

Peter/Zheyuan HU

University of Cambridge | Jardine Scholar | Research Assistant | Challenge Solver

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Looking forward to research around Visual Computing (Graphics / Vision).

## TECHNICAL SKILLS


**Data Sci:** Prob and Stat, Python, NumPy, ML&DL, PyTorch, Computer Vision.

**Visual:** Computer Graphics, OpenGL, GLSL, XR (AR/VR/MR), Unity, Unreal Engine, 3D Modelling (Blender).

**Prog:** C/C++, Java, OOP, CMake, gdb, Algorithms and Data Structure, OCaml (Functional Programming).

**Dev Tools:** bash/shell, git, CI/CD pipeline, Docker, VS Code, Pycharm, IntelliJ IDEA.

## EDUCATION


 **University of Cambridge**, United Kingdom

Oct 2025-Jun 2026

M.Eng. (Hons) Computer Science.

Jardine Scholarship

Selected from top undergrads, on par with the **M.Phil** in research depth and assessment rigor, stated by [the department](#).

 **University of Cambridge**, United Kingdom

Oct 2022-Jul 2025

B.A. (Hons) Computer Science | First-Class (72.4) | Dissertation (93.5).

Jardine Scholarship

OS, DB, Architecture, Graphics, XR, Network, BioInfo, Quantum Computing, Information Theory, etc | [detailed notes](#).

 **Universitas Amaiensis**, **Project 985** & Top 1 in Southern China


Sep 2021-Jun 2022

B.Eng. undergrad in Software Engineering | Rank 1/173 (1st term) | Yearly score (88.2).

Withdrew after 1st year

C and C++, Object-Oriented Programming, Calculus and Linear Algebra, University Physics, Presentation, ACM, SSE.

## LIST OF PUBLICATIONS

Under the supervision of *italic*, † indicates equal contribution. 

@ **Cambridge Open Reality and Visual AI Lab**, directed by Prof. **Cengiz Öztireli**.

**FreNBRDF: A Frequency-Rectified Neural Material Representation**

[arXiv](#) |  | 2024-2025

**Zheyuan Hu**<sup>†</sup>, [Chenliang Zhou](#)<sup>†</sup>, Cengiz Öztireli.

*IEEE International Workshop on Machine Learning for Signal Processing (MLSP), 2025.*

- Computer Graphics (BRDF, real-world materials), Frequency Rectification (Spherical Harmonics).
- Evolved from my individual project in the **Machine Visual Perception** module (rank 2/15).

**NeuMaDiff: Neural Material Synthesis via Hyperdiffusion**

[arXiv](#) | 2024-2025

[Chenliang Zhou](#), **Zheyuan Hu**, [Alejandro Sztrajman](#), Yancheng Cai, Yaru Liu, Cengiz Öztireli.

*Under review.*

- Computer Graphics (BRDF, real-world materials), Vision (generation via PCA, VAE, diffusion).
- Adapted from my undergrad **dissertation project** (93.5, rank 1/133).

**CHORd: Generation of Collision-Free, House Scale, and Organized Digital Twins for 3D Indoor Scenes with Controllable Floor Plans and Optimal Layouts**

[arXiv](#) | 2025

Chong Su<sup>†</sup>, Yingbin Fu<sup>†</sup>, **Zheyuan Hu**, [Jing Yang](#), Cengiz Öztireli, [Fangcheng Zhong](#), et al.

*Under review in SIGGRAPH Asia, 2025.*

- Indoor Scene Synthesis, Generative Models, Digital Twin Generation. Mentored by Dr **Fangcheng Zhong**.

## INDUSTRY RESEARCH



@ **Industry Research Center, Cambridge Science Park**, UK. Details: 

Research Engineer: **Graphics Algorithm/GPU Architecture**

Jun 2023-Jan 2024

- Linear Algebra, Convolution (Bilateral Filter Kernel on Monte Carlo Samples using GBuffer), spatial-temporal locality.
- NN (PyTorch): Train (lr decay, shuffle data 5GB+, dropout) and Infer (conservative loss), 3D Data Encoding, etc.
- Graphics: Key developer for **Ray Tracing simulation** (OpenGL, GLSL, OpenMP, CMake). Host **sharing sessions**.
- Performance Engineer / Data structure design, targeting micro-benchmarks (performance counters, cache hit rate, etc.)
- Supervised by PhD graduate, senior AI researcher and senior GPU Architects.

Research Intern: **CPU Architecture**

Jun-Oct 2023

- **Review** of CPU Scheduling, DVFS policy, Idle Management in terms of energy efficiency. Convex Optimisation, Duality, LP, Pareto Optimality, Stanford CVX, Online Algorithms, Competitive Analysis, Disjoint Set Union-find, etc.
- Set up simulation, event-driven architecture with state machine, taking in runtime profiled task model. Compare different algorithms w.r.t complexity, performance, energy (temperature, thermal), Memory Contention, floor-plan, applications. Python (Numpy, Matplotlib, Networkx, Pandas, DAG, TopologicalSorter, etc).

Software Engineer: **GPU Driver**

Dec 2022-May 2023

- GPU industry workflow, Linux, Vulkan; GPU driver and verification, Game Engines (UE4), shader debug (RenderDoc).
- Introducing independent full [automation tools](#) in the CI/CD, reducing error rate to nearly 0.

## HONORS & AWARDS



**Cambridge Summer Internship and Research Award**, the Browning fund

Jun-Oct 2025

supporting my research at **Cambridge Open Reality and Visual AI lab** (*certificate*).

**College Scholarship & Prize for Computer Science**, Magdalene College Governing Body (Cambridge)

Aug 2025

in recognition of the excellent performance in the Computer Science Part II (*certificate*).

<b>Gold Medal, 3D Data Compression Algorithm, national Tech Arena, UK</b> <i>engineering + research, digesting papers and source code, like RFC1951, etc.</i> <ul style="list-style-type: none"> <li>Responsible for implementation &amp; improvement of LZSS. 6-level / concurrent LZSS Compression.</li> <li>C with bitwise operators &amp; hash tables, optimization via branch prediction and concurrency.</li> <li>In a team of 4, leading the team and engaging in pre-processing, serialization with teammates.</li> </ul>	10 Oct-26 Nov 2022
<b>Top 2 Team, Maritime Data Science, Mercuria Hackathon, Switzerland</b> <i>regression for Route-Planning and reduce the carbon emissions of the maritime industry.</i>	16 Dec-18 Dec 2022
<b>Jardine Scholarship, the Jardine Foundation</b> <i>merit-based, fully-funded Scholarship while pursuing my four-year studies at the University of Cambridge (certificate).</i>	Oct 2022-Jun 2026
<b>Third Place, High school Science and Technology Innovation Contest, Shanghai</b> <i>deep research thesis into the phenomenon of tire-locking, including pros and cons using Force Analysis (certificate).</i> <ul style="list-style-type: none"> <li>Self-made physical simulation test. Introduce Anti-lock braking system into our research with help from mentor.</li> </ul>	Apr 2020
<b>Publication twice, Shanghai Students' Post</b> <i>topic: Effective Ways to Overcome Obstacle in Study, Campus Life without Snack Stores.</i>	Oct 2018, May 2019
<b>Participant, Chinese Physics/Mathematical Olympiad (ChPO, CMO)</b>	Oct 2019
<b>LIST OF PROJECTS</b>	
<b>Machine Learning and its applications</b> <ul style="list-style-type: none"> <li>DNN in CV <i>Stanford CS231n</i> kNN, Softmax, SVM, MLP, CNN. Caption: RNN, Attention. Gen: GAN, VAE.</li> <li>ML <i>Stanford CS229</i> Linear classifiers (Logistic Regression, GDA), SGD, Regularization, PCA, SVM.</li> <li>Kaggle DataSci practice &amp; ML model (Regression, MLP, etc), PyTorch DNN Debugging, Visualization, Validation.</li> <li>Text Classification via Naive Bayes, HMM, NLP; Social Network and Graph.</li> </ul>	Oct 2022-Jan 2024
<b>Graphics Renderer (C++, OpenGL)</b> <i>real-time simulation, composite design pattern for 3D objects class hierarchy with transformation.</i> <ul style="list-style-type: none"> <li>MIT6.837 ray casting, normal visualization, rendering, voxel rendering, super sampling.</li> <li>large OOP project, with 3D objects, light, camera classes, building over 20 C++ source files from scratch.</li> </ul>	Jul-Sep 2022
<u><b>System</b></u>	
<b>Operating System (MIT 6.S081)</b> <i>user-mode and kernel programming of Unix V6 RISC-V multiprocessor.</i> <ul style="list-style-type: none"> <li>implement Unix utilities, System Call. Process Scheduling, Memory (Segment, Page, VM), I/O, File.</li> </ul>	Oct-Dec 2022
<b>Database Design Management System (CMU15-445 Project)</b> <i>engineering and code style: using C++ STL, Google C++ Style Guide.</i> <ul style="list-style-type: none"> <li>Memory Management, including Buffer Pool Management System, Replacement policy: LRU</li> <li>Concurrency: implement the Parallel Buffer Pool Manager.</li> </ul>	Aug-Oct 2022
<u><b>C, C++, OOP</b></u>	
<b>Multifunctional Supermarket Management System (C++)</b> <i>inheritance polymorphism, operator overloading, read/write files, etc.</i>	Apr 2022
<b>Typing Game (C, EasyX)</b> <i>a standard keyboard layout, where different modes are provided.</i>	Dec 2021
<u><b>Front/Back-end</b></u>	
<b>Weather App (Flutter)</b> <i>collaborating with team members on an App integrating weather forecast with daily calendar events. I am responsible for:</i> <ul style="list-style-type: none"> <li>Frontend: Beautiful design with UI components, written in Flutter, with Object-oriented programming.</li> <li>Backend: Integration of iCalendar API, asynchronous IO, Computer Networking: HTTP request, get.</li> </ul>	April-May 2023
<b>Personal Website and Blog (HTML, CSS, React)</b> <i>project blogs, files, etc; built up from scratch using HTML/ CSS. Deployed by React, with high code reuse.</i>	Aug 2022
<u><b>Game Dev</b></u>	
<b>Interactive AR block tower (AR foundation, Unity)</b> <i>Extended Reality (XR) module video-based AR project.</i>	Jan-Mar 2025
<b>Priest-Beneath (Unity, C#)</b> <i>2023 Cambridge Game Jam (Group Project).</i>	Feb 2023
<u><b>Utility Tools</b></u>	
<b>URL Finder (Web Crawler, Python, Go)</b> <i>download the web page available at the input URL and extract the URLs of other distinct pages linked to from the HTML.</i> <ul style="list-style-type: none"> <li>Data Structure: Lists, Sets; Computer Networking: HTTP request, like get; Synchronous File IO.</li> </ul>	Apr 2023
<b>Trace File Parser (Java)</b> <i>parsing trace files and generate a unique and sorted list in Java.</i>	May 2023
<b>EXTRACURRICULAR INTEREST</b>	
<b>Photography, Music, Gym   Society: Ethics in Science   Econ: Macro &amp; Micro, Money Banking   Volunteering</b>	

“Zheyuan Hu, together with AI team researcher, proposed the ray-prediction algorithm. According to the test results, the ray intersection latency in reflection scenarios can be reduced by 33%, RTU energy consumption can be reduced by 15%, or RTU throughput can be improved by 20%. The results achieved are recognized by the hardware team. This algorithm will be the official delivery technology of the HiMeta project. They have demonstrated strong algorithmic capabilities and have shown typical examples of cross-team collaboration. Well done and congratulations!” Source: [Research Center](#)

“This project is exceptional in scope, depth, and originality. It shows independent research capability, deep technical implementation, and significant scientific contribution. This work is well beyond the undergraduate standard, and is comparable to a strong MSc or even early-stage PhD project.” Source: Dissertation supervisor report ([Chenliang Zhou](#))

“During our time working together, I found Peter to be a highly collaborative and supportive colleague who consistently demonstrated a willingness to share his knowledge and expertise with others. Peter’s ability to problem-solve complex C/C++ development issues was invaluable, and his commitment to learning and staying up-to-date with the latest advancements in his field is truly impressive. His passion for ray-tracing is contagious, and I have learned so much from his knowledge sharing.” Source: [LinkedIn](#)