Justin W Smith

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Backend developer focused on systems programming, distributed architectures, and database optimization.

Education

University of Hawai'i at Mānoa **Honolulu, HI**

Bachelor of Science in Computer Science *Expected Graduation, Spring 2026*

- **GPA:** 3.9/4.0
- **Concentrations:** Software Engineering, Backend Development
- **Relevant Coursework:** Data Structures & Algorithms, Computer Organization, Object-Oriented Programming, Software Engineering, Data Networks, Programming Language Theory, Linear Algebra, Discrete Math
- **Dean's List:** Every semester for academic excellence.

Experience

Undergraduate Research Assistant | *C++* | *Python* | *SQL* **March 2025 – Present**

- Collaborating with Dr. Yifan Wang on research combining **AI**, **databases**, and **language-based query optimization**.
- Building a custom **PostgreSQL** extension in **C++** that adds **new SQL operators powered by LLMs** for natural language condition matching within queries.
- Developing an **asynchronous C++ query interface** to enable non-blocking execution and evaluate performance outside traditional SQL environments.
- Implementing **data retrieval strategies** to compare query inputs against ground-truth datasets and reduce reliance on real-time LLM calls.

Projects

Image Processing Service | *Amazon S3* | *Docker* | *Go* | *PostgreSQL* | *React* | *Redis* **April 2025**

- Built a full-stack image processing platform with a **Go backend** that handles uploads and processing, storing images in **Amazon S3** and managing user data in **PostgreSQL**.
- Created a secure authentication system with **JWT tokens** and **bcrypt** password encryption, including email verification and password reset.
- Used **Redis** for caching and as a task queue, allowing efficient background image processing to improve user experience.
- Packaged using **Docker** for streamlined development and deployment, with the complete stack deployed on **Render**.

Custom Memory Allocator + Visualizer | *C* | *TailwindCSS* | *TypeScript* **April 2025**

- Developed a custom **memory allocator** in C replicating standard functions like **malloc**, **free**, and **realloc**.
- Implemented comprehensive **unit tests** and integration tests to verify functionality, memory safety, and edge case handling.
- Created an interactive **visualizer** using TypeScript and TailwindCSS to analyze memory fragmentation and allocation strategies in real time.
- Optimized memory performance with advanced **data structures** and efficient allocation algorithms.

Study Buddy | *Node.js* | *PostgreSQL* | *Prisma* | *React* | *Vercel* **December 2024**

- Led backend development in a 5-person team project building a platform to connect students for study sessions.
- Designed and implemented the database schema, RESTful API, and authentication system with **Prisma** and **PostgreSQL**.
- Built key frontend components for session scheduling and user management using **React**.
- Implemented secure user features including **email verification** and **password reset**, and deployed the application on **Vercel**.

Technical Skills

Languages: C, C++, CSS, Go, HTML5, Java, JavaScript, Python, SQL, TypeScript

Developer Tools: Docker, Git, Kafka, Postman, Render, Vercel, Vite

Libraries/Frameworks: AWS, Express, GraphQL, Jest, MongoDB, NodeJS, PostgreSQL, Redis, ReactJS, RESTful APIs