

CONTACT
INFORMATION

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EDUCATION

National University of Singapore, Singapore. 2023–2025(Expected)
◦ Master of Computing, Computer Science Specialization. GPA: 4.38/5.0
South China University of Technology (SCUT), Guangzhou, China. 2019–2023
◦ B.Eng., Software Engineering. GPA: 3.61/4.0

PRIZES
AND
AWARDS

- **Excellent Degree Dissertation of South China University of Technology** 2023
- **Honorable Mention** in Mathematical Contest in Modeling 2023
- **National Scholarship** 2022
- *Bronze Medal (46th)* in ICPC Asia-East Continent Final(Xi An) 2022
- *101/1608* in CCF-DBCI Competition of "Small Sample Data Classification" 2022
- *Silver Medal (46th)* in ICPC Asia Regional Contest(Ji Nan) 2021
- *44/3567* in CCF-DBCI Competition of "Recognition of figure skaters' skeleton points based on Paddle" 2021
- *First Prize* in National Olympiad in Informatics in Province(NOIP) 2017

RESEARCH
EXPERIENCE

- *Symmetric Matrix Solving Algorithm Parallel Optimization for ARM Architecture*
Mentor: Prof. Deyou TANG May-Dec. 2022
 - Optimize and parallel Bounded Bunch-Kaufman Algorithm(*sysv_rk subroutine of LAPACK) for solving symmetric matrix on ARM server processor with NEON instruction set and openMP.
 - Implement a parallel column reordering method in row swap of solving symmetric matrix to enhance memory access locality for column major matrix for better cache hit rate and parallelism, achieving a performance improvement from 320Gflops to 580Gflops.
 - Implement the same optimization on Skylake Intel processor and achieve 2-5x multi-core speedup than MKL library for *sytrs_3 subroutine of LAPACK.
 - Awarded as the Excellent Degree Dissertation of South China University of Technology.
- *Research Assistant* in **Hong Kong University of Science and Technology, Guangzhou**
Mentor: Prof. Zeyi WEN Apr-Sept. 2023
 - Implement a library of parallel hyper graph partitioning with openMP task.
 - Realize a multiple node contraction algorithm for graph coursenning.
 - Research parallel graph partitioning algorithm and adapt it for fill-in reduction of sparse matrix.
- *Internship* in **SG Digital Trust Lab, Singapore Research Center, 2012 Laboratory**
Mentor: Dr. Tao HUANG Jan.-May 2024
 - Research on high-performance symmetric encryption algorithm and SIMD optimization with AES instructions.

- Optimize LOL-MINI-NMH algorithm with scroll array and XOR fusion feature of KUNPENG 920 processor to improve the performance from 7.1Gbps to 8.5Gbps.
- Realize a new stream encryption algorithm with 49Gbps performance on KUNPENG 920 processor with the same AES instructions involved(3:1) as SOTA method Rocca which run at 38Gbps on the same processor.

• **Research Assistant in National University of Singapore**

Mentor: Prof. Bingsheng He

May-Aug. 2024

- Research on efficient inference for large language models(LLMs).
- Deploy a Qwen-72B model inference with tensor parallel and 4-bit quantized KV cache on 4 NVIDIA A100 GPU system.
- Attempt on new quantized KV cache design for LLMs.

TECHNICAL
SKILLS

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- *English*: IELTS(6.5), CET-4, CET-6.
 - *Programming Languages*: C/C++, Fortran, p4-16, Python, SQL, L^AT_EX.
 - *Technical Skills*: openMP, SIMDs(NEON, AVX512), MPI, PyTorch, CUDA.
 - *TestDemo Certificate*: C++, TOP 10%, LINUX, TOP 10%, PYTHON, TOP 10%.
 - *Kaggle Certificate*: Data Visualization, Intro to Machine Learning, Intro to Deep Learning, Intro to Game AI and Reinforcement Learning.
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EXCHANGE
EXPERIENCE

- **Online Academic Program on Machine Learning, McGill University** Jan.-Feb. 2022

联系方式

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教育经历

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|---------------------|---------------|
| 新加坡国立大学, 新加坡 | 2023–2025(预计) |
| ◦ 计算机科学硕士, 计算机科学方向. | GPA: 4.38/5.0 |
| 华南理工大学, 广东省广州市 | 2019–2023 |
| ◦ 工学学士, 软件工程专业. | GPA: 3.61/4.0 |

获奖荣誉

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| ● 华南理工大学本科优秀毕业设计(论文) | 2023 |
| ● 二等奖 美国大学生数学建模竞赛 (MCM/ICM) | 2023 |
| ● 铜牌 第46届ICPC国际大学生程序设计竞赛亚洲区决赛 | 2022 |
| ● 101/1608 CCF-DBCI ”小样本数据分类算法” 竞赛 | 2022 |
| ● 国家奖学金 | 2022 |
| ● 银牌 第46届ICPC国际大学生程序设计竞赛(济南站) | 2021 |
| ● 44/3567 CCF-DBCI ”基于飞浆实现花样滑冰选手骨骼点识别” 竞赛 | 2021 |
| ● 一等奖 全国青少年信息学奥林匹克联赛(NOIP) | 2017 |

项目经历

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| ● 对称矩阵函数求解BBK算法的并行优化 | 2022/04-2022/12 |
| 合作单位: 华为鲲鹏计算 导师: 汤德佑教授 | |
| ◦ 在ARM处理器上利用NEON指令集和openMP对Bounded Bunch-Kaufman算法(LAPACK库 *sysv_rk 函数)进行并行优化。 | |
| ◦ 实现了一种并行列重排方法, 在列优先矩阵的行交换中改进访存局部性, 使得缓存命中率和并行性能得到提高, 在鲲鹏920-6426处理器上的单精度性能从320Gflops提升到580Gflops。 | |
| ◦ 将该方法移植到Intel Skylake处理器上, 对比MKL库的*sytrs_3函数, 实现了2-5倍的并行性能提升。 | |
| ◦ 该项目获评华南理工大学本科优秀毕业设计。 | |
| ● 科研助理: 香港科技大学广州校区 | 2023/04–2023/09 |
| 导师: 文泽忆教授 | |
| ◦ 实现了一个基于openMP Task的并行多层拓扑图分割库。 | |
| ◦ 在图压缩中实现了一种多节点收缩算法。 | |
| ◦ 研究将并行图分割算法, 应用于稀疏矩阵的填充减少。 | |
| ● 实习生: 华为2012实验室新加坡研究所数字信任实验室 | 2024/01–2024/05 |
| 导师: 黄涛博士 | |
| ◦ 研究利用SIMD指令集实现的高性能的流式对称密码算法。 | |
| ◦ 通过滚动数组优化和鲲鹏920处理器的异或指令融合特性, 将LOL-MINI-NMH算法的性能从7.1Gbps提升到8.5Gbps。 | |
| ◦ 实现了一种新的对称流加密算法, 与当前SOTA算法Rocca相比, 在使用相同比例AES指令(3:1)的情况下, 在鲲鹏920处理器上达到了49Gbps的性能, Rocca算法在该处理器上性能为38Gbps。 | |

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| | <ul style="list-style-type: none"> ● 科研助理: 新加坡国立大学 <p>导师: 何丙胜教授</p> <ul style="list-style-type: none"> ○ 研究大型语言模型(LLMs)的高效推理。 ○ 在4 NVIDIA A100 GPU系统上, 利用张量并行和4位量化KV缓存部署了Qwen-72B模型推理。 ○ 尝试新的LLMs的量化KV缓存设计。 | 2024/05–2024/08 |
| 专业技能 | <ul style="list-style-type: none"> ● 英语认证水平: CET-4, CET-6, IELTS(6.5). ● 编程语言: C/C++, Fortran, p4-16, Python, SQL, L^AT_EX. ● 编程技能: openMP, SIMDs(NEON, AVX512), MPI, PyTorch, CUDA. ● <i>TestDemo</i> 编程技能认证: C++, TOP 10%, LINUX, TOP 10%, PYTHON, TOP 10% ● <i>Kaggle</i> 课程认证: 数据可视化, 机器学习, 深度学习, 强化学习 | |
| 交换经历 | <ul style="list-style-type: none"> ● 机器学习线上访学项目, 麦吉尔大学 | 2022/01–2022/02 |