

# Xusheng CHEN

## EDUCATION

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- **Ph.D candidate in Computer Science, The University of Hong Kong. 2017-CURRENT.**  
Supervisor: Dr. Heming Cui.  
Research interests: distributed systems, fault-tolerant protocols, distributed database and key-value store systems, machine learning training systems, blockchain.
- **Bachelor of Engineering in Computer Science, THE UNIVERSITY OF HONG KONG, 2012-2017**  
Major: Computer Science, Minor: Mathematics, cGPA: 3.7
- **Exchange student at UNIVERSITY OF CALIFORNIA, San Diego, USA. JAN-JUN, 2015.**  
Major: Computer Science and Engineering, GPA: 4.0

## PUBLICATIONS

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- **HAMS: High Availability for Distributed Machine Learning Service Graphs**  
**Xusheng Chen**, Shixiong Zhao, Cheng Wang, Fanxin Li, Ji Qi, Heming Cui, Cheng Li, Sen Wang.  
*Proceedings of the 50th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN '20)*  
**\* Parallel First Author (annotated in the paper's first page)**  
Describes HAMS, an efficient fault-tolerance system for a distributed deployment graph consisting of machine learning serving models (some are stateful) with little performance overhead. HAMS is the first system that can correctly replicate the non-determinism caused by GPU threads on running AI serving models.
- **UPA: An Automated, Accurate and Efficient Differentially Private Big-data Mining System**  
Tzs On Li, Jianyu Jiang, Ji Qi, Chi Chiu So, Jiacheng Ma, **Xusheng Chen**, Tianxiang Shen, Heming Cui, Yuxuan Wang, Peng Wang  
*Proceedings of the 50th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN '20)*  
Describes UPA, the first automated, efficient and precise differentially private big-data mining system that can preserve individual privacy while supporting general Spark big-data queries.
- **Uranus: Simple, Efficient SGX Programming and Its Applications**  
Jianyu Jiang, **Xusheng Chen**, Tzs On Li, Cheng Wang, Tianxiang Shen, Shixiong Zhao, Heming Cui, Cho-Li Wang, Fengwei Zhang  
*Proceedings of the 15th ACM ASIA Conference on Computer and Communications Security (ASIACCS '20)*  
Describes Uranus, the first SGX-compatible and Spark-compatible secure big-data computing system that can practically support typical big-data datasets with our new big-data aware Java memory reuse protocols.
- **Fulva: Efficient Live Migration for In-memory Key-Value Stores with Zero Downtime**  
Jiewen Hai, Cheng Wang, **Xusheng Chen**, Tsz On Li, Heming Cui  
*Proceedings of the 38th International Symposium on Reliable Distributed Systems (SRDS '19)*  
Describes Fulva, an in-memory key-value store migration system that can almost pertain the store's normal-case performance with no downtime during migration.
- **PLOVER: Fast, Multi-core Scalable Virtual Machine Fault-tolerance**  
**Xusheng Chen**, Cheng Wang, Weiwei Jia, Haoran Qiu, Boxuan Li, Shixiong Zhao, Heming Cui  
*Proceedings of The 15th USENIX Symposium on Networked Systems Design and Implementation 2018 (NSDI '18)*  
**\*Parallel First Author (annotated in the paper's first page)**  
Describes PLOVER, a multi-core scalable VM fault-tolerance system built on the Virtualized State Machine Replication (VSMR) concept.
- **A Fast, General Storage Replication Protocol for Active-Active Virtual Machine Fault Tolerance**  
Cheng Wang, **Xusheng Chen**, Zixu Wang, Youwei Zhu, Heming Cui  
*Proceedings of the IEEE 23rd International Conference on Parallel and Distributed Systems (ICPADS '18), 2017*  
Describes Gannet, a replication protocol for efficiently replicating virtual machines

- **Effectively Mitigating I/O Inactivity in vCPU Scheduling**

Weiwei Jia, Cheng Wang, **Xusheng Chen**, Jianchen Shan, Xiaowei Shang, Heming Cui, Xiaoning Ding, Luwei Cheng, F.C.M. Lau, Yuexuan Wang, Yuangang Wang

*Proceedings of the 2018 USENIX Annual Technical Conference (ATC '18), 2018*

Describes vMigrator, a lightweight, easy to use tool that can effectively mitigate I/O inactivity in vCPU scheduling, greatly improving I/O performance in VMs.

- **APUS: Fast and Scalable PAXOS on RDMA**

Cheng Wang, Jianyu Jiang, **Xusheng Chen**, Ning Yi, Heming Cui

*Proceedings of the ACM Symposium on Cloud Computing (SOCC '17), 2017*

Describes APUS, a fast Paxos protocol and its runtime system using fast RDMA features.

- **Eges: Efficient, DoS-resistant Consensus for Permissioned Blockchains.** **Xusheng Chen**, Shixiong Zhao, Cheng Wang, Haoze Song, Jianyu Jiang, Ji Qi, Tsz On Li, T.-H. Hubert Chan, Heming Cui.

*Submitted to IEEE TDSC, under review.*

Describes Edges, an efficient consensus protocol that can hide consensus nodes to defend against targeted DoS attacks in a large-scale permissioned blockchain system.

- **Chronos: Low-latency, Serializable Transaction Processing in Globally-distributed Edge Data Centers** **Xusheng Chen**, Haoze Song, Jianyu Jiang, Heming Cui.

*Submitted, under review.*

Describes Chronos, a fault-tolerant concurrency control protocol that achieves low tail latency and horizontal scalability globally-distributed database deployed in edge data centers.

## TECHNOLOGY TRANSFER (PATENT)

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- A Distributed Fault-tolerant Storage System via Virtualized State Machine Replication.

Cheng Wang, **Xusheng Chen**, Heming Cui, Weifeng Shen, Long Bai, and Shuzhan Bi *Submitted to the Patent Cooperation Treaty (PCT), World Intellectual Property Organization (WIPO).*

*Huawei Ref No.: 85714660PCT01*

- An Efficient and DoS-resistant Consensus Protocol for Permissioned Blockchain Systems.

**Xusheng Chen**, Shixiong Zhao, Cheng Wang, Jianyu Jiang, Heming Cui, Sen Wang, Peng Wang, Gong Zhang

*Owned by Huawei Ltd. Ref No.: 202010247629.1*

- An Efficient Memory Management Approach for Trusted Execution Hardware.

*Owned by Huawei Ltd. Ref No.:*

## WORK EXPERIENCE

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- Researcher Assistant at Center of Cloud Computing & Big Data, Lenovo, Hong Kong. Dec 2015 - Jul 2016

Developed a container/cluster management platform, based on Docker and written in Golang. User can apply for a n-node cluster through the Web-UI, with each node running as a docker container on the backend machines, together with Image management and status monitor features.

- Student Trainee at Global Banking and Markets and HSBC, Hong Kong. Aug 2015 - Nov 2015

Helped project managers to manage the end-to-end delivery of "Change the Bank" initiatives for business—from the creation of business cases, to the post implementation cases, mainly the complicated project involving several departments of the bank.

- Summer Intern at Laboratory of Complex Systems and Intelligence Science, Institute of Automation, Chinese Academy of Science, Beijing. June 2014 - Aug 2014.

Developed a front-end interface for an automatic remote sensor network and agricultural internet of things.

## OTHERS

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- Lee Shaw Kee Scholarships, 2014.

- Three times Deans Honours List, 2014-2015, 2015-2016, 2016-2017.
- Two times project co-leader of Huawei Innovation Research Programs (HIRP).
- Two times Champion in the university basketball league in Hong Kong for mainland China students.