Rui Liu

Ph.D Student · Distributed System & Database

Department of Computer Science, University of Chicago

ruiliu@uchicago.edu | csruiliu.github.io | github.com/csruiliu | www.linkedin.com/in/csruiliu

Education

University of Chicago — *USA*

Ph.D. in Computer Science, with full scholarship — *Aug. 2017 - Present*

- Under the supervision of Prof. Michael J. Franklin (Fellow of ACM) and Prof. Aaron J. Elmore

The Hong Kong Polytechnic University — *Hong Kong SAR, China*

M.Phil. in Computer Science, with full scholarship — *Oct. 2012 - Dec. 2015*

- Under the supervision of Prof. Jiannong Cao (Fellow of IEEE)

Northeastern University — *China*

B.Eng. in Software Engineering, First Honor — *Sep. 2008 - Jun. 2012*

- Under the supervision of Prof. Ruiyun Yu

Experience

Department of Computer Science, National University of Singapore — *Singapore*

Research Assistant, working with Prof. Beng Chin Ooi (Fellow of ACM, IEEE, SNAS) — *Aug. 2016 - June. 2017*

Working on distributed data management, data cleansing, and blockchain

Department of Information Engineering, The Chinese University of Hong Kong — *Hong Kong SAR, China*

Research Assistant, working with Prof. Kehuang Zhang — *Mar. 2016 - Aug. 2016*

Working on system security

Harbin Institute of Technology — *China*

Visiting Student for Big Data Management and Analysis Program — *Jun. 2015 - Jul. 2015*

International Volunteer Program — *Patong Town, Thailand*

International Volunteer, helping to teach people who didn't have normal education chances — *Jul. 2012 - Oct. 2012*

State Key Laboratory of Synthetical Automation for Process Industries — *China*

Assistant Engineer Internship, working on a joint project with State Grid Corporation of China — *Oct. 2011 - Jan. 2012*

Environment Computing Group, IBM China Research Laboratory — *China*

Student Internship, working on Smart City Program for Shenyang City — *Jun. 2010 - Dec. 2010*

Projects

BlockBench: A Framework for Analyzing Private Blockchains — *NUS*

Core Member

- Design and implement BlockBench, the first evaluation framework for evaluating performance of private blockchains
- Conduct comprehensive evaluation of two popular private blockchains: Ethereum and Hyperledger Fabric
- I am responsible for the Hyperledger part, eg., I build Hyperledger in a private network, implement APIs, and conduct evaluation to measure its performance. I am building Eris-DB as well for future work.

GAM: Globally Addressable Memory — *NUS*

Core Member

- Propose a DSM (Distributed Shared Memory) framework based on RDMA (Remote Direct Memory Access), which allows users to view the whole memory from a cluster of servers as a GAM (Globally Addressable Memory)
- I evaluate the current implementation and improve the parallelism of GAM. More specifically, I implement a key-value store test on both GAM and Grappa (another DSM framework) to evaluate them from different perspectives, and optimize communication and reduce contention between different processes to improve GAM's performance.

DICE: A System for Anytime Big Tabular Data Integration and Cleansing *NUS*

Core Member

- Provide an integrating and cleaning approach for tabular data based on machine learning and crowdsourcing
- I concentrate on developing the DICE-Core, which is used to generate optimal execution plans for different workflows, such as schema matching, entity resolution, and data cleansing.

A Large-Scale Investigation on Source Code Protection of Android Apps *CUHK*

Member

- Conduct a comprehensive technical survey on a large-scale Android apps to investigate the usage of protections, including obfuscation, hidden calls and hidden files
- I help to analyze the collected source code of Android apps (more than 100,000) to generate the results based on the metrics we defined for the main protection techniques, including obfuscation, hidden calls and hidden files.

Coordination and Computation in Distributed Intelligent MRS *HK PolyU*

Coordinator

- Develop a programming model to coordinate MRS (Mobile Robots System)
- The most challenging part is to design and implement a programming model supporting time-constraint mechanism
- I work with the team members to develop a proof-of-concept prototype of a declarative programming model for distributed coordination of MRS.

Distributed Proactive Adaptation for Ubiquitous Interactive Objects *HK PolyU*

Core Member & Coordinator in 2015

- Propose a distributed adaptation for Ubiquitous Interactive Objects System (UIO). The development is demanding due to the need of creating, deploying, and testing numerous and heterogeneous smart devices in differing environments and scenarios
- I am a major contributor to the distributed adaptation which allows users to dynamic adding to, deleting from, and updating of the UIO system, collaborating with a research group in University of Mannheim.

A Simulation Environment for Pervasive Networking and Computing *HK PolyU*

Core Member

- Develop a simulation environment for pervasive computing, with a focus on intelligent transportation systems
- I design and implement the communication and interaction part based on OSGi (Open Service Gateway Initiative) and Eclipse RCP (Rich Client Platform) for simulation environment on intelligent transportation systems.

Publication

Conference Anh Dinh, Ji Wang, Gang Chen, **Rui Liu**, Beng Chin Ooi, and Kian-Lee Tan, BLOCKBENCH: A Framework for Analyzing Private Blockchains. ACM International Conference on Management of Data (SIGMOD), Chicago, IL, USA. 2017

Conference Zhe Zhou, Wenrui Diao, Xiangyu Liu, Zhou Li, Kehuan Zhang, **Rui Liu**, Vulnerable GPU Memory Management: Towards Recovering Raw Data from GPU. 17th Privacy Enhancing Technologies Symposium (PETS), Minneapolis, MN, USA. 2017

Conference **Rui Liu**, Jiannong Cao, Sebastian VanSyckel, Wenyu Gao, "PriMe: Human-centric Privacy Measurement based on User Preferences towards Data Sharing in Mobile Participatory Sensing Systems", 14th IEEE International Conference on Pervasive Computing and Communications (PerCom), Sydney, Australia. 2016

Conference **Rui Liu**, Jiannong Cao, Lei Yang, Kehuan Zhang, "PriWe: Recommendation for Privacy Settings of Mobile Apps based on Crowdsourced Users' Expectations", 4th IEEE International Conference on Mobile Services (IEEE MS), New York, USA. 2015

Journal **Rui Liu**, Junbin Liang, Jiannong Cao, Kehuan Zhang, Wenyu Gao, Lei Yang, Ruiyun Yu, "Understanding Mobile Users' Privacy Expectations: A Recommendation-based Method through Crowdsourcing", accepted by IEEE Transactions on Services Computing (TSC), doi:10.1109/TSC.2016.2636285 (Preprint). (IF: 2.365)

Journal **Rui Liu**, Jiannong Cao, Kehuan Zhang, Wenyu Gao, Lei Yang, Junbin Liang, "When Privacy Meets Usability: Unobtrusive Privacy Permission Recommendation System for Mobile Apps based on Crowdsourcing", accepted by IEEE Transactions on Services Computing (TSC), doi:10.1109/TSC.2016.2605089 (Preprint). (IF: 2.365)

Journal Junbin Liang, Jiannong Cao, **Rui Liu**, Tao Li "Distributed Intelligent MEMS: A Survey and a Real-time Programming Framework", ACM Computing Surveys (CSUR), 2016, vol. 49, no. 1, pp. 20:1-20:29; doi:10.1145/2926964. (IF:3.373)

Journal Ruiyun Yu, **Rui Liu**, Xingwei Wang, Jiannong Cao, "Improving Data Quality with Accumulated Reputation Model in Participatory Sensing Systems", Sensors, 2014, 14(3):5573-5594. (IF:2.245)

Honors & Awards

2017 **CERES Graduate Scholar Fellowship, granted by University of Chicago**
This award recognizes first-year graduate students with outstanding research potential

2015 **Second Runner-up of National Java Programming Contest**
Held by Oracle, only ten competitors are selected as finalists

2013 **Honorable Mention of Research Competition in Computing Annual Research Day, COMP@HK PolyU**

2012 **Research Studentship, granted by HK PolyU**
It supported my whole M.Phil study

2012 **Outstanding Graduate of Liaoning Province, China**
Only top 1% graduates are granted the award in Liaoning Province, China

2011 **Google Excellence Scholarship, granted by Google**
Only 3 undergraduate recipients in Northeastern University, I was the only one selected and sponsored by Google to visit its headquarters of China

2011 **First Class Scholarship of Northeastern University**
Only top 3% students can achieve this award

2010 **First Prize of China Undergraduate Mathematical Contest in Modelling, Liaoning Site**

2010 **Second Runner-up of IBM Mainframe Technology National Application Contest**

2009 **Best Mainframe Application Award of Citibank Finance and Information Technology Application Contest**

Services

2014 **Teaching Assistant**, COMP437, Mobile Computing, Spring 2014 *HK PolyU*

2013 **Teaching Assistant**, COMP320, Introduction to Internet Computing, Fall 2013 *HK PolyU*

2013 **Teaching Assistant**, ENG2003, Information Technology, Spring 2013 *HK PolyU*