Peter HU *University of Cambridge | Jardine Scholar | Research Assistant | Technical Solutions Provider*
zh369@cam.ac.uk | (+44) 07990719841 | inpeterhu2022 | PeterHUistyping | peterhuistyping.github.io | CV

TECHNICAL SKILLS

Prog: C , C++ , Java , OOP , CMake , Gdb , Algorithms and Data Structure , OCaml (Functional Programming)
Data Sci: Python , NumPy , Machine Learning , Deep Learning , Natural Language Processing , Computer Vision
System: OS , Arch , Software Engineering, Design Patterns , Security , Digital Electronic
Math: Calculus , Linear Algebra , Discrete Math , Probability and Statistics , Abstract Algebra , Latex , Topology (basic)
Full-stack: Front-End: HTML/ CSS , React , Flutter , Interaction Design , Back-End : Database , SQL , NoSQL
Dev Tools: bash/shell, git, CI/CD pipeline, Docker, VS, VS Code, Pycharm, IntelliJ IDEA.

EXPERIENCE

Research Intern: GPU / Graphics Algorithm *Jun 2023-Present*

- Mathematical approach: Linear Algebra, error analysis. Ensure IEEE fpp robustness and Vulkan CTS watertightness.
- Algorithm approach: Proper data structure and traversal logic. Target micro-benchmarks, cache hit rate.
- Data Science: NN training and inference, 3D Data Encoding, shuffling data, loss functions etc (compressed data over 5GB).
- Key developer for simulation framework. Host sharing sessions. Details

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 platform, 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*

EDUCATION

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

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)

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 and 3D. |
- Huge OOP project, with 3D objects, light, camera classes. Building over 20 C++ source files from scratch.

Machine Learning and Real-world Data (Python) *Jan-Mar 2023*
Text Classification using ML with improvements

- Naive Bayes classifier, Cross-Validation, NLP, HMM. |

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.

INTEREST & EXTRACURRICULAR ACTIVITIES

Logic and Proof | Music, Yoga, Gym,etc. | Society Joined: Ethics in Mathematics | Macro & Micro, Money Banking

APPENDIX: FULL LISTS OF INTERESTING PROJECTS

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

System

Research Intern: GPU / Graphics Algorithm ∧ *Jun 2023-Present*

- Real-time renderer simulation(OpenGL, GLSL, ImGui, etc). GPU Debugging (RenderDoc), Unit Tests (Google Test framework), Performance Measurement (Graphics Analysers)
- CPU concurrent programming (OpenMP), CPU-GPU memory synchronisation (via texture, UBO, SSBO), etc.
- Follow open-source library and industry standards. e.g., proper CMake structure, platform-neutral design (macro), class UML document (Doxygen).

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. |

AI and Data Science (Python)

Artificial Intelligence *Oct 2022-Present*

- Linear classifiers (Logistic Regression, GDA), Stochastic Gradient Descent, L1 L2 Regularization, SVM.

Computer Vision *Jan 2023-Present*

- Python, Numpy, kNN, Softmax, SVM classifier, Cross Validation.

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**