 91), including **0ms Total Blocking Time** and **0 Cumulative Layout Shift**, demonstrating that static-first architectures can outperform traditional dynamic systems.

## Full-Stack Systems Engineering

- Single-handedly designed and built a production-grade Transportation Management System using React, Node.js, and Supabase.
- Implemented live GPS tracking, dynamic route optimization, automated documentation, and role-based workflows within a system architected for long-term stability.

## Data Recovery, Analytics & Systems Integration

- Recovered years of seemingly lost, password-protected SQL analytical data by accessing backend application data when standard reporting paths were unavailable.
- Reconstructed historical datasets to restore operational and financial visibility.

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- Built automated revenue and profit dashboards using SQL and custom data-processing scripts.
- Integrated Google Analytics across multiple business entities.

## Infrastructure Modernization & Cost Elimination

- Migrated multiple websites and internal tools from high-cost, legacy hosting environments to serverless and static-first architectures.
- Reduced recurring hosting and infrastructure costs by up to **87%** while improving performance, security, and resilience.

## Engineering for Independence

- Applied Domain-Driven Design, clean architectural boundaries, and Git-based workflows to ensure systems remain understandable and operable without ongoing developer involvement.
- Designed architectures enabling endless extensibility and reusable solutions.

## Professional Experience | Centuria (Contractor for National Oceanic and Atmospheric Administration)

### Scientific Applications Programmer / Database Administrator (Security Clearance)

Stennis Space Center, MS | 8/2022 – 8/2024

Engineered and maintained mission-critical scientific data systems supporting NOAA operational and archival platforms, spanning secure data ingestion, real-time processing, system automation, and web infrastructure.

- **Designed and implemented a high-performance secure file retrieval system in Java**, replacing legacy **FTP with HTTPS** and **eliminating recurring FTP server costs**. Introduced **offline hashmap-based state tracking** to detect file deltas and download only new data, achieving **O(1) bandwidth efficiency** and significantly improving **system reliability**.
- Built and automated large-scale data pipelines using **Python and SQL** to ingest, normalize, and persist netCDF scientific datasets; integrated metadata enrichment into databases and automated reporting pipelines.
- Optimized real-time system performance through **multithreaded C++ modules** and Linux cron-based automation, increasing update frequency and improving timeliness of mission-critical radar and sensor data.
- Developed recovery and backfilling scripts (**sh**) to correct archival inconsistencies across monthly HFRadar datasets; **went above and beyond by identifying previously unintegrated active stations**, restoring historical completeness, and ensuring long-term data integrity.
- Diagnosed and resolved complex cross-system integration failures involving ASCII parameter mismatches (e.g., COMPTILT asciild), restoring interoperability between partner systems and external data consumers.
- Maintained and repaired multiple production websites using **PHP, HTML, and JavaScript**; resolved regressions introduced by library updates, corrected logic errors, and restored full functionality.
- Led analytics platform migrations across multiple web properties, transitioning sites from **Google Analytics 360 to GA4**, ensuring accurate reporting and continuity of performance metrics.

## Projects | AI, Game Development & Large-Scale Web Systems (Sole Development / Personal Projects)

- **3D Snake Game with Neural Networks** – Unreal Engine 5.2, C++ | [itch.io](https://itch.io) | 2023  
Built a 3D Snake game with Q-Learning and neural network-controlled NPCs; optimized reinforcement learning algorithms and integrated real-time performance monitoring for responsive gameplay.
- **Open-World Multiplayer Networked Survival Game Base** – Unreal Engine 5.2, C++, Blueprint, Kotlin, SQL | 2023–2024  
Implemented a networked multiplayer inventory system using **MySQL and Kotlin API for database connectivity**, optimized build configurations, and leveraged Live Coding workflows for rapid iteration and reduced input latency.
- **OceanOnline: Massive Multiplayer Static Sailing Game** – WebGL, JavaScript, PeerJS | 2025  
Built a large-scale multiplayer sailing platform with dynamic generative terrain and an endless GPU-accelerated ocean. Utilized fragment and vertex shaders with deterministic functions to solve the ocean equation, achieving static deterministic replication using a single seed and ocean time variable. Implemented local encryption for player accounts, enabling fully serverless gameplay, and leveraged multithreading/workers for performance on desktop and mobile. Deployed entirely as a static site ([oceanonline.pages.dev](https://oceanonline.pages.dev)).

## Education

### M.S., Machine Learning and Artificial Intelligence | GPA 4.0

University of Illinois at Chicago, College of Engineering | 7/2023 – 12/2024

*Relevant Coursework:* Deep Learning, Reinforcement Learning, Large Language Models

### B.S., Computer Science | Recognized on College Honor Roll

University of Illinois at Chicago, College of Engineering | 5/2017 – 12/2021

*Relevant Coursework:* Algorithms, 3D Graphics Programming, Data Structures