

Tony Yiding Tian

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EDUCATION

University of Pennsylvania - School of Engineering and Applied Sciences Philadelphia, PA
Computer Engineering, B.S.E. May 2027
• GPA: 3.74 — Relevant Courses: Operating Systems Design & Implementation, Data Structure & Algorithm, GPU Programming, Advanced Rendering, Interactive Computer Graphics, Embedded Systems, Electrical Circuit

EXPERIENCE

Linux Kernel Policies Research Assistant - PURM Scholar May 2025 – Present
Learning Directed Operating System (LDOS), Prof. Sebastian Angel Philadelphia, PA
• Developed eBPF-based kernel monitoring infrastructure collecting real-time TCP networking metrics retrieved from 5 crucial kernel tcp functions of tcp_v4_rcv, v4_connect, state_process, congestion_control, and cubic
• Engineered high-performance data analysis pipeline processing 10,000+ TCP state transitions per second, identifying critical performance bottlenecks in kernel networking policies and congestion control algorithms
• Architected and contributed 2000+ lines of C and Python code to open-source KernMLOps repository, implementing kernel probing infrastructure used by 15+ researchers

Beta Test Engineer & QA Analyst Dec 2022 – Oct 2023
miHoYo - Genshin Impact (AAA Mobile Gaming) Remote
• Selected as exclusive beta tester for Genshin Impact, a \$4B+ revenue mobile game with 60M+ monthly active users, participating in pre-release testing cycles every 6 weeks
• Conducted comprehensive quality assurance testing for 10+ character releases, each generating \$1M+ in revenue, ensuring gameplay balance and identifying critical performance issues before public launch
• Performed systematic testing of open-world gameplay mechanics including combat systems, puzzle design, and performance optimization across multiple mobile platforms (iOS, Windows)
• Provided detailed feedback on character design, combat mechanics, and user experience, influencing design decisions for characters with combined revenue exceeding \$10M

PROJECTS

PennOS - UNIX-like Operating System | C, Shell, Kernel Mar 2025 – May 2025
• Architected and implemented a complete user-level operating system in C with team of 4, featuring 8000+ lines of systems code with full process lifecycle management
• Designed Process Control Block (PCB) data structure managing 50+ concurrent processes with metadata including PID allocation, priority levels, parent-child relationships, signal handling, and user/kernel stack management
• Implemented preemptive multi-level priority scheduler supporting 3 priority levels with Round Robin time-slicing (10ms quantum), preventing starvation through priority aging and achieving 95% CPU utilization
• Built POSIX-compliant interactive shell supporting 15+ built-in commands (ps, kill, jobs, fg/bg), I/O redirection, pipeline chaining, and batch script execution with robust error handling

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 direct light sampling and multiple importance sampling shaders
• Developed physically-based rendering (PBR) shader pipeline with albedo/metallic/roughness maps achieving real-time ray tracing on modern GPUs with 60+ FPS real-time performance
• Engineered custom BRDF models for materials including chrome, plastic, and complex surface properties
• Rendering demo reel: <https://github.com/tonytrgt/TonyTianRenderDemo>

Mini Minecraft - Voxel-based 3D Game | C++, OpenGL, Qt Oct 2024 – Dec 2024
• Collaborated in team of 3 to develop fully-featured voxel game engine in C++ using OpenGL in Qt
• Engineered procedural terrain generation system using layered 2D/3D Perlin noise algorithms, creating 5 distinct biomes (Grassland, Mountain, Desert, Islands, Caves) with biome-specific block distributions and procedurally placed vegetation assets
• Developed dual physics simulation system: gravity-based collision detection with terrain for ground movement, and buoyancy calculations for water/lava interaction, plus creative fly-mode with 6-DOF movement
• Project demo showcasing all features: <https://youtu.be/jRb4EHV5KQI>

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