

HEMING CUI

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Academic Qualification

- PhD, Computer Science, Columbia University, New York, USA, December 2014.
- Master, Computer Science, Tsinghua University, Beijing, China, July 2008.
- Bachelor, Computer Science, Tsinghua University, Beijing, China, July 2005.

Academic Position

- January 2015 ~ now, Assistant Professor, Computer Science, HKU.
- Website: <http://www.cs.hku.hk/people/profile.jsp?teacher=heming>

Relevant Research Work

- Dependable distributed systems: [Crane SOSP '15], [Apus SOCC '17], [Plover NSDI '18].
- Secure and fast big-data computing: [Kakute ACSAC '17], [Confluence TPDS '17].
- Security bug detection: [PLDI '12], [Woodpecker ASPLOS '13], [Owl DSN '18].
- Reliable multi-threading: [Tern OSDI '10], [Peregrine SOSP '11], [Parrot SOSP '13].

Five Most Representative Publications in Recent Five Years

- Cheng Wang, Xusheng Chen, Weiwei Jia, Boxuan Li, Haoran Qiu, Shixiong Zhao, and **Heming Cui**. "PLOVER: Fast, Multi-core Scalable Virtual Machine Fault-tolerance". Proceedings of The 15th USENIX Symposium on Networked Systems Design and Implementation 2018 (**NSDI '18**).
- Jianyu Jiang, Shixiong Zhao, Danish Alsayed, Yuexuan Wang, **Heming Cui**, Feng Liang, and Zhaoquan Gu. "Kakute: A Precise, Unified Information Flow Analysis System for Big-data Security". Proceedings of the Annual Computer Security Applications Conference 2017 (**ACSAC '17**). **Best paper award**.
- Shixiong Zhao, Rui Gu, Haoran Qiu, Tsz On Li, Yuexuan Wang, **Heming Cui**, and Junfeng Yang. "OWL: Understanding and Detecting Concurrency Attacks". Proceedings of the 48th IEEE/IFIP International Conference on Dependable Systems and Networks 2018 (**DSN '18**).
- Feng Liang, F.C.M. Lau, **Heming Cui**, and C.L. Wang. "Confluence: Speeding Up Iterative Distributed Operations by Key-dependency-aware Partitioning". IEEE Transactions on Parallel and Distributed Systems 2017 (**TPDS '17**).
- **Heming Cui**, Rui Gu, Cheng Liu, Tianyu Chen, and Junfeng Yang. "Paxos Made Transparent". Proceedings of the 25th ACM Symposium on Operating Systems Principles (**SOSP '15**).

Other Representative Publications

- Cheng Wang, Jianyu Jiang, Xusheng Chen, Ning Yi, and **Heming Cui**. "APUS: Fast and Scalable PAXOS on RDMA". Proceedings of the ACM Symposium on Cloud Computing 2017 (**SOCC '17**).

- Cheng Wang, Xusheng Chen, Zixu Wang, Youwei Zhu, Heming Cui, and **Heming Cui**. "A Fast, General Storage Replication Protocol for Active-Active Virtual Machine Fault Tolerance". Proceedings of the IEEE 23rd International Conference on Parallel and Distributed Systems 2017 (**ICPADS '17**).
- Junfeng Yang, **Heming Cui**, Jingyue Wu, Yang Tang, and Gang Hu. "Determinism Is Not Enough: Making Parallel Programs Reliable with Stable Multithreading". Communications of the ACM 2014 (**CACM '14**).
- **Heming Cui**, Jiri Simsa, Yi-Hong Lin, Hao Li, Ben Blum, Xinan Xu, Junfeng Yang, Garth Gibson, and Randy Bryant. "Parrot: a Practical Runtime for Deterministic, Stable, and Reliable Threads". Proceedings of the 24th ACM Symposium on Operating Systems Principles (**SOSP '13**).
- **Heming Cui**, Gang Hu, Jingyue Wu, and Junfeng Yang. "Verifying Systems Rules Using Rule-Directed Symbolic Execution". Proceedings of the 18th International Conference on Architecture Support for Programming Languages and Operating Systems (**ASPLOS '13**).
- Jingyue Wu, Yang Tang, Gang Hu, **Heming Cui**, Junfeng Yang . "Sound and Precise Analysis of Parallel Programs through Schedule Specialization". Proceedings of the 33rd ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI '12**).
- **Heming Cui**, Jingyue Wu, John Gallagher, Huayang Guo, and Junfeng Yang. "Efficient Deterministic Multithreading through Schedule Relaxation". Proceedings of the 23rd ACM Symposium on Operating Systems Principles (**SOSP '11**).
- **Heming Cui**, Jingyue Wu, Chia-che Tsai, and Junfeng Yang. "Stable Deterministic Multithreading through Schedule Memoization". Proceedings of the Ninth Symposium on Operating Systems Design and Implementation (**OSDI '10**).
- Jingyue Wu, **Heming Cui**, and Junfeng Yang. "Bypassing Races in Live Applications with Execution Filters". Proceedings of the Ninth Symposium on Operating Systems Design and Implementation (**OSDI '10**).

Research Grants (as a PI)

- "Achieving Strong Fault-tolerance for General Storage Applications via Fast, RDMA-powered PAXOS", the Huawei Innovation Research Program (**HIRP**), 2017~2019, HK \$ 544,000.
- "GAIA: Strengthening the Reliability of Datacenter Computing via Fast Distributed Consensus", HK RGC **GRF** (Ref: HKU 17207117), 2017~2020, HK \$ 500,000.
- "FALCON: Modeling, Detecting, and Defending against Concurrency Attacks", HK RGC Early Career Scheme (**ECS**) (Ref: HKU 27200916), 2016~2019, HK \$ 618,470.
- "RepBox: Transparent State Machine Replication and its Applications", **Croucher Innovation Award**, 2016~2021, HK \$ 5,000,000.

Technology Transfer (Patent)

- Cheng Wang, Xusheng Chen, **Heming Cui**, Weifeng Shen, Long Bai, and Shuzhan Bi. "A Distributed Fault-tolerant Storage System via Virtualized State Machine Replication". Submitted to the Patent Cooperation Treaty (**PCT**), World Intellectual Property Organization (WIPO). Huawei Ref No.: 85714660PCT01.