(+86)156-1611-1252
Beijing, China
jameschennerd@gmail.com

Dong Chen

HomePage: dongchen-coder.github.io
Google Scholar: Dong Chen

My research focuses on program analysis on the correctness and performance of programs. I am also interested in program synthesis, system software, advanced computing paradigms including optical and quantum computing, and programming language theories.

EDUCATION

Ph.D in Computer Science, *University of Rochester*	2014.09-2019.05
BS/MS in Computer Science, *National University of Defense Technology*	2007.09-2013.12

EXPERIENCE

Research Software Engineer	**2022.05-**
Huawei	*Beijing, China*
Assistant Professor	**2019.06-2021.05**
National University of Defense Technology	*Changsha, China*
Intern(x2)	**2016.06-2016.08, 2018.06-2018.08**
Qualcomm, Graphics Compiler Team	*CA, USA*
Intern	**2015.06-2015.08**
FutureWei Technologies, Compiler Team	*CA, USA*

SKILLS

Tools and Languages	C++, Python, Parallel Programming, LLVM
Communication	Chinese (native), English (working proficiency)

PROJECTS

Automatic Github Issue Resolving   **2024.01-**
- developed a task graph-based multi-agent framework to ensure precise plan execution.
- achieved state-of-the-art performance in SWE-bench, resolving 28.33% of issues between June 4–17, 2024.

Program Synthesis for Locality Analysis   **2021.01-**
- proposes and implements an input-output-example-abased syntax-guided synthesis framework for locality analysis.
- designs a DSL and a unification search algorithm to explore the candidate program space.

Static Analysis for Memory Safety   **2022.05-2024.12**
- explores techniques to reason about program properties automatically (sparse-value flow analysis, abstract interpretation, etc).
- implements tools to identify memory bugs for large-scale industrial codes, such as null pointer dereference, memory leaks, etc.

Compiler Leasing   **2019.01-2022.12**
- proposes a framework that enables fine-grained control of data replacements in a cache by a compiler.
- designs and implements an algorithm to derive optimal leases for each reference in a program to minimize cache misses.

Static Sampling for Locality Analysis   **2018.05-2021.12**
- designs and implements an LLVM compiler pass that predicts the cache performance of loop nests. It specializes the loops to enable static profiling of reuse intervals.

Write Locality   **2016.01-2016.12**
- designs and implements a linear-time algorithm to model cache writebacks from the memory access trace of a program.
- implements a scheduling algorithm to minimize writebacks by grouping co-running programs, with the writeback model.

OpenCL Performance portability   **2012.01-2013.12**
- designs a source-to-source translator based on LLVM infrastructure. It automatically transforms OpenCL kernel for GPU with fine-grained parallelism to vectorized code for CPU.

PUBLICATIONS

[**Draft**] Jun He, Xin Ju, Mei Wen, Yasong Cao, Zhongdi Luo, Jianchao Yang, Jingkui Yang, Gang Li, *Dong Chen*, Jian Cheng. "Accumulation Precision Exploration for Deep Networks with Block Floating Point Arithmetic".

[**Draft**] Yifei Zhang, Dong Chen, Fan Wang, Yan Chen, Xiangjin Kong, Yu-Gang Ma. "Synthesizing Optical Neural Networks with Mach-Zehnder Interferometers"

[**Draft**] Dong Chen, Shaoxin Lin, Muhan Zeng, Daoguang Zan, Jian-Gang Wang, Anton Cheshkov, Jun Sun et al. "CodeR: Issue Resolving with Multi-Agent and Task Graphs". arXiv preprint arXiv:2406.01304 (2024).

[**Draft**] Daoguang Zan, Zhirong Huang, Ailun Yu, Shaoxin Lin, Yifan Shi, Wei Liu, *Dong Chen* et al. "SWE-bench-java: A GitHub Issue Resolving Benchmark for Java". arXiv preprint arXiv:2408.14354 (2024).

[**Draft**] Wenrui Zhang, Tiehang Fu, Ting Yuan, Ge Zhang, Dong Chen, and Jie Wang. "A Lightweight Framework for Adaptive Retrieval In Code Completion With Critique Model." arXiv preprint arXiv:2406.10263 (2024).

[Draft, co-first author] Daoguang Zan, Ailun Yu, Wei Liu, *Dong Chen*, Bo Shen, Wei Li, Yafen Yao, Yongshun Gong, Xiaolin Chen, Bei Guan, Zhiguang Yang, Yongji Wang, Qianxiang Wang, Lizhen Cui. "CodeS: Natural Language to Code Repository via Multi-Layer Sketch". https://arxiv.org/abs/2403.16443

[Draft] *Dong Chen*, Jie Zhao, Wenrui Zhang, Ting Yuan, Jie Wang. "Program Locality Analysis by Synthesizing Symbolic Reuse Intervals".

[MICRO24] Jianchao Yang, Mei Wen, Dong Chen, Zhaoyun Chen, Zeyu Xue, Yuhang Li, Junzhong Shen, Yang Shi. "HyFiSS: A Hybrid Fidelity Stall-Aware Simulator for GPGPUs". 57th Annual IEEE/ACM International Symposium on Microarchitecture.

[JSA23] Hao Ming, Tingting Pan, *Dong Chen*, Chencheng Ye, Haikun Liu, Liting Tang, Xiaofei Liao and Hai Jin. "VIDGCN: Embracing Input Data Diversity with A Configurable Graph Convolutional Network Accelerator". Journal of Systems Architecture.

[TACO22] Chen Ding, *Dong Chen*, Fangzhou Liu, Benjamin Reber, Wesley Smith. "CARL: Compiler Assigned Reference Leasing". ACM Transactions on Architecture and Code Optimization.

[LCPC21] *Dong Chen*, Chen Ding, Dorin Patru. "CLAM: Compiler Leasing of Accelerator Memory". 32nd Workshop on Languages and Compilers for Parallel Computing.

[ISMM21] *Dong Chen*, Chen Ding, Fangzhou Liu, Benjamin Reber, Wesley Smith, and Pengcheng Li. "Uniform Lease vs LRU Cache: Analysis and Evaluation". The 2021 ACM SIGPLAN International Symposium on Memory Management.

[MEMSYS20] Ian Prechtl, Ben Reber, Chen Ding, Dorin Patru, *Dong Chen*. "CLAM: Compiler Lease of Cache Memory". The 6th International Symposium on Memory Systems.

[PPoPP20p] Fangzhou Liu, *Dong Chen*, Wesley Smith, and Chen Ding. "PLUM: static parallel program locality analysis under uniform multiplexing". 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (Poster).

[PhD Thesis] *Dong Chen*. "Program locality analysis based on reuse intervals". University of Rochester, 2019.

[LCPC19] *Dong Chen*, Chen Ding, and Dorin Patru. "CLAM: Compiler leasing of accelerator memory." Languages and Compilers for Parallel Computing: 32nd International Workshop, LCPC 2019, Atlanta, GA, USA, October 22–24, 2019, Revised Selected Papers 32, pp. 89-97. Springer International Publishing, 2021.

[MEMSYS19] *Dong Chen*, Fangzhou Liu, Mingyang Jiao, Chen Ding, Sreepathi Pai. "Statistical Caching for Near Memory Management". 5th International Symposium on Memory Systems.

[PLDI18] *Dong Chen*, Fangzhou Liu, Chen Ding, Sreepathi Pai. "Locality analysis through static parallel sampling". 39th ACM SIGPLAN Conference on Programming Language Design and Implementation. (Artifact evaluated).

[LCPC18] *Dong Chen*, Chunling Hu, Chucheow Lim, Sreepathi Pai, Chen Ding. "POSTER: Static Sampling for GPU Code". 31th International Workshop on Languages and Compilers for Parallel Computing.

[LCPC17] *Dong Chen*, Fangzhou Liu, Chen Ding, Chucheow Lim. "POSTER: Static Reuse Time Analysis Using Dependence Distance". 30th International Workshop on Languages and Compilers for Parallel Computing.

[TACO17] Chencheng Ye, Chen Ding, Hao Luo, Jacob Brock, *Dong Chen*, Hai Jin. "Cache Exclusivity and Sharing: Theory and Optimization". ACM Transactions on Architecture and Code Optimization.

[TACO17] Pengcheng Li, Xiaoyu Hu, *Dong Chen*, Jacob Brock, Hao Luo, Eddy Z Zhang, Chen Ding. "LD: Low-Overhead GPU Race Detection Without Access Monitoring". ACM Transactions on Architecture and Code Optimization.

[MEMSYS16] *Dong Chen*, Chencheng Ye, Chen Ding. "Write Locality and Optimization for Persistent Memory". 2nd International Symposium on Memory Systems

[Frontiers15] Mei Wen, Dafei Huang, Changqing Xun, *Dong Chen*. "Improving performance portability for GPU-specific OpenCL kernels on multi-core/many-core CPUs by analysis-based transformations". Frontiers of Information Technology & Electronic Engineering Vol.16 No.11 P.899-916

[EuroPar14] Dafei Huang, Mei Wen, Changqing Xun, *Dong Chen*, Xing Cai, Yuran Qiao, Nan Wu, Chunyuan Zhang. "Automated Transformation of GPU-Specific OpenCL Kernels Targeting Performance Portability on Multi-Core/Many-Core CPUs". 20th International European Conference on Parallel and Distributed Computing.

[JZUS13] Changqing Xun, *Dong Chen*, Qiang Lan, and Chunyuan Zhang. "Efficient fine-grained shared buffer management for multiple OpenCL devices". Journal of Zhejiang University Science C 14, no. 11 (2013): 859-872.

[AMM13] *Dong Chen*, Hua You Su, Wen Mei, Li Xuan Wang, and Chun Yuan Zhang. "Scalable parallel motion estimation on multi-GPU system". Applied Mechanics and Materials 347 (2013): 3708-3714.

[HPCC13] *Dong Chen*, Changqing Xun, Dafei Huang, Mei Wen, Chunyuan Zhang. "Automatic mapping single-device OpenCL program to heterogeneous multi-device platform". 15th Conference on High-Performance Computing and Communications.

PROFESSIONAL ACTIVITIES

Professional Services: Artifact Evaluation Committee for POPL25, OOPSLA25, PLDI25. Reviewer for VerifAI@ICLR25, JCST. Sub-reviewer for MEMSYS19, ICS19, LCPC18, ICS17, MEMSYS17, NPC17.

Teaching Assistant: Data Structure, Programming Language Design and Implementation, Advanced Compiler.