# LUNA TIAN

San Ramon, CA | 707-628-0995 | lunacute1777@gmail.com | LinkedIn | Portfolio

## EDUCATION

**Master of Science (MS), Computer Science** | Northeastern University *May 2025 - Present*
**Bachelor of Art (BA), Computer Science (3.76/4.00 GPA)** | University of California, Berkeley June 2020 - *August 2022*

## SKILLS

**Languages:** C++, Python, C, C#, Java, JavaScript, SQL
**Graphics & Vision:** Rasterization pipeline, Ray tracing fundamentals, Shader programming, Real-time rendering, OpenGL
**Performance Computing:** multithreading, concurrency control, GPU-accelerated computation (PyTorch/CUDA), SIMD, memory locality optimization, low-latency system design
**Machine Learning:** PyTorch, diffusion models, CLIP embeddings, model evaluation, NumPy, Pandas, Scikit-learn
**Systems & Tools**: Linux/Unix, Git, Docker, AWS, Django, SpringBoot

## EXPERIENCE

Foundation for a Human Internet (humanID) - GitHub Link
***Tech Team Lead*** *June 2024 – June 2025*

- Led backend and infrastructure initiatives at humanID, driving improvements in authentication and integration workflow, enhancing privacy, scalability, and user adoption rates.
- Implemented CI/CD pipelines (GitHub Actions, AWS, Docker) and configured Cloudflare with SSL/TLS, WAF, DDoS protection, and rate-limiting to enhance system reliability, availability and scalability.
- Re-architected a Stripe-integrated billing system, moving from cron-based async jobs to a real-time sync architecture, improving data freshness from hours to real-time and cutting peak load query delays by more than half.
- Collaborated with cross-functional teams to align authentication workflows with product requirements.

***Software Engineer Intern*** *January 2024 – May 2024*

- Developed automated user onboarding workflows for humanID Discord Verification Bot (Python, Django, REST), boosting new registrations by 83% and weekly logins by 53%.
- Improved page accessibility and UI clarity by implementing a display card feature backed by API enhancements and optimized frontend components using JavaScript, Bootstrap, HTML, and CSS.
- Enhanced bot functionality for 10K+ community users by implementing role-based access control, automated channel permissions, and real-time event handling (Discord.py), with Sentry for monitoring and incident response.

## PROJECTS

**Style-Conditioned Diffusion on WikiArt** – Link | GitHub

- Designed a generative model based on Stable Diffusion v1.5 to decouple artistic style from image content, utilizing the WikiArt dataset.
- Implemented a custom Cross-Attention Processor in PyTorch, injecting style information directly into UNet layers via CLIP embeddings and learnable gating, achieving fine-grained control over stylization intensity.
- Adopted a Parameter-Efficient Fine-Tuning (PEFT) strategy, training only the adapter modules while keeping the pre-trained backbone frozen to reduce computational costs.
- Outperformed the IP-Adapter baseline in content structure preservation and style consistency, validated through style loss metrics and visual ablation studies.

**Music-Driven Spiky Chrome Sphere (Unity, Shader Graph, C# Audio Driver)** – Link

- Designed and implemented a real-time procedural shader with triplanar noise and normal-based vertex displacement to generate dynamic chrome spikes.
- Built a custom C# FFT audio driver mapping high-frequency energy to spike amplitude and low-frequency beats to pulsation/rotation, leveraging RMS energy, spectral flux, envelope smoothing, gamma shaping, and exponential decay for stable synchronization.
- Delivered an interactive demo showcasing real-time audio-reactive graphics, highlighting expertise in Unity engine programming, shader development, and performance-conscious design.

**Triangle Rasterization (Graphics)** – Link

- Implemented a custom OpenGL rasterizer in C++ with point-in-triangle tests, bounding-box optimization, anti-aliasing (supersampling), and mipmap-based texture mapping for efficient, high-quality rendering.

# LUNA TIAN

San Ramon, CA | 707-628-0995 | lunacute1777@gmail.com | LinkedIn | Portfolio

**NumC** – Link

- Developed a high-performance C library replicating NumPy's matrix computation functionalities by leveraging the Python/C API for seamless integration with Python-based workflows.
- Optimized numerical computations using SIMD-based parallel programming techniques, achieving performance speedups compared to baseline implementations, ranking the project #1 performance in the class.

**RISC-V CPU Design (Computer Architecture)** – Link

- Implemented a fully functional 32-bit RISC-V CPU in Logisim Evolution, including ALU (arithmetic, logic, shift, multiply), Register File with 32 registers (x0 hardwired to zero), Immediate Generator, Control Logic decoder, and aligned Data Memory with write masks.
- Extended the design into a two-stage pipelined processor (IF, ID/EX/MEM/WB) with branch flush handling, supporting arithmetic, load/store, branch, and jump instructions.

**Pintos Operating System**

- Extended a teaching operating system by implementing thread management, system calls, process control, and virtual memory, gaining hands-on experience with synchronization, scheduling, and low-level kernel debugging.

**BYOW (2D tile-based maze game)** – Link

- Engineered a Java game project that generates a random maze with interconnected rooms and hallways using recursion and randomization algorithms.
- Enhanced user experience through StdDraw integration for GUI development, ensuring consistency with LinkedHashMap and incorporating diverse distributions for randomness.

**MiniTwitter** – Link

- Designed and developed a microblogging platform MVP using Spring Boot, focusing on building a scalable backend architecture with RESTful APIs for secure user authentication and content management.
- Implemented complete CRUD operations for posts and user accounts, building custom authentication and Redis-based authorization with MySQL for reliable data persistence and optimized query performance.

**GitLet** – Link

- Designed and implemented a lightweight version-control system in Java, supporting key features such as content commits, branch management, version rollback, directory reset, merge operations, and remote repository synchronization.
- Built a modular file storage architecture and optimized data serialization for efficient tracking of repository states, improving performance and reliability for directory structures.

**Spam/Ham Email Classification (Machine Learning)** – Link

- Developed a text classification pipeline on the SpamAssassin dataset (8K+ emails), performing feature engineering (token indicators, text normalization, HTML-tag detection) with Python, Pandas, and scikit-learn.
- Trained and validated logistic regression models, achieving ~89.5% test accuracy while analyzing trade-offs across precision, recall, and false-alarm rate to optimize reliability.
- Conducted error analysis and ROC evaluation to diagnose misclassifications and proposed integrating richer text features and non-linear models to enhance performance at scale.

**Housing Price Prediction (Machine Learning)** – Link

- Engineered a preprocessing pipeline for 200K+ housing records (Cook County dataset) using Python, Pandas, and NumPy, applying log transforms, one-hot encoding, and domain-specific feature engineering.
- Trained and evaluated linear regression models with scikit-learn, reducing test RMSE from ~300K to ~228K, representing a 25%+ accuracy improvement over the baseline.
- Diagnosed issues including multicollinearity and regressive taxation bias, and proposed adding nonlinear models and fairness-aware features to improve prediction reliability and equity.