

CONTACT
INFORMATION

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EDUCATION

National University of Singapore, Singapore. 2025–now
◦ Doctor of Philosophy, Computer Science. Supervisor: Prof. HE Bingsheng
National University of Singapore, Singapore. 2023–2025
◦ Master of Computing, Computer Science Specialization. GPA: 4.4/5.0
South China University of Technology (SCUT), Guangzhou, China. 2019–2023
◦ B.Eng., Software Engineering. GPA: 3.6/4.0

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

PREPRINTS
AND
PUBLICATIONS

- **CHEN Han, Tao Huang, Phuong Pham, Shuang Wu. HiAE: A High-Throughput Authenticated Encryption Algorithm for Cross-Platform Efficiency** 2025
- **CHEN Han, Zicong Jiang, Zining Zhang, Bingsheng He. LogQuant: Log-Distributed 2-Bit Quantization of KV Cache with Superior Accuracy Preservation.** Accepted at ICLR 2025 Workshop on Sparsity in LLMs 2025
- **Wenqi Pei, Hailing Xu, Henry Hengyuan Zhao, CHEN Han, Zining Zhang, Shizheng Hou, Luo Pingyi, Bingsheng He. Optimizing Small Language Models for NL2SQL.** Accepted at ICLR 2025 Third Workshop on Deep Learning for Code 2025

PROJECT
EXPERIENCE

- **Cryptography Engineer: Efficient Cipher Implementation and Whitebox Design** in SG Digital Trust Lab, Singapore Research Center, 2012 Laboratory
- Mentor: Dr. WU Shuang Jan.-June 2025
 - Design whitebox implementation of AES for different platforms, products and scenarios.
 - Implement HiAE cipher for kernel and user space, integrate it into several products, including mobile phone, server and auto-driving chips.
 - Optimize the performance of SM2, SM3 and SM4 ciphers on ARM platforms.
- **Research Assistant: optimization for large language Model inference** in National University of Singapore
Mentor: Prof. HE Bingsheng May-Sept. 2024

- Design a new 2-bit KV Cache quantization for LLMs base on attention patterns. achieve over 200% accuracy improvement at same compression rate.
- Implement a adaptive API for popular inference frameworks like Python' s `transformers`, boosts batch size by 60% without increasing memory consumption.
- Accepted at ICLR 2025 Workshop on Sparsity in LLMs. [\[Paper\]](#) [\[Code\]](#)

• ***Internship: Cryptography Engineer*** in **SG Digital Trust Lab, Singapore Research Center, 2012 Laboratory**

Mentor: Dr. HUANG Tao

Jan.-Dec. 2024

- Design a 'XAXX' structure to efficiently utilize the distinct pipelines of both ARM and x86 (with AES-NI) architectures, achieving high IPC.
- Build a new AEAD (Authenticated Encryption with Associated Data) cipher named 'HiAE' based on the 'XAXX' structure, which is 5× faster than AES-256-GCM across different platforms and outperforms all existing AEAD ciphers on latest ARM and x86 processors.
- Create a new record of 340Gbps throughput for single-threaded and single-stream AEAD encryption. Applied to the various products.
- Open-source on Cryptology ePrint Archive [\[Paper\]](#) [\[Code\]](#)

• ***Research Assistant: Parallel Graph Partitioning*** 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 coursennning.
- Research parallel graph partitioning algorithm and adapt it for fill-in reduction of sparse matrix.

• ***Symmetric Matrix Solving Algorithm Parallel Optimization for ARM Architecture***

Mentor: Prof. TANG Deyou

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.

TECHNICAL
SKILLS

- *English*: IELTS(6.5), CET-4, CET-6.
- *Programming Languages*: C/C++, Fortran, p4-16, Python, SQL, \LaTeX .
- *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.

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

新加坡国立大学, 新加坡	2025-现在
◦ 计算机科学博士.	导师: 何丙胜教授
新加坡国立大学, 新加坡	2023-2025
◦ 计算机科学硕士.	GPA: 4.4/5.0
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: 3.6/4.0

获奖荣誉

- 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

预印本和发表
论文

- *CHEN Han, Tao Huang, Phuong Pham, Shuang Wu. HiAE: A High-Throughput Authenticated Encryption Algorithm for Cross-Platform Efficiency* 2025
- *CHEN Han, Zicong Jiang, Zining Zhang, Bingsheng He. LogQuant: Log-Distributed 2-Bit Quantization of KV Cache with Superior Accuracy Preservation.* Accepted at ICLR 2025 Workshop on Sparsity in LLMs 2025
- *Wenqi Pei, Hailing Xu, Henry Hengyuan Zhao, CHEN Han, Zining Zhang, Shizheng Hou, Luo Pingyi, Bingsheng He. Optimizing Small Language Models for NL2SQL.* Accepted at ICLR 2025 Third Workshop on Deep Learning for Code 2025

项目经历

- 密码算法工程师: 高效密码算法实现和白盒设计: 新加坡数字信任实验室, 华为2012实验室新加坡研究所 2025/01-2025/06
导师: 吴双博士
 - 设计了不同场景和平台的AES白盒实现。
 - 在用户态和内核态实现了HiAE密码算法, 并集成到多种产品中, 包括手机、服务器和自动驾驶芯片。
 - 优化了SM2、SM3和SM4密码算法在ARM平台上的性能。
- 科研助理: 大语言模型推理优化: 新加坡国立大学 2024/05-2024/09
导师: 何丙胜教授
 - 设计了一种基于注意力模式的2位KV Cache量化方法, 在相同压缩率下, 提高了200%的准确率。

	<ul style="list-style-type: none"> 实现了一个适应性API, 用于流行的推理框架, 如Python的transformers, 在不增加内存消耗的情况下, 将批处理大小提高了60%。 该项目已被ICLR 2025 Sparsity in LLMs Workshop接受。[Paper] [Code] 	
	<ul style="list-style-type: none"> 实习生: 密码算法工程师: 华为2012实验室新加坡研究所谢尔德实验室 2024/01–2024/12 导师: 黄涛博士 <ul style="list-style-type: none"> 设计了一种新的‘XAXX’算法结构, 可以高效利用ARM和x86(带AES-NI)架构的流水线, 实现了高IPC。 基于‘XAXX’结构构建了一种新的AEAD(带关联数据的认证加密)密码算法, ‘HiAE’, 在多种平台上相较AES-256-GCM提升5倍以上性能, 在最新的ARM和x86处理器上优于所有现有的AEAD密码算法。 创造了单线程单流AEAD加密的340Gbps新纪录, 并应用于多种华为产品。 该项目已在Cryptology ePrint Archive上开源。[Paper] [Code] 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 <ul style="list-style-type: none"> 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。 对称矩阵函数求解BBK算法的并行优化 2022/04–2022/12 导师: 汤德佑教授 <ul style="list-style-type: none"> 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。 	
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. TestDemo 编程技能认证: C++, TOP 10%, LINUX, TOP 10%, PYTHON, TOP 10% Kaggle 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 	