***Peter* HU** *University of Cambridge | Jardine Scholar | Research Assistant | Challenge Solver*
✉zh369@cam.ac.uk | ✆ +44 07990719841 | peterhuistyping.github.io | PeterHUistyping | Kaggle | CV
Looking forward to research experience around Visual Computing / System.

TECHNICAL SKILLS

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

EXPERIENCE

Research Intern: **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 Dr. Mihai (senior AI reseacher, PhD in math) and senior GPU Architects.

Research Intern: **CPU Architecture** *Jun-Oct 2023*

- Research into CPU Scheduling, DVFS policy, Idle Management in terms of energy efficiency. Convex Optimisation, Duality, LP, Pareto Optimality, Stanford CVX101, 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). *@ Cambridge Research Lab, Huawei UK R&D*

EDUCATION

University of Cambridge, UK *Graduating June 2025*
Computer Science, BA 67.5%(Strong Upper Second)
Merit-based, fully-funded Jardine Scholarship

Calculus, Linear Algebra, Discrete Math, Prob & Stat, Convex Optimisation, Logic and Proof **[Math]**
Signal/Image Processing, Computer Vision, Graphics, Discrete Differential Geometry, Machine Visual Perception **[Visual]**
OS, Arch, Software Engineering, Design Patterns, Security, Digital Electronic **[System]**

Xiamen University, Top 1 in Southern China, Project 985 *Sep 2021-June 2022*
Software Engineering, BE First year rank 1/173 first term, 88/100 overall
C and C++, Object-Oriented Programming, Calculus and Linear Algebra, ACM, SSE.

HONORS & AWARDS

Gold Medal, 3D Data Compression Algorithm *@ UK Tech Arena* *10 Oct-26 Nov 2022*
Engineering + Research, digesting papers and source code, like RFC1951, etc.

- Responsible for implementation & improvement of LZSS. 6-level / concurrent LZSS Compression.
- C with bitwise operators & hash tables, optimization via branch prediction and concurrency.
- In a team of 4, leading the team and engaging in pre-processing, serialization with teammates.

Top 2 Team, Maritime Data Science *@ Mercuria Hackathon* *16 Dec-18 Dec 2022*
Using Python regression for Route-Planning and reduce the carbon emissions of the maritime industry.

Third Place, High school Science and Technology Innovation Contest *@ Shanghai* *Apr 2020*
Deep research thesis into the phenomenon of tire-locking, including pros and cons using Force Analysis

- Self-made physical simulation test. Introduce Anti-lock braking system into our research with help from mentor.

Participant, Chinese Physics/Mathematical Olympiad (ChPO, CMO) *Oct 2019*
Publication twice on Shanghai Students' Post *Oct 2018, May 2019*
Topic: Effective Ways to Overcome Obstacle in Study, Campus Life without Snack Stores.

PROJECTS (MORE IN APPENDIX)

Machine Learning and its Applications *Oct 2022-Present*

- **DNN in CV**, *Stanford CS231n*: Classifier: kNN, Softmax, SVM, MLP, CNN. Caption: RNN, Attention.
- **ML**, *Stanford CS229*: Linear classifiers (Logistic Regression, GDA), SGD, Regularization, PCA, SVM.
- Kaggle: DataSci practice & ML model (Regression, MLP, etc), PyTorch DNN Debugging, Visualization, Validation.
- Text Classification via Naive Bayes, HMM, NLP; Social Network and Graph |

Graphics Renderer (C++, OpenGL) *Jul-Sep 2022*
Real-time simulation. Composite design pattern for 3D objects class hierarchy with transformation.

- Ray casting, normal visualization, rendering, voxel rendering, super sampling. |
- Huge OOP project, with 3D objects, light, camera classes. Building over 20 C++ source files from scratch.

Personal Website and Blog (React, HTML, CSS) *Aug 2022*
Project blogs, files, etc. Built up from scratch using HTML/ CSS. Deployed by React, with high code reuse.

EXTRACURRICULAR INTEREST

Photography, Music, Gym, Yoga, etc | *Society*: Ethics in Science | *Econ*: Macro & Micro, Money Banking

APPENDIX: FULL LISTS OF INTERESTING PROJECTS

The following Projects are either individual or collaborative, as grouped by corresponding fields.

System

Operating System (MIT 6.S081) *Oct-Dec 2022*

Program in kernel mode and user mode of Unix V6 RISC-V multiprocessor

- Implement Unix utilities, System Call. Process Scheduling, Memory (Segment, Page, VM), I/O, File.

Database Design Management System (CMU15-445 Project) *Aug-Oct 2022*

Engineering and code style: Using C++ STL, Google C++ Style Guide

- Memory Management, including Buffer Pool Management System, Replacement policy: LRU
- Concurrency: implement the Parallel Buffer Pool Manager. |

Utility Tools

URL Finder (Web Crawler, Python, Go) *Apr 2023*

Download the web page available at the input URL and extract the URLs of other distinct pages linked to from the HTML.

- Data Structure: Lists, Sets; Computer Networking: HTTP request, like get; Synchronous File IO.

Trace File Parser *May 2023*

Parsing Trace File and generate a unique and sorted list in Java.

C, C++, OOP

Multifunctional Supermarket Management System *Apr 2022*

Inheritance polymorphism Operator Overloading

- Read/Write Files, etc |

APPENDIX: REFERENCE

"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 Team Leader

"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: Linked**in**