Nathan Gopee

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Education

- **State University of New York at New Paltz** Jan. 2025 – Present
  M.S. Computer Science *New Paltz, NY*
- **State University of New York at New Paltz** Aug. 2021 – Dec. 2024
  B.S. Computer Science *New Paltz, NY*

Experience

- **Graduate Teaching Assistant** Jan. 2025 – Present
  SUNY New Paltz *New Paltz, NY*
  - Developed materials, held review sessions, office hours, and ran lab for 50+ students in Assembly Computer Architecture and Principles of Programming Languages; improved student performance by 10%
  - Integrated LCC.js a web compiler toolkit I worked on for interactive demonstrations
- **Graduate Lab Manager & Systems Administrator** Aug. 2024 – Present
  SUNY New Paltz *New Paltz, NY*
  - Architected enterprise SSO infrastructure with SAML authentication managing 50+ Linux servers at `hydra.newpaltz.edu`
  - Deployed local LLM infrastructure (`gpt.hydra.newpaltz.edu`) and lead 3D printing lab operations
  - Implemented network security protocols, automated deployments, and comprehensive disaster recovery systems

Projects

QView3D — 3D-Printer Farm Management Platform Python Go Vue Flask PySerial SQLite Bootstrap

- Led team to decompose monolithic Python backend into OOP-style classes: Go service handling virtual printer emulation with goroutines managing concurrent connections, Flask REST API orchestrating print queues across 20+ printers, and Vue.js frontend consuming WebSocket streams for real-time temperature, position, and status updates
- Built printer-agnostic G-code parser implementing USB serial communication protocol with baud rate handshaking, automatic port detection, and error recovery mechanisms for fault tolerance across different printer firmware; reducing manual oversight by 70% through intelligent job distribution and load balancing algorithms

ScuffedK8 — Lightweight Container Orchestration System Go K8s gRPC WebSocket REST

- Developed Kubernetes-inspired container scheduler implementing bin-packing, first-fit, and spread algorithms to maximize resource utilization, using Go interfaces to define pluggable scheduling policies with constraint filtering based on CPU cores, memory limits, and node labels for optimal workload distribution
- Implemented pod lifecycle management, node heartbeat monitoring with exponential backoff retry logic, and service discovery using microservices architecture with REST, gRPC, WebSocket protocols for high-availability container deployment

ScuffedRedis — Cache Performance Visualization Tool C++ React Three.js Node Socket.IO Docker

- Followed a tutorial (`https://build-your-own.org/`) for a C++ cache backend with template-based LRU/LFU/MRU eviction policies using `std::unordered_map` for O(1) hash lookups paired with doubly-linked list for O(1) insertion/deletion; exposed functionality through Node.js N-API bindings with automatic memory management via smart pointers
- Created 3D WebGL visualization rendering 100 voxels using Three.js instanced mesh rendering with color-coded heat maps for access patterns, particle effects for cache operations, and interactive animations displaying cache hit/miss patterns; deployed using Docker containers and nginx reverse proxy with Zipf distribution for realistic traffic simulation

Malware Classification Research — Security ML Analysis Python scikit-learn pandas NumPy Jupyter

- In progress of analyzing CIC-MalMem-2022 dataset, implementing several models (Log Reg, XGBoost, and others) to identify malware indicators like suspicious API patterns and code injection signatures; goal of achieving high classification accuracy with 55 memory features

Fibonacci Fractal Engine — Distributed Mathematical Computation Java gRPC Vue REST

- Built distributed compute cluster using Java ExecutorService with configurable thread pools (ForkJoinPool for recursive tasks), gRPC service mesh for work distribution across nodes with automatic load balancing, and comprehensive JUnit/Mockito test coverage including performance benchmarks
- Optimized recursive Fibonacci from exponential $O(2^n)$ time complexity to linear O(n) using HashMap memoization, reducing computation time from 20+ minutes to under 5 seconds through memory-efficient algorithms and parallel processing

Danmomo — Multiplayer Physics Game Godot Node WebSocket AWS

- Created Suika-inspired multiplayer game with real-time physics synchronization, WebSocket state management, and AWS-hosted leaderboards supporting concurrent players with <50ms latency

Fitness Tracker — Social Fitness Platform Vue Node Express Supabase Bulma

- Built full-stack social fitness application with user authentication, meal/exercise tracking, friend system, and analytics dashboards using Vue.js frontend and Node.js backend deployed on Render cloud platform

Homelab — Kubernetes Infrastructure Platform Docker K8s Linux Prometheus Grafana Traefik

- In progress of building out a multi-node Kubernetes/Proxmox cluster (workstations and several gaming laptops), Traefik ingress controller, Prometheus/Grafana monitoring stack, RAID NAS-backed for redundancy and snapshots, Longhorn distributed storage, and internal auth portal for secure access management

Technical Skills & Certifications

Languages

Java
C
C++
Python
Go
JavaScript
TypeScript
SQL
Assembly

Frontend/UI

React
Vue
Three.js
PixiJS
Tailwind
Bulma
Bootstrap
Electron
Godot

Backend/Databases

Node.js
Express
Flask
FastAPI
WebSockets
gRPC
REST
Nginx
Traefik
PostgreSQL
SQLite
MongoDB
Redis
MariaDB

Data/ML

pandas
NumPy
SciPy
scikit-learn
PyTorch
Matplotlib
Jupyter
OpenCV

DevOps/Cloud

Docker
Kubernetes
Helm
Ansible
Terraform
CI/CD
Git

Cloud Platforms

AWS
GCP
Azure
Render

Systems

Linux
Prometheus
Grafana
SSO/SAML

Certifications

Networking
Cloud Sec.
IT Arch.
DevOps