

Shuoran Zhao

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Education

School of EECS | Computer Science, Peking University / *Undergraduate* Sep. 2023 — Jul. 2027

GPA: 3.56/4.0 (Top 40%). Selected coursework: Machine Learning, Data Structures (CS61B), Operating Systems, Database Systems (CMU 15-445), Computer Networks, Computer Systems (CMU 15-213).

Research Experience

SIMD Code Generation Benchmarking and Study | *School of Computer Science, Peking University* ICSE 2025 under review, second author

- Helped build SimdBench, the first benchmark dedicated to LLM-based SIMD intrinsic code generation.
- Covered major SIMD extensions: x86 (SSE/AVX), ARM (NEON/SVE), and RISC-V (RVV).

Projects

BusTub: A Simple Database System in C++ | *CMU 15-445*

- Implemented a Buffer Pool Manager with PageGuard and LRU-K, supporting multithreaded access and eviction.
- Built a concurrent B+ tree index with read-write locks for insert/delete/lookup.
- Gained hands-on understanding of core DBMS components.

JOS: x86-based Operating System Kernel | *MIT 6.828*

- Implemented a multitasking OS kernel from scratch: virtual memory, scheduling, file system, and shell.
- Supported preemptive scheduling, IPC, and a simple network stack; deepened understanding of x86 protection and privilege levels.

RISC-V CPU Simulator | *Berkeley CS61C*

- Built a 5-stage pipelined CPU simulator for RV32I with data forwarding, branch prediction, and hazard detection.
- Modeled memory hierarchy and validated correctness and pipeline performance using RISC-V assembly tests.

Shell and Dynamic Memory Allocator | *CMU 15-213*

- Implemented a Unix shell with job control, signal handling, process groups, and fg/bg switching.
- Developed malloc/free/realloc using explicit free lists and segregated fit to optimize performance.

RTP and MyFTP Protocol Implementations | *Peking University — Computer Networks*

- Implemented a reliable transport protocol (RTP) and a simplified file transfer protocol (MyFTP) in modern C++.
- RTP handled loss and delay with GBN and Selective Repeat to ensure in-order reliable delivery.
- MyFTP supported open/ls/cd/get/put/sha256/quit; server used pipe+fork+execv for file ops and verification.

Gitlet: A Minimal Git in Java | *Berkeley CS61B*

- Implemented common Git operations such as push, checkout, branch, and commit.
- Gained insight into Git's design philosophy and VCS implementation.

Bear Maps: Route Planning Application | *Berkeley CS61B*

- Built an interactive Java mapping app with A* routing and KD-Tree spatial indexing.
- Implemented tile loading and rasterization; optimized data structures for responsive large-scale interaction.

Peking University App — HarmonyOS Native Development | *Peking University Computing Center*

- Contributed to refactoring the HarmonyOS-native PKU app for on-campus users.
- Implemented key features: dark mode, customizable quick actions, color scheme refactor, and database updates.

Skills

- **Programming:** Python, Java, C/C++, ArkTS
- **Tools:** Linux, L^AT_EX, Vim, Git, Docker
- **Languages:** English (CET-6 535)

Awards

- Peking University Freshman Third-class Scholarship 2023
- Peking University Academic Excellence Award 2025

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教育经历

信息科学技术学院 [计算机科学与技术, 北京大学 | 本科] [2023.09-2027.07]

GPA: 3.56/4.0 (年级前 40%)。主要课程: 机器学习、数据结构 (CS61B)、操作系统、数据库系统 (CMU 15-445)、计算机网络、计算机系统 (CMU 15-213)。

研究经历

SIMD 指令集向量化代码生成基准与研究 | 北京大学计算机学院

ICSE 2025 在投, 第二作者

- 参与构建首个面向 LLM 的 SIMD 内联函数代码生成评测基准 SimdBench。
- 覆盖主流 SIMD 扩展: x86 (SSE/AVX)、ARM (NEON/SVE)、RISC-V (RVV)。

项目经历

BusTub: 基于 C++ 的简易数据库系统 | CMU 15-445

- 实现 PageGuard + LRU-K 的缓冲池管理器, 支持多线程并发访问与页面淘汰。
- 构建可并发的 B+ 树索引, 读写锁支持插入/删除/查找操作。
- 系统性掌握 DBMS 核心组件的设计与实现。

JOS: x86 内核操作系统 | MIT 6.828

- 自底向上实现支持多任务的内核: 虚拟内存、调度、文件系统与 Shell。
- 支持抢占式调度、IPC 与简易网络栈; 深入理解 x86 保护模式与特权级。

RISC-V CPU 模拟器 | Berkeley CS61C

- 实现 RV32I 五级流水线 CPU 模拟器, 集成数据前递、分支预测与冒险检测。
- 建模存储层次结构, 使用 RISC-V 汇编用例验证正确性与性能。

Shell 与动态内存分配器 | CMU 15-213

- 开发支持作业控制的 Unix Shell, 含信号处理、进程组与前后台切换。
- 实现 malloc/free/realloc 分配器, 采用显式空闲链表与分离适配优化性能。

RTP 与 MyFTP 协议实现 | 北京大学—计算机网络

- 使用现代 C++ 实现可靠传输协议 RTP 与简化文件传输协议 MyFTP。
- RTP 采用 GBN 与选择重传, 处理丢包与时延, 保证有序可靠交付。
- MyFTP 支持 open/ls/cd/get/put/sha256/quit; 服务端基于 pipe+fork+execv 执行文件操作与校验。

Gitlet: Java 实现的简易 Git | Berkeley CS61B

- 实现 push、checkout、branch、commit 等常见 Git 操作。
- 理解 Git 的设计哲学与版本控制系统实现要点。

Bear Maps: 地图路径规划应用 | Berkeley CS61B

- 基于 Java 开发交互式地图应用, 支持 A* 路径规划与 KD-Tree 空间索引。
- 实现瓦片加载与栅格化渲染, 优化数据结构以支持大规模交互。

北京大学 APP (HarmonyOS 原生开发) | 北京大学计算中心

- 参与重构面向校内用户的鸿蒙原生北京大学 APP。
- 实现深色模式、可定制快捷功能、配色重构与数据库更新等功能。

技能

- 编程语言:** Python、Java、C/C++、ArkTS
- 工具:** Linux、 $\LaTeX$ 、Vim、Git、Docker
- 外语:** 英语 CET-6 535

荣誉奖项

- 北京大学新生三等奖学金 2023
- 北京大学学习优秀奖 2025