Gabriel Windlin

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Education

ETH Zürich **Expected Graduation: June 2028**

Bachelor of Computer Science *Zürich*

- Courses: Algorithms & Data Structures, Linear Algebra, Discrete Mathematics, Intro to Programming.

Experience

VIS ETHZ **Oct 2025 – Present**

Computer Infrastructure Team Member *Zürich*

- Deployed **Rallly**, an open-source collaborative scheduling tool, on the association's local cluster using **Kubernetes**, enabling easier event coordination for the student board.
- Configured container orchestration and networking to ensure reliable, high-availability self-hosted services for the students.
- Collaborated with the infrastructure team to maintain, patch, and monitor on-premise server resources, gaining hands-on experience with bare-metal Linux administration.

PureGym / Skills Park **Mar 2022 – Present**

Customer Service & Operations *Zürich Area*

- Developed strong interpersonal and communication skills by serving a diverse client base in fast-paced environments, ensuring efficient daily operations and conflict resolution.

Projects

TCP Port Scanner | *Website* | *GitHub* **C | POSIX Sockets | Non-blocking I/O**

- Developed a highly efficient single-file TCP `connect()` port scanner in C, demonstrating deep understanding of **POSIX sockets** and **low-level networking**.
- Implemented **non-blocking I/O** with **select()** to manage per-port timeout control, significantly increasing scanning speed compared to blocking implementations.
- Engineered asynchronous connection handling using **EINPROGRESS** and **SO_ERROR** to correctly classify ports as open, closed, or filtered.
- Designed a minimal, signal-focused output system that emphasizes clarity and correctness without relying on any external libraries.

Converged Homelab Infrastructure **Docker | PostgreSQL | Caddy | Bash**

- Designed and deployed a microservices infrastructure on a resource-constrained node (Ubuntu), utilizing **Docker Compose** for orchestration and **Caddy** for automated HTTPS ingress.
- Architected a shared-resource database pattern using centralized **PostgreSQL 16** and **Redis** clusters to optimize memory usage across multiple self-hosted applications.
- Implemented **Split-Horizon DNS** via **AdGuard Home** and **Tailscale** for seamless local/remote access, secured with **CrowdSec** intrusion prevention and secrets management.
- Engineered automated reliability workflows using **Bash** scripts and **Cron** jobs for nightly encrypted database dumps and volume snapshots with strict retention policies.

SEC-SUITE: Security Toolkit | *Website* | *GitHub* **Python | Multi-threading | Security**

- Engineered a comprehensive security toolkit featuring multiple password cracking techniques including **Markov Chain** probabilistic generation, dictionary attacks, and **multi-threaded brute force**.
- Implemented modern hash algorithms (bcrypt, scrypt, argon2) with automatic type detection and salt handling.
- Developed security utilities including a **network port scanner** and encoding/decoding tools wrapped in an intuitive interactive CLI interface.

Kiroku-TUI | *GitHub* **Rust | Ratatui | Git Integration**

- Developed a high-performance terminal-based journaling tool in **Rust** using the **Ratatui** library for a responsive and keyboard-centric TUI.
- Integrated **Git-based synchronization** and file-watching functionality to ensure seamless note consistency across multiple devices.
- Implemented advanced search capabilities including **fuzzy matching**, deep content search, and tag-based filtering via YAML frontmatter.
- Engineered a robust configuration system and custom theming engine to support personalized workflows and visual aesthetics.

Neural Network in C | *GitHub* **C | Linear Algebra | Machine Learning**

- Engineered a modular neural network from scratch in pure C, implementing **backpropagation** and **gradient descent** without external libraries.
- Implemented multiple activation functions (ReLU, Sigmoid, Tanh) and loss functions to solve complex classification and regression problems.
- Integrated advanced training features including **momentum**, **learning rate decay**, and **L2 regularization** to improve convergence and prevent overfitting.
- Developed a diagnostic suite featuring **gradient checking** to mathematically verify the correctness of the backpropagation implementation.

Our Place: Collaborative Digital Space | *Website* | *GitHub* **React | Supabase | Framer Motion | PostgreSQL**

- Developed a collaborative "Digital Apartment" web application using **React 18** and **Supabase** to facilitate shared experiences for long-distance relationships.
- Implemented real-time synchronization for a shared media player (YouTube API) and a drag-and-drop canvas using **Supabase Realtime**.
- Integrated **OpenCage Geocoding** and **React-Leaflet** to create an interactive memory map, automatically mapping city/country strings to geographic coordinates.
- Engineered a gamified "Relationship RPG" task tracker with virtual currency and reward systems, utilizing PostgreSQL for secure user-specific data storage.

Matrix Calculator | *Website* | *GitHub* **Java | Spring Boot | React | REST API**

- Engineered a full-stack mathematical tool using **Spring Boot** to perform complex linear algebra operations including inverses, determinants, and transposition.
- Developed an interactive **React** frontend with **Vite**, implementing dynamic state management to handle variable matrix dimensions and real-time equation visualization.
- Designed a robust RESTful API architecture with custom exception handling to decouple high-precision computation logic from the user interface.

Dotfiles Configuration | *Website* | *GitHub* **Shell | Lua | Arch Linux | Hyprland**

- Maintained a personal **Infrastructure as Code** repository for a keyboard-centric **Arch Linux** setup with Hyprland window manager.
- Configured developer tooling including **Kitty** terminal, **Neovim** (Lua configuration), Zsh, and Waybar status bar.
- Developed custom installation scripts for rapid system deployment and environment replication.

Technical Skills

Languages: Java, Python, C, Rust, SQL, Bash/Shell, JavaScript, TypeScript, Lua

Infrastructure & Tools: Linux, Docker, Kubernetes, Git, Supabase, Caddy, CrowdSec, Neovim

Libraries/Frameworks: Spring Boot, React, Ratatui, Framer Motion, PostgreSQL, Redis, Astro, Tailwind CSS