

# Gilbert Zhang

<https://gilbertz.me>

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## EDUCATION

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### Stony Brook University

B.S. Computer Science Honors

- GPA: 4.00/4.00, Dean's List Fall 2025

Stony Brook, NY

August 2025 – Expected May 2028

## EXPERIENCE

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### Research Assistant

Stony Brook University

September 2025 – Present

Stony Brook, NY

- Develop Neomantis, a distributed RNA sequence index at COMPAS Lab under Prof. Mike Ferdman, achieving **3x faster queries** and **2x lower costs** than existing tools, serving researchers across multiple institutions.
- Implement distributed indexing components using **Rust** and **gRPC**; deploy and manage a cluster of 90+ workers with **Ansible** to enable scalable, fault-tolerant sequence processing.
- Build **TypeScript**-based coordinator and frontend interface to provide researchers with intuitive access to query capabilities and real-time system monitoring.
- Optimize search algorithms and data structures to reduce query latency from seconds to **sub-second responses**, enabling reliable searches across **10,000+ RNA sequences** with comprehensive correctness testing.
- Collaborate with researchers from University of Maryland and Northeastern University to discuss design decisions, share results, and contribute to paper in preparation.
- Mentor new team members on codebase architecture and project goals; lead weekly meetings to discuss progress, challenges, and technical decisions, fostering a collaborative research environment.

### Representative

Stony Brook Computing Society @ Stony Brook University

September 2025 – Present

Stony Brook, NY

- Coordinate outreach initiatives and contribute to event planning for 200+ member computer science club, helping organize hackathons, tech talks, and networking events.
- Design and host hands-on Docker workshops for 30–40 students, teaching containerization best practices and development environment management with positive feedback on clarity and practical application.
- Mentor students on technical projects through peer mentorship program, providing guidance on architecture design, implementation strategies, and debugging to help mentees successfully complete projects.

## PROJECTS

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### Mutation Authority Framework | Rust, PostgreSQL, TypeScript, Next.js, WebAssembly

- Develop toolkit enabling developers to build secure, realtime collaborative applications with built-in conflict resolution and state synchronization, simplifying complex distributed systems challenges.
- Implement core backend services in **Rust** for performance and memory safety, using **PostgreSQL** for data persistence, **WebAssembly** for cross-platform deployment, and **TypeScript** for client-side framework APIs.
- Build the Next.js documentation site at [maf.gilbertz.me](https://maf.gilbertz.me) with interactive demos and comprehensive guides to enhance developer onboarding and adoption; publish the TypeScript SDK to npm and the Rust crate to crates.io for easy integration.

### CIMBALL | C++, Rust, Python, React, TypeScript

- Led a team of 4 students to design and build an internet-connected pinball machine for a class project, enabling remote gameplay through a web browser with real-time video streaming and input control.
- Designed 3D components in Autodesk Inventor and fabricated them using 3D printing and laser cutting to build the physical structure, integrating motors, sensors, and electronics for fully functional gameplay.
- Developed embedded software for Arduino in **C++** to control hardware components and manage game logic; implemented a **Rust**-based server for network communication; and built a **React** frontend with **TypeScript** for real-time flipper control and game state visualization.
- Successfully demonstrated the working prototype to 50+ students and faculty, showcasing seamless integration of mechanical, electrical, and software systems.

## TECHNICAL SKILLS

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**Languages:** HTML, CSS, JavaScript, TypeScript, Python, Java, SQL, C, C++, Rust, Bash

**Frameworks:** Node.js, React, React Native, Next.js, Express, Hono, tRPC, Django, Sanity CMS

**Developer Tools:** Git, GitHub, Docker, Linux, PostgreSQL, Ansible, gRPC, Bun, GraphQL, Autodesk Inventor