Tony Yiding Tian

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EDUCATION

University of Pennsylvania - School of Engineering and Applied Sciences — Philadelphia, PA

Bachelor of Engineering in Computer Engineering — *May 2027*

Master of Engineering in Computer Graphics and Game Technology — *May 2027*

- Grade/Credit: GPA 3.74 / 26 Credit Hours
- Relevant Courses: GPU Programming, Advanced Rendering, Interactive Computer Graphics, Operating Systems Design & Implementation, Data Structure & Algorithm, Embedded Systems, Electrical Circuits & Systems

EXPERIENCE

Learning Directed Operating System (LDOS), Researcher — May 2025 – Present

Distributed Systems Laboratory at UPenn — *Philadelphia, PA*

- Penn Undergraduate Research Mentorship (PURM) 2025 Scholarship awardee, student of Prof. Sebastian Angel.
- Developed eBPF-based kernel monitoring tools collecting real-time TCP networking metrics across 5+ workload types including iperf3 and Redis benchmarks
- Built data analysis pipeline processing 10,000+ TCP state transitions per second, identifying performance bottlenecks in kernel networking policies
- Contributed to open-source KernMLOps repository with 2000+ lines of C and Python code for kernel probing infrastructure

Social Media Mobile App Feature Researcher & Designer — Jan 2025 – May 2025

YesTech, Corp. — *Remote*

- Worked in user-centric team of the startup company to develop a social media app Best Friends Network.
- Researched and designed Friendship Portal, a core feature of the app that encourages friends to share their moods.
- Tested various app features, designed and distributed surveys, and provided constructive feedback to developers.

Guest Service Attendant — May 2024 – Aug 2025

Residential and Hospitality Services at UPenn — *Philadelphia, PA*

- Facilitated the move-in of 1000+ high school students over the summers.
- Managed important access credentials of the building for residents and facility workers.
- Distributed essential college house resources to residents in need (temporary credentials, carts, linens).
- Communicated frequently with residents including minors, delivering excellent customer service to the guests.

Genshin Impact, Quality Inspector — Dec 2022 – Oct 2023

miHoYo — *Remote*

- Participated in the open-world mobile role-play game Genshin Impact's beta tests before the release of each major update every 6 weeks.
- Quality assurance of the game's product: characters eligible of in-game purchases. Provided thorough assessment of 20+ characters' performance and design before their release, each character harnessing over $1M of sales profit.
- Tested the open-world experience of combats and puzzles in the game. Discovered and reported bugs in gameplay.

PROJECTS

Monte Carlo Path Tracer & Real-Time PBR Renderer | *C++, GLSL* — Jan 2025 – May 2025

- Implemented Monte Carlo path tracer supporting Cornell Box, glass refraction, microfacet materials, and environment mapping with 60+ FPS real-time performance
- Developed physically-based rendering (PBR) shader pipeline with albedo/metallic/roughness maps achieving real-time ray tracing on modern GPUs
- Engineered custom BRDF models for materials including chrome, plastic, and complex surface properties
- Demo: https://github.com/tonytgrt/render-demo

T&T Slots - Sense the Win | *ATMega328PB, SPO2 Sensor, I2C, Embedded C* — Mar 2025 – May 2025

- Built an electronic slot machine that takes into account the player's heart rate to adjust the probability of winning, developing core software features:
- Graphical gameplay GUI on a LCD display connected to the Microchip ATMega328PB, developed the graphical library for the embedded system.
- Communication of the MAX30102 SPO2 heart rate sensor using I2C, developed an sensor-specific I2C library.
- Sound effects via a buzzer using PWM digital output.

- Links: [Project Website](#)   [Github repo](#)

PennOS | *Priority Scheduler, Interactive Shell, C*   Mar 2025 – May 2025
- Implemented a user-level UNIX-like operating system using C in group of four, developing core kernel features:
- Process Control Block (PCB) data structure that stores metadata of a process including PID, priority, parent/child relationships, process state, and stack/thread info.
- Multi-level priority scheduler that distributes CPU resources to processes according to their priority level. Processes of same priority are scheduled with Round Robin without any starvation.
- Interactive shell that supports common UNIX commands, I/O redirection, and script execution.
- System calls for spawning processes, waiting, sleeping, signal delivery, process exit, and file I/O wrappers.

Mini Minecraft | *OpenGL, Qt, C++, GLSL*   Oct 2024 – Dec 2024
- Participated in a group of three to implement Minecraft using C++ and GLSL in Qt, developing core features:
- Procedural terrain generation using 2D and 3D perlin noise, including Grassland, Mountain, Desert, Islands, and Cave. Each terrain has unique geographical traits and procedurally placed assets such as trees and cacti.
- Post-process shaders with GLSL. Set up a post-process rendering pipeline with the OpenGL graphical API that applies a distortion filter when the player is in water or lava. Implemented the crosshair at the center of screen.
- Two physics modes that can be toggled: normal mode that follows gravity on the ground and buoyancy in water; fly mode that allows free movement in the world across obstacles.
- Character-environment interaction: breaking and placing blocks in the world.
- Project demo: https://youtu.be/jRb4EHV5KQI

TremorChecker | *Python, Raspberry Pi, Microchip MGC*   Jan 2021 – Jun 2023
- Designed and built a Parkinson's disease early screening device that calculates human hand's tremor frequency by creating an electrostatic field to detect the electric potential change.
- Implemented the PD screening device with Microchip MGC3030 sensor and Raspberry Pi 4b developing board.
- Used Python to write the software that manages the data input and report file output of the device.
- Conducted experiments with PD patients and performed screening to 50+ local residents in Shenzhen.
- Obtained utility patent in China and participated in the 2023 International Science and Engineering Fair (ISEF).

TECHNICAL SKILLS

Programming Languages: C/C++, CUDA, GLSL, Python, Java, eBPF, Assembly, JavaScript, LATEX
Graphics & Rendering: OpenGL, DirectX, Real-time Ray Tracing, Path Tracing, PBR, Procedural Generation
Systems & Tools: Linux Kernel Development, Docker, Qt, Git, CMake, Embedded Systems, TCP/IP
Frameworks & APIs: Qt, Raspberry Pi, ATMega, VMware, CloudLab, Jupyter Notebook